SABBATICAL REPORT
APRIL 2022

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SABBATICAL REPORT

SABBATICAL LEAVE PROPOSAL
Nancy Che Mahan

1. Briefly state the purpose of your sabbatical leave.

This application for sabbatical leave is to request the time necessary to **create a YouTube channel consisting of quality videos covering all the topics of Math 130 (Intermediate Algebra) as a much-needed OER resource for students and faculty.** This format requires quite a bit of time to thoughtfully plan, create, and edit quality videos for students.

In light of AB 705 which will result in more students being placed in college-level mathematics, many of us in the math department are well aware of the challenges that we will face in our classroom as students may not yet have necessary basic algebra skills. In a recent placement assessment by VSV (Viking Summer Voyage) in Summer 2019, the data showing initial placements of incoming students are as follows.

This data indicates that 41% of students are coming in at a pre-algebra level, 38% at a beginning algebra level, and 15% at an intermediate algebra level. However, most of them will be placed into Math 130 or a college-level math course.

Some math faculty administered a Math 130 Student Support Survey in Spring 2019. 228 students completed it. In this survey, **when asked if the students would watch LBCC-made videos, 63% indicated Yes, and 7% indicated Maybe.**
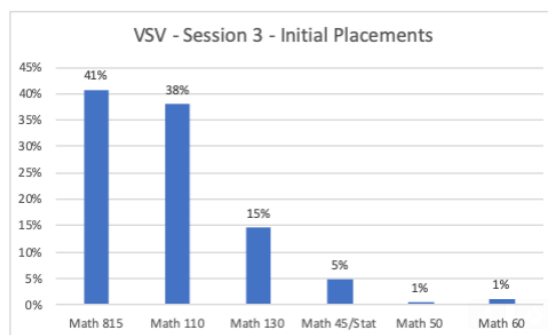
In response to the above math-skill-levels data and the survey of students, the math department has discussed the need to create Algebra math videos made by faculty here at Long Beach City College. However, due to time and resource constraints, many math faculty are unable to do so.

Therefore I would like to use my sabbatical to create an Algebra YouTube channel consisting of quality videos covering all the topics of Math 130 (Intermediate Algebra) as a much-needed OER resource for students and faculty. I have taught these classes every semester during my 7 years here (part-time and full-time), so I am very familiar with the struggles that students face with these topics. I have already created a few videos using my cell phone throughout the semester as the need arouse from students, however to have the time set aside to create a thorough library of videos that are more professionally and creatively made, I believe, will be a valuable resource to the department and to students for years to come.

Although there are many existing math videos available on the internet, having *videos created & taught by an LBCC instructor and in an orderly topical manner that follows our specific course outline, will help LBCC students feel more connected to the college and their courses.* Furthermore, as we've been learning about the importance of equity & representation, it can be powerful to have increase diversity in the existing library of math videos out on the internet. I'd like to add to the online resource with my voice, face, gender, ethnicity, and teaching style, in hopes that this would reach out to more diverse students.

2. Give all pertinent details of your proposed plan. This should include all activities, projects, research, itinerary, study, employment, expected outcomes, relationships with current coursework, etc. connected with your proposed leave.

In an article about Khan Academy (https://www.huffpost.com/entry/does-khan-academy-really_b_946969), Shantanu Sinha describes some of the principles that makes online math videos such as Khan Academy so successful with students. Some of these principles are:
- Students are free to learn anytime, anywhere
- Students can jump to where help is needed most, and spend as much time as necessary to master concepts
- The content is short, fun, approachable, and easily digestible
- There is a clear and continuous path to learning complex topics

My videos will have the following components:
- Free access.
- Uploaded onto a You-Tube channel with clear topic headings
- Links to the You-Tube channel and videos, with topics listed in order, will be in Canvas for both faculty and student access.
- I will be in the video. In my studies about equity, it can be powerful for students to see mathematics being taught by an Asian-American woman.
- Closed-caption.
- No more than approximately 7 minutes long per video
- Each topic will consist of an explanation / lecture of the topic along with 3 levels of examples: Easy, Medium, Difficult. Each of these would take no more than 7-minutes. So each topic may have 4-5 videos for it.

I am already familiar and competent with creating videos and uploading them to the internet. For the past several years, I have been using my cell phone to create videos and uploading them on YouTube whenever my students needed help on a homework problem. YouTube provides free closed captioning, however if need be I will contact the LBCC Instructional Media Production Services Department for any further help with the closed caption portion or video support.

I will be using the LBCC Math 130 course outline topics, which consists of approximately 52 topics. I plan on creating at least 3-4 videos per topic, which will result in 156-208 videos.

3. Provide a timeline indicating how the activities in your plan will be completed within the time frame of the proposed leave.

According to LBCC's course outline, Math 130 is broken up into 9 main chapters or sections. I will create videos for each chapter covering the topics and examples. To accomplish this task, I plan to work on the Math 130 course outline topics according to the following timeline:

September 2020
    I.   Equations and Inequalities
        A. Solving Linear Equations
        B. Problem Solving and Using Formulas
        C. Applications involving Linear Equations
        D. Solving Linear Inequalities
        E. Absolute Value Equations and Inequalities

    II.   Graphs and Functions
        A. Introduction to Cartesian Coordinate System and Graphs
        B. Functions and Their Properties
        C. Graphs of Linear Functions and Their Applications
        D. Equations and Graphs of a Line Using Slope-intercept Form
        E. Equations of a Line Using Point-slope Form
        F. The Algebra of Functions
        G. Graphing Linear Inequalities

October 2020
    III.   Systems of Equations and Inequalities
        A. Solving 2X2 Systems of Linear Equations

B. Solving 3X3 Systems of Linear Equations
C. Applications Involving System of Linear Equations in 2 Variables and 3 Variables
D. Solving Systems of Linear Inequalities

November 2020
IV.   Polynomials and Polynomial Functions
A. Addition and Subtraction of Polynomials
B. Multiplication of Polynomials
C. Division of Polynomials
D. Factoring GCFs and by Grouping
E. Factoring Trinomials
F. Special Factoring Formulas
G. Polynomial Equations

December 2020
V.   Rational Expressions and Equations
A. Domains, Mult./Div. of Rational Fns.
B. Add./Subtr. of Rational Expressions
C. Complex Fractions
D. Solving Rational Equations
E. Applications involving Rational Equations
F. Variation

February 2021
VI.   Roots, Radicals, and Complex Numbers
A. Roots and Radicals
B. Rational Exponents
C. Simplifying Roots
D. Add, Subtract, and Multiply Roots
E. Dividing Roots
F. Equations Involving Roots
G. Complex Numbers

March 2021
VII.   Quadratic Functions
A. Solving by Completing the Square
B. Solving by the Quadratic Formula
C. Applications of Quadratic Equations
D. Solving Equations in Quadratic Form
E. Graphing Quadratic Functions
F. Inequalities Involving Polynomials or Rational Polynomials

April 2021
VIII.   Exponential and Logarithmic Functions
A. Composite and Inverse Functions
B. Exponential Functions
C. Logarithmic Functions
D. Properties of Logarithms
E. Common Logarithms
F. Exponential and Logarithmic Equations
G. Natural Exponential and Log. Functions

May 2021
IX.   Conic Sections
A. The Parabola and the Circle
B. The Ellipse and the Hyperbola
C. Nonlinear System of Equations and their Applications

June 2021 – I will prepare the finalized videos and report to present when I return.

4. Describe how the proposed leave will contribute to your professional development, including how it relates to your current assignment.

This sabbatical project will enhance my development as a math professor since it gives me an online resource to give to my students whenever I teach my math classes.

5. Describe how the proposed leave will benefit the college and students.

I believe this project will be a great asset and resource to the students for years to come as they take math courses. Especially in light of AB 705, students will be searching for basic math assistance as they're taking their college level courses. Having videos taught by an LBCC instructor and in an orderly topical manner that follows our course outline will hopefully help students feel more comfortable and connected to the college.

6. List and describe the specific, tangible products you will bring to the college within 90 days after you return to your assignment.

Upon returning from sabbatical, I will provide a link to the You-Tube channel which will house all videos. I will also have an online website outlining the topics and examples from the videos, so that any faculty or student who would like to use these videos can have access to them and see all the topics and links.

These videos would be a free resource (OER) for students and faculty to use, either to supplement their learning, use as an instructional tool by faculty, and/or anything in between.

In a short survey / questionnaire sent out to the math department about the creation of this math YouTube channel created by an LBCC math faculty, full-time and adjunct faculty indicated that they are interested in using these videos in the following ways:

- Videos may be used by math faculty as a resource to see another professor's approach to teaching an Algebra topic
- Faculty may provide videos as an OER supplemental learning resource for their students outside of class time
- Faculty may use videos as an OER Instructional use during class time or for math distance learning classes
- Faculty may embed OER videos into course material
- Video channel can be used a resource to direct students in the success center as a trusted resource that could help students throughout the rest of their courses once students have been shown its existence.
- Videos may be a launch pad for math faculty to create videos for other courses such as Statistics

7. Describe how you will share the outcomes of your proposed leave with other interested parties upon your return.

I have already briefly discussed this project with my chair, and she is in full support of the creation of these videos. We recently had a Math 130 meeting this past summer 2019 to discuss what resources we can provide for students, and the topic of creating videos was discussed and embraced in our department.

Upon return from my sabbatical, I will upload the video links onto our Math Faculty Canvas page with topics and description under each video. I would lead a workshop (most likely during one of our Department College hour) to introduce faculty members to the YouTube channel, showing them how to access it and how to share it with their students. If there is any interest outside of the department, I would be happy to share with any interested parties as well.

Approximately 35 math faculty (full-time & adjuncts) have already expressed interest in attending a presentation about this YouTube channel to learn about how it was created and how to utilize it in their classes. I would do a presentation the semester upon my return at a Department College Hour, and send an email out to the department regarding this. The presentation would include instructions on how to use the YouTube Channel, the topics that are being presented and its order, and suggestions of ways that faculty can use it.

8. If applicable, please disclose any additional sources of employment earnings during the proposed leave.
Non-Applicable at this time.

Nancy Che Mahan   August 28, 2019
_____   _____
Signature of Applicant   Date Originally Submitted

SECTION 2:
BRIEF SUMMARY OF THE SABBATICAL PROJECT

PURPOSE OF SABBATICAL

The purpose of my sabbatical was to create a cohesive and sequential online resource of math videos covering all topics of algebra as an OER resource for students and faculty. The intent was to help students have a creative, relevant, and effective mode of learning and experiencing algebra.

With these videos, students are free to learn anytime, anywhere. Students can jump to where help is needed most, and spend as much time as necessary to master concepts, The content is short, fun, approachable, and easily digestible, and there is a clear and continuous path to learning complex topics.

Another purpose was to provide math educators an engaging library of math videos and corresponding math worksheets that would reach this generation of students, consisting of thoughtfully sequential videos and worksheets that are accessible and free to all and that can be used to replace expensive math textbooks.   The videos mostly consist of lectures from Dr. Nancy Che Mahan, a Vietnamese-American woman teaching mathematics at Long Beach City College.   Adding to the library of existing videos, having more diversified math teachers can be powerful in reaching out to a diverse population of learners.

About this Project

Video Link: https://youtu.be/x-IVA13U4-A

LIST THE TANGIBLE PRODUCTS YOU ARE BRINGING TO THE COLLEGE.

I started off just wanting to create videos. As I continued along and as the shutdown occurred 2020-2021, I expanded my project by creating a Canvas Course shell for math faculty to use for online and/or hybrid teaching with multiple resources.

- "Math Rocks!": This is my Algebra YouTube channel consisting of a library of sequential lecture videos covering all the topics of Algebra as an OER resource for students and faculty.
    - Canvas Course: These videos are outlined sequentially in a Canvas Algebra shell course.
    - As I progressed with making the videos, I saw the need to not only cover Intermediate Algebra, but also Beginning Algebra as well (Math 110 and Math 140). These videos are applicable to all of College Algebra courses (Math 45) and other higher level and tranfer-level mathematics courses that require basic algebra skill review.
    - I created 14 Modules that cover the entire content of Beginning & Intermediate Algebra according to our LBCC Course Outline, which amounts to 255 topics. There is at minimum one video for each topic, so I created over 255 videos. All of my videos are approximately 5-7 minutes along.

- Corresponding Worksheets: In addition to the videos, I put together math worksheets using ALEKS (an online homework & testing system) for each module and each video, which consists of every problem covered in that topic, totaling 14 Modules and 255 topics. The videos mirror the worksheets where students can follow along.
- Library of Homework, Quizzes, and Exams, using ALEKS (an online math system) all correspond to the videos and are a smooth cohesive pathway for students to study, practice, and get assessed.
- Online discussion forums and class project ideas for faculty to use in their classes
- Sample welcoming syllabus with flexible due dates for students

BRIEF DESCRIPTION OF HOW THE OBJECTIVES OF THE PROPOSAL WERE MET.

This current semester, Spring 2022, I implemented all of the above into all three of my algebra courses that I was teaching. This greatly eliminated the need for costly textbooks, and opened up access for students to learn math in various settings. Finding resources to learn algebra became a clear path for students as everything was laid out in an accessible, creative, and relevant manner.

BRIEFLY DESCRIBE HOW THE SABBATICAL BENEFITED YOU PROFESSIONALLY.

Creating the YouTube videos, worksheets, and the Canvas shell has benefited me professionally by challenging me to get more technologically savvy. I have learned so much about creating videos, using YouTube, using Canvas, and has given me much more confidence to try new technology in my profession so that I can be more relevant with my students. Also, when I returned from my sabbatical, having all of these resources created for my algebra classes freed me up to go extra and beyond my normal teaching routines by spending more time in-class with active learning activities and reaching out to struggling individual students.

BRIEFLY DESCRIBE HOW THE RESULTS OF YOUR SABBATICAL BENEFITED THE COLLEGE AND STUDENTS, INCLUDING METHODS OF INSTRUCTION OR SERVICES TO STUDENTS.

In recent student evaluations and feedback from this semester in the courses that I implemented these videos and worksheets, my students have expressed how much these videos and worksheets helped them learn algebra! It also allows students to have more flexibility with learning math; It is a useful tool aiding with online, hybrid, and in-class learning. In my detailed report below, I share some of the quoted feedback from students.

I will also be presenting my sabbatical project in a math department meeting in the near future to share of the resources. Even though Beginning and Intermediate Algebra will no longer be offered by LBCC starting Fall 2022, many of the topics overlap with topics in College Algebra and are pre-requisite skills for upper-level math classes such as Calculus.

The elimination of remedial basic algebra classes due to AB 705 is a challenge for the math department as we face teaching students college-level mathematics while their basic math skills are still in development. Thus, this project can be used to supplement students' learning and fill in the gaps of algebra skills needed to succeed in transfer-level mathematics.

Furthermore, this platform can be used as a model for other math courses to build upon.

ADDITIONAL COMMENTS.

Thank you to the Board and the Sabbatical committee for granting me this opportunity to work on this sabbatical project! In the future, I hope to have more opportunities to continue this work of creating more math videos, worksheets, and resources in other math courses.

SECTION 3:
RESULTS OF THE PROJECT

I created an Algebra YouTube channel consisting of a library of sequential lecture videos covering all the topics of Algebra as an OER resource for students and faculty.

As I progressed with making the videos, I saw the need to not only cover Intermediate Algebra, but also Beginning Algebra as well (Math 110 and Math 140). These videos are applicable to all of College Algebra courses (Math 45) and other higher level and tranfer-level mathematics courses that require basic algebra skill review.

These videos are uploaded on a YouTube channel entitled "Math Rocks!" and are outlined sequentially in a Canvas Algebra shell course. With these videos, students are free to learn anytime, anywhere, students can jump to where help is needed most, and spend as much time as necessary to master concepts. The content is short, fun, approachable, and easily digestible, and there is a clear and continuous path to learning complex topics.

I created 14 Modules that cover the entire content of Beginning & Intermediate Algebra according to our LBCC Course Outline, which amounts to 255 topics. There is at minimum one video for each topic, so I created over 255 videos. All of my videos are approximately 5-7 minutes along.

I am in all the videos, providing a consistent style of teaching throughout the course. I have been teaching approximately 44 Algebra courses in the span of 11 years, interacting with approximately over 2,000 students, and thus have much experience and insight upon the common struggles or stumbling blocks students face as in each algebra topic that I teach. In my videos, I am able to teach, address, and explain some of the common pitfalls.

In addition to the videos, I have created math worksheets for each module, which consists of every problem covered in that topic, totaling 14 Modules and 255 topics. For example, Module 1 has 23 topics for students to master. I provide a worksheet with 23 problems that cover each topic in Module 1. I have 23 videos uploaded onto YouTube and onto our Canvas course under Module 1, with every topic and problem taught and solved by me.

This semester Spring 2022, I taught three Math 140 classes in which I applied this sabbatical project as follows:

- I implemented my created Canvas course with the videos and worksheets into all three classes.
- Each week, I hand out a new worksheet for the module we are covering. I not only lecture on them, I also intersperse my live lecture with the videos.
- The #1 complaint that math teachers get is that the lecture goes too fast. Too much information is presented in one sitting and students have a hard time following along. Therefore, since my videos are available online, I am able to not only slow down on my lectures but also allow for much more student participation, group work, and creative classroom activities, on other words, more active learning occurs during our meeting times.
- Making the videos available to my students on Canvas and YouTube, students who miss class can easily get caught up at home if they missed class or go over any topics that they did not understand completely during class.
- Free to all students, whether they are learning in class or online, students have access to the library of algebra videos and worksheets.
- The videos and the worksheets are thoughtfully and intentionally sequential.
- Students don't need to search the internet looking for videos to learn a topic taught by a random person. They can now have access to the same instructor teaching in a sequential thoughtful manner, with worksheets in front of them so that they can follow along.
- Furthermore, students don't need to watch all the videos. They can complete as much of the worksheets on their own, and when they get stuck on a problem, they can go to the video that corresponds with that problem and watch a quick 7-minute video that they can pause and watch at their own pace. Students are more apt to watch short clips to get immediate help than hours of lecture covering topics that are going too slow or too fast for them.
- This prepares them to do their homework, their tests, and ultimately, understand algebra.

What does this Project consist of?

Video Link: https://www.youtube.com/watch?v=36jLG1lkZfA&t=1sV

Video Timestamps:

- 0:00 Introduction to Project
- 1:22 Weekly Modules
- 3:32 Videos & Worksheets
- 7:49 "YouTry" Homework
- 9:37 Quiz Yourself
- 11:37 Additional Resources
- 12:06 Discussion Forum Ideas
- 14:20 Sample Syllabus & Course Calendar
- 17:07 ALEKS Course Shell
- 18:57 Last Remarks

In this project, you will find:

- **14 MODULES:** 14 Modules covering all of the topics in Beginning and Intermediate Algebra. (Ideally, one module is to be assigned per week, leaving 2 weeks of the 16-week semester for studying for the final exam and/or for students to catch up on missed work.). A few extra things to note about the Modules:
  - *Module 1 is a review of Pre-Algebra and Beginning Algebra. Even if you are teaching Math 130 Intermediate Algebra, I have found this to help students start off on a more confident note as they are doing math that looks familiar to them, and it is an important on-ramp to Algebra to give them a one-week refresher of Arithmetic Readiness (Real Numbers, Order of Operations, Fractions, etc.). Furthermore, the first week of online learning is a learning curve for students to adjust to new platforms, structures, policies, etc., so having "easier" material during the first week can help ease them into online learning and set them up for success.*
  - *I have thoughtfully and mindfully created these modules and number of topics after teaching this class for many years and constantly tweaking it every semester. For example, I have noticed that students struggle the most when they get to topics such as Rationals, hence I split Rationals into two weeks (Part A and Part B), which allows those who did not fully grasp the previous module on Factoring, another chance to catch up and learn.*
  - *Some weeks have less topics than others, and intentionally so, to help students catch up. If you look at my suggested course calendar, I have included "Catch Up" days during those weeks to give students breathing space.*

- **VIDEOS & WORKSHEET:** Under each Module is a worksheet that has problems & answers that align with each of the of the topics in that module, along with YouTube videos covering each problem on that worksheet. The YouTube videos are recorded in a way in which the material is being taught (not just a problem being solved). Each of the videos are less than 7-minutes long to help students learn each topic one-by-one without getting overwhelmed. Having the worksheets in front of them, students can easily follow along the videos and take notes.

- **YOU TRY:** Based on the instructor's preference, students can now do their homework either online using ALEKS or with printed out worksheets. If a teacher is using ALEKS (my preferred method), I have already created an ALEKS Course Shell for this class with all modules and all problems to align with the above videos and topics. Please contact me if you'd like me to send you a copy of this ALEKS Course Shell.   If you prefer students doing homework by hand, worksheets with answer keys aligning with the exact topics shown in the videos are provided.

- **QUIZ YOURSELF:** Here is a chance for students to assess their understanding before taking the weekly module exam! The quiz is on ALEKS and/or is provided here as a hard-copy, and consists of the main concepts from the module. Quizzes generally consist of approximately 10 questions. On ALEKS, I've scheduled the quizzes to be available every Friday - Sunday, in which students can take the quizzes an unlimited number of times to help them prepare for the exam. The exam itself is every Monday, and is very similar to the quiz.

- **ADDITIONAL VIDEO RESOURCES (optional):** For students who need to see more examples, here I have created additional videos solving more problems for the week's module. Here, I also include other YouTube videos created by other math instructors that I found to be well taught and well explained. Sometimes it is helpful for students to hear a topic being taught from a different voice, perspective, method. Furthermore, I have tried to find videos that are diversified in ethnicity, gender, personalities, teaching methods, to make mathematics more welcoming to a diverse student population.

Additional Resources:

- ALEKS Course Shell with Homework, Quizzes, and Exams, that correspond with this project's Videos and Worksheets
- Sample / Suggested Course Syllabus and Calendar that correspond with this project
- Interactive Weekly Discussion Forums and Class Project Ideas
- Dr. Nancy Mahan's Biography and Contact Information

SECTION 4:
PROFESSIONAL BENEFITS

Creating the YouTube videos, worksheets, and the Canvas shell has benefited me professionally by challenging me to get more technologically savvy. I have learned so much about creating videos, using YouTube, using Canvas, and has given me much more confidence to try new technology in my profession so that I can be more relevant with my students. Also, when I returned from my sabbatical, having all of these resources created for my algebra classes freed me up to go extra and beyond my normal teaching routines by spending more time in-class with active learning activities and reaching out to struggling individual students.

SECTION 5:
BENEFIT TO STUDENTS

As it is widely known, the majority of students stumble in mathematics and mathematics unfortunately becomes a frustrating gatekeeper to students who are looking for a degree.

More and more students are using technology and videos as a learning tool, and in light of increased online and hybrid learning due to recent events, this need for a cohesive library of math videos is even more relevant and pertinent than I had first envisioned. Furthermore, as we've been learning about the importance of equity & representation, I am increasing diversity in the existing library of math videos out on the internet. I have added to the online resource with my voice, face, gender, ethnicity, and teaching style, in hopes that this would reach out to more diverse students.

Although there are many existing math videos available on the internet, having videos created & taught by an LBCC instructor in an orderly topical manner that follows our specific course outline, will help LBCC students feel more connected to the college and their math courses.

This current semester, Spring 2022, I implemented the videos & corresponding worksheets into all three of my algebra courses that I was teaching. This greatly eliminated the need for costly textbooks, and opened up access for students to learn math in various settings. Finding resources to learn algebra became a clear path for students as everything was laid out in an accessible, creative, and relevant manner.

In recent student evaluations from this semester, students wrote:
- *"Providing videos mirroring the worksheet is an excellent resource in understanding the material."*
- *"I like the style of the class. I'm not a STEM major and I struggled with math in the past. Professor Mahan's teaching style and ALEKs along with online videos are making a 6 unit math class manageable."*
- *"Professor Mahan's YouTube videos is going the extra mile for student success."*
- *"She has this down pat. I signed up for her in the following semester."*
- *"Prof. Mahan has been one of the best professor's I've had so far. Extremely engaged with her students, and really wants her students to do well."*
- *"Professor Mahan is awesome! I have always hated math and feared taking this class. Prof. Mahan has made math fun (if that's possible) and interesting. She really has a good way of explaining things and giving us each step and explaining things clearly. I honestly look forward to taking another math class with her for the Fall semester."*
- *"Amazing professor. Knowledgeable, Communicative. Communication is her strong trait."*
- *"This class is a hybrid class. The professor is an amazing instructor. She really cares and is eager for her students to learn the material. Explains the math problems in ways we can all understand them."*
- *"Professor Mahan is on top of her game."*

Based on the feedback, I can see that my students have benefited from this sabbatical project. Creating videos covering each problem of a worksheet that mirrors the homework, quizzes, and tests, has been incredibly helpful for students.

The elimination of remedial basic algebra classes due to AB 705 is a challenge for the math department as we face teaching students college-level mathematics while their basic math skills are still in development. Thus, this project can be used to supplement students' learning and fill in the gaps of algebra skills needed to succeed in transfer-level mathematics.

SECTION 6:
BENEFITS TO THE COLLEGE

I will be presenting my sabbatical project in a math department meeting in the near future to share of my project and the resources. Even though Beginning and Intermediate Algebra will no longer be offered by LBCC starting Fall 2022, many of the topics overlap with topics in College Algebra and are pre-requisite skills for upper-level math classes such as Calculus. Faculty will be able to use any of these videos and worksheets for their classes. Furthermore, this platform can be used as a model for other math courses to build upon.

As it is widely known, the majority of students stumble in mathematics and mathematics unfortunately becomes a frustrating gatekeeper to students who are looking for a degree. When more students are able to understand and pass their math classes, particularly the early math classes, there is more likelihood of students graduating.

Creating videos covering each problem of a worksheet that mirrors the homework, quizzes, and tests, has been incredibly helpful for students. This platform can be used as a model for other math (or non-math) courses to build upon. Other instructors are welcome to use these videos, however, they may want to consider making their own videos based on the worksheets provided in replacement of my videos, so that their students can see and hear from them personally.

Lastly, having an experienced LBCC faculty add to the plethora of videos on the internet enforces our LBCC's mission and values of providing equitable student learning and achievement by providing these supportive resources to our diverse communities. These videos and worksheets create a clear pathway in the classroom to help students succeed in a flexible and accessible manner.

SECTION 7:
TANGIBLE PRODUCT

I. CANVAS COURSE SCREENSHOTS
Below are screenshots of the Canvas Course shell I created for Algebra.
This Canvas shell also explains to other faculty how to use this Canvas shell and the resources in it.

Beginning and Intermediate Algebra SHELL ⚡   🖋 Edit   ⋮

INTRO TO THIS PROJECT	WEEKLY MODULES	SAMPLE SYLLABUS & COURSE CALENDAR	"MATH ROCKS" YOUTUBE VIDEOS	ALEKS COURSE SHELL	INTERACTIVE DISCUSSIONS & CLASS PROJECT IDEAS	CONTACT INFO & BIO

About this Project ⚌

Introduction

This resource is intended to serve as an Open Education Resource (OER) for anyone teaching or studying Beginning and Intermediate Algebra (Math 110, Math 130, or Math 140). Much of the content here can also be applied to College Algebra (Math 45) and can be a very helpful algebra refresher for Calculus students (Math 60).

In a fast-changing culture of technology and media, and the limitations of face-to-face classes, more and more students prefer to watch videos as their main method of learning. Visual and audio connection, and the ability to pause or re-watch, allow students to have more control and flexibility of learning at their own pace.   Especially with mathematics where students struggle greatly both with psychological anxiety and with basic math skills, the ability to comfortably learn at their own pace through media, can be empowering and supportive.

However, one of the challenges students face with watching online videos, is finding the right videos to correlate with what they're suppose to learn. The challenge for teachers is to provide sequential quality mathematics videos that teach the material, and not just solve problems. The search for the right video is time-consuming and can be frustrating for both educator and students.

Deeper understanding and retainment of information occurs when students take notes and follow along with videos. To this end, having sequential worksheets with problems to follow along with the videos is an incredibly supportive resource.

Having taught Beginning and Intermediate Algebra online for a good amount of time, I have taken these thoughts, my own best proven practices, and feedback from many students, to create this project.

Purpose

The purpose of this project is to provide math educators an engaging library of math videos and corresponding math worksheets that would reach this generation of students, consisting of thoughtfully sequential videos and worksheets that are accessible and free to all and that can be used to replace expensive math textbooks.   The videos mostly consist of lectures from Dr. Nancy Che Mahan, a Vietnamese-American woman teaching mathematics at Long Beach City College.   Adding to the library of existing videos, having more diversified math teachers can be powerful in reaching out to a diverse population of learners.

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In this project, you will find:

- **14 MODULES:** 14 Modules covering all of the topics in Beginning and Intermediate Algebra. (Ideally, one module is to be assigned per week, leaving 2 weeks of the 16-week semester for studying for the final exam and/or for students to catch up on missed work.). A few extra things to note about the Modules:
  - *Module 1 is a review of Pre-Algebra and Beginning Algebra. Even if you are teaching Math 130 Intermediate Algebra, I have found this to help students start off on a more confident note as they are doing math that looks familiar to them, and it is an important on-ramp to Algebra to give them a one-week refresher of Arithmetic Readiness (Real Numbers, Order of Operations, Fractions, etc.). Furthermore, the first week of online learning is a learning curve for students to adjust to new platforms, structures, policies, etc., so having "easier" material during the first week can help ease them into online learning and set them up for success.*
  - *I have thoughtfully and mindfully created these modules and number of topics after teaching this class for many years and constantly tweaking it every semester. For example, I have noticed that students struggle the most when they get to topics such as Rationals, hence I split Rationals into two weeks (Part A and Part B), which allows those who did not fully grasp the previous module on Factoring, another chance to catch up and learn.*
  - *Some weeks have less topics than others, and intentionally so, to help students catch up. If you look at my suggested course calendar, I have included "Catch Up" days during those weeks to give students breathing space.*
- **VIDEOS & WORKSHEET:** Under each Module is a worksheet that has problems & answers that align with each of the of the topics in that module, along with YouTube videos covering each problem on that worksheet. The YouTube videos are recorded in a way in which the material is being taught (not just a problem being solved). Each of the videos are less than 7-minutes long to help students learn each topic one-by-one without getting overwhelmed. Having the worksheets in front of them, students can easily follow along the videos and take notes.
- **YOU TRY:** Based on the instructor's preference, students can now do their homework either online using ALEKS or with printed out worksheets. If a teacher is using ALEKS (my preferred method), I have already created an ALEKS Course Shell for this class with all modules and all problems to align with the above videos and topics. Please contact me if you'd like me to send you a copy of this ALEKS Course Shell. If you prefer students doing homework by hand, worksheets with answer keys aligning with the exact topics shown in the videos are provided.
- **QUIZ YOURSELF:** Here is a chance for students to assess their understanding before taking the weekly module exam! The quiz is on ALEKS and/or is provided here as a hard-copy, and consists of the main concepts from the module. Quizzes generally consist of approximately 10 questions. On ALEKS, I've scheduled the quizzes to be available every Friday - Sunday, in which students can take the quizzes an unlimited number of times to help them prepare for the exam. The exam itself is every Monday, and is very similar to the quiz.
- **ADDITIONAL VIDEO RESOURCES (optional):** For students who need to see more examples, here I have created additional videos solving more problems for the week's module. Here, I also include other YouTube videos created by other math instructors that I found to be well taught and well

- **ADDITIONAL VIDEO RESOURCES (optional):** For students who need to see more examples, here I have created additional videos solving more problems for the week's module. Here, I also include other YouTube videos created by other math instructors that I found to be well taught and well explained. Sometimes it is helpful for students to hear a topic being taught from a different voice, perspective, method. Furthermore, I have tried to find videos that are diversified in ethnicity, gender, personalities, teaching methods, to make mathematics more welcoming to a diverse student population.

Note to instructors: You are more than welcome to use my videos that I have created. However, you may want to consider making your own videos based on the worksheets provided in replacement of my videos, so that your students can see and hear from you. This is very time-consuming, but if you do a few a semester, it'll add up!

Additional Resources:

- ALEKS Course Shell with Homework, Quizzes, and Exams, that correspond with this project's Videos and Worksheets
- Sample / Suggested Course Syllabus and Calendar that correspond with this project
- Interactive Weekly Discussion Forums and Class Project Ideas
- Dr. Nancy Mahan's Biography and Contact Information

There are 14 Modules I created on Canvas covering all 255 topics of Beginning and Intermediate Algebra. Each of the "Math Rocks" videos for the modules are shown below, and the videos are hyperlinked. Corresponding worksheets are attached to each Module.

▾ Module 1: Algebra Readiness (23 topics)

- WATCH - Math Rocks! YouTube Videos for Module 1: Algebra Readiness
- YOU TRY - Worksheet Problems for Module 1
- QUIZ - Module 1
- Additional Videos for extra help - Module 1

▾ Module 2: Linear Equations and Inequalities (24 topics)

- WATCH - Math Rocks! YouTube Videos for Module 2: Linear Equations & Inequalities
- YOU TRY - Worksheet Problems for Module 2
- QUIZ - Module 2
- Additional Videos for extra help - Module 2

▾ Module 3: Lines and Functions (26 topics)

- WATCH - Math Rocks! YouTube Videos for Module 3: Lines and Functions
- YOU TRY - Worksheet Problems for Module 3
- QUIZ - Module 3

▾ Module 4: Systems of Equations (15 topics)

- WATCH - YouTube Videos for Module 4: Systems of Equations (15 topics)
- YOU TRY - Worksheet Problems for Module 4
- QUIZ - Module 4

Module 5: Exponents & Polynomials

WATCH - YouTube Videos for Module 5: Exponents & Polynomials (25 topics)

YOU TRY - Worksheet Problems for Module 5

QUIZ - Module 5

Module 6: Factoring

WATCH - Math Rocks! YouTube Videos for Module 6 - Factoring (19 topics)

YOU TRY - Worksheet Problems for Module 6

QUIZ - Module 6

Module 7: Rationals Part A

WATCH - Math Rocks! YouTube Videos for Module 7 - Rationals Part A (19 topics)

YOU TRY - Worksheet Problems for Module 7

QUIZ - Module 7

Module 8: Rationals Part B

WATCH - YouTube Videos for Module 8 - Rationals Part B (12 topics)

YOU TRY - Worksheet Problems for Module 8

QUIZ - Module 8

▾ Module 9: Radicals Part A

WATCH - Math Rocks! YouTube Videos fo Module 9 - Radicals Part A (17 topics)

YOU TRY - Worksheet Problems for Module 9

QUIZ - Module 9

▾ Module 10: Radicals Part B

WATCH - YouTube Videos for Module 10 - Radicals Part B (20 topics)

YOU TRY - Worksheet Problems for Module 10

QUIZ - Module 10

▾ Module 11: Quadratics

WATCH - YouTube Videos for Module 11 - Quadratics (17 Topics)

▾ Module 12: Functions & Exponentials

WATCH - YouTube Videos for Module 12 - Functions & Exponentials (12 Topics)

▾ Module 13: Logarithms

WATCH - YouTube Videos for Module 13 - Logarithms (14 Topics)

▾ Module 14: Conics

WATCH - YouTube Videos for Module 14 - Conics (12 Topics)

This is a screenshot of YOU TRY worksheets that provide additional practice for students as homework!

YOU TRY - Worksheet Problems for Module 1

Here's your chance to practice what you learned!

Teachers: Use whichever method of homework that works best for your class. I prefer using ALEKS and have created an ALEKS course shell with all the homework assignments corresponding to the videos. Please contact me NMahan@lbcc.edu if you would like a copy of this course shell! If you would rather your students do worksheets by hand, I've included a worksheet below:

ALEKS

This week's homework on ALEKS correspond with the topics covered in the videos for this module. Homework is assigned each week and is due every Friday. There is a grace period until Sunday midnight if needed.

WORKSHEET

Here you'll find a new set of problems that correspond with the topics covered in the videos for this module. Answer sheets are at the end.

This is a screenshot of a Quiz after each module that is similar to the videos and worksheets that they worked on. This prepares them for the Exam!

QUIZ - Module 1 ⇗

#204237911

Here's your chance to test what you learned & prepare for the exam!

Teachers: Use whichever method of exam prep that works best for your class. I prefer using ALEKS and have created an ALEKS course shell with all the homework assignments corresponding to the videos. Please contact me NMahan@lbcc.edu if you'd like a copy of this course shell! If you prefer your students doing a quiz by hand, I've included a quiz below:

ALEKS QUIZ ⇗

Each week's quiz is available every Thursday and is due by Monday midnight. You may take it an unlimited number of times, untimed. Use it to get ready for the exam, which will be very similar to the quiz. (30-minutes maximum for the exam).

⌢ **QUIZ : M1 - Arithmetic Readiness.pdf** ⤓

⌢ Your exam will be very similar to your quiz. So make sure you understand how to do each problem on this quiz worksheet! Answers are the end for you to check.

This is a screenshot of interactive Discussion forum ideas for faculty to use in their classes.

MATH DISCUSSION FORUMS A⁺

Discussion Forums are an important aspect to online teaching to help students stay engage and connected with their class.

I have created and used the following Discussion Forum Activities that align with the modules and/or student study habits during the semester. As you will see below, some of the discussions pertain to the math material for the week, helping students do "peer teaching" to learn the material at a deeper level. Other discussions pertain to supporting students in their Study Habits, such as time management and reflection. And other discussion forums help build community in the online classroom.

- Discussion 1 for First Week "What Are You Showing Up For?"
- Discussion 1 for First Week: "Introduce Yourself!"
- Discussion 2 for Time Management: "Got Time?"
- Discussion 3 for Systems of Equations & Peer Teaching: "Systems of Equations"
- Discussion 3 for Reflection: "Discontent"
- Discussion 4 for Exponents / Polynomials & Peer Teaching: "Exponents & Polynomials"
- Discussion 5 for Motivation: "Learning Something New!"
- Discussion 6 for Mid-Semester Reflections: "Mid-Semester Reflections"
- Discussion 7 for Rationals Part A & Peer Teaching: "Rationalize This!"
- Discussion 8 for Rationals Part B & Peer Teaching: "More Rationalizing!"
- Discussion 9 for Parabolas: "Parabolas are Everywhere!"
- Discussion 10 for Complex / Imaginary Numbers: "Use Your Imagination!"
- Discussion 11 for Exponential Functions: "Exponential Growth & Financial Goals"
- Discussion 12 for Drop Deadline: "Looking Ahead"
- Discussion 13 : Practicing Thanks-Giving

II. MATH ROCKS! YOUTUBE VIDEO LINKS

Module 1: Algebra Readiness (23 topics)

In the videos below, your professor will be going over the topics in the following worksheet. Download and print the worksheet below. If you need help on any of the problems, find the corresponding video below and follow along by taking notes, highlighting important concepts, and writing down any questions.

You will be doing these topics in your ALEKS homework, so if you get stuck on a topic, refer to the corresponding worksheet & videos.

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Worksheet: Module 1 Algebra Readiness- Video Worksheet

Problem # on Worksheet	Topic	Video
	Introduction to the Language of Math	https://www.youtube.com/watch?time_continue=1&v=4aokDjreCIs&feature=emb_logo
1	Perimeter of a Polygon	0:00
2	Area of a Rectangle	1:08
3	Absolute Value	1:45
4	Percentages to Decimals	3:25
5, 6	Adding Integers	4:50
7, 8	Subtracting Integers	10:58
9	Adding & Subtracting Integers	15:38
10	Multiplying and Dividing Integers	17:49
11	Dividing with Zeroes	19:24
12, 13	Adding and Subtracting Fractions	21:08
14, 15	Multiplying and Dividing Fractions	29:24
16	Converting Mixed Fractions to Improper Fractions	35:33
17	Exponents	38:12
18	Order of Operations with Exponents	42:21
19	Evaluating an Expression	47:40
20-23	Combining Like Terms	51:02

<div style="background-color:green">**Module 2 : Linear Equations & Inequalities (24 topics)**</div>

In the videos below, your professor will be going over the topics in the following worksheet. Download and print the worksheet below. If you need help on any of the problems, find the corresponding video below and follow along by taking notes, highlighting important concepts, and writing down any questions.

You will be doing these topics in your ALEKS homework, so if you get stuck on a topic, refer to the corresponding worksheet & videos.

Worksheet: **Module 2 Linear Equations & Inequalities - Video Worksheet**

Problem # on Worksheet	Topic	Video
	Introduction to Module 2	0:00
1	Steps to Solving Linear Equations; Solving Linear Equations containing Parentheses	2:00
2, 3	Solving Linear Equations containing Fractions	13:26
4	Solving Linear Equations with Proportions	28:28
5	Solving Linear Equations with one, zero, or infinitely many solutions	32:27
6	Solving Linear Equations with Multiple Variables	41:07
7	How to Solve Word Problem; Word Problem - Direct Translation	43:14
8	Word Problem: Motion	51:19
9	Word Problem: Geometry	59:01
10, 11	Word Problem: Sales Price	1:02:41
12	Graph an Inequality	1:07:18
13	Write an Inequality	1:09:46
14	Introduction to Set Theory; Graph a Compound Inequality	1:10:30
15	Write a Compound Inequality	1:15:55
16	Set Builder and Interval Notation	1:17:30
17	Union & Intersection of Finite Sets	1:21:40
18	Union & Intersection of Intervals	1:24:28
19	Solving an Inequality	1:28:52
20	Solving an Inequality containing Fractions	1:32:56
21	Solving a Compound Inequality	
22, 23	Solving a Linear Equation containing Absolute Value	1:37:53
24	Solving a Linear Inequality containing Absolute Value	1:44:26

Module 3: Lines & Functions (23 topics)

In the videos below, your professor will be going over the topics in the following worksheet. Download and print the worksheet below. If you need help on any of the problems, find the corresponding video below and follow along by taking notes, highlighting important concepts, and writing down any questions. You will be doing these topics in your ALEKS homework, so if you get stuck on a topic, refer to the corresponding worksheet & videos.

Worksheet: **Module 3 Lines & Functions - Video Worksheet**

Problem # on Worksheet	Topic	Video
	Introduction to Module 3	
1-2	Cartesian Coordinate System; Reading a Point in the Coordinate Plane; Plot a point in the Coordinate Plane	https://youtu.be/GIstQMPdA1A
3-4	Table for a Linear Equation; Identifying Solutions to a Linear Equation	https://youtu.be/TchrKrnE82Y
5	Graph a Line by Plotting Points	https://youtu.be/O4Dw4mbVeB0
6	Graph a Vertical or Horizontal Line	https://youtu.be/uMyCCmthXX4
7-9	What is an x- and y- intercept? Graph a Line given x- and y-intercept Graph a Line by finding x- and y-intercepts	https://youtu.be/dWG_Pffq3Zk
10-13	Introduction to Slopes Find Slope given a Graph Find Slope given Two Points	https://youtu.be/j62Rk6wjXz8
14, 15	Graph a Line given Slope and y-intercept Graph a Line given Slope and a Point	https://youtu.be/za9xntIEvEA
16-17	Graph a Line by finding Slope and y-intercept; Graph a Line given in Point-Slope form	https://youtu.be/APUWwn2GnI0
18	Write the Equation of a Line given Two Points	https://youtu.be/5t6oOUcse7c
19	Write the Equations of Horizontal and Vertical Lines	https://youtu.be/NelQQlEMITc
20	Parallel and Perpendicular Lines: Find Slopes	https://youtu.be/aK1MgkiWha8
21	Parallel and Perpendicular Lines: Write the Equations	https://youtu.be/Kwd3TBN0wXc
25	What is a Function? Evaluating Functions	https://youtu.be/YMm8k7GCVGQ
22-23	Identifying Functions	https://youtu.be/5Sf3VHZdjuc
24, 26	Find Domain and Range of a Set Find Domain and Range of a Graph	https://youtu.be/P6_UzgLZkmk

Module 4: Systems of Equations (15 topics)

In the videos below, your professor will be going over the topics in the following worksheet below. It is recommended that you download the worksheet and take notes, follow along, as you are watching the videos corresponding to each topic. You will be doing these topics in your ALEKS homework, so if you get stuck on a topic, refer to the corresponding worksheet & video below.

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WORKSHEET: Systems of Linear Equations & Inequalities Worksheet

Intro to Solving Systems of Linear Equations & Solve by Graphing (#1 on worksheet)

Solve System of Linear Equations using Method of Substitution (#2 on worksheet)

Solve System of Linear Equations using Method of Elimination / Addition - Simple Example (#3 on worksheet)

Solve System of Linear Equations using Method of Elimination / Addition - More Challenging Example (#4 on worksheet)

Solve System of Linear Equations using Method of Elimination / Addition - Example with Fractions (#5 on worksheet)

Solve Systems of Equations: Solution, No Solution, or Infinitely Many Solutions (#6 on worksheet)

Solve Systems of Equations: 3 Equations & 3 Unknowns (3 x 3) (#7 on worksheet)

System of Equations: Word Problems - Direct Translation - Example 1 (#8 on worksheet)

System of Equations: Word Problems - Direct Translation - Example 2 (#9 on worksheet)

Mixture Word Problem (#10 on worksheet)

Motion Word Problem (#11 on worksheet)

Graphing Linear Inequalities - Example 1 (#12 on worksheet)

Graphing Linear Inequalities - Example 2 (#13 on worksheet)

Graphing Systems of Linear Inequalities - Example 1 (#14 on worksheet)

Graphing Systems of Linear Inequalities - Example 2 (#15 on worksheet)

Module 5: Exponents & Polynomials (25 topics)

In the videos below, your professor will be going over the topics in the following worksheets. It is recommended that you download the worksheet and take notes, follow along, as you are watching the videos corresponding to each topic. You will be doing these topics in your ALEKS homework, so if you get stuck on a topic, refer to the corresponding worksheet & video below.

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WORKSHEET: Exponents and Polynomials (25 topics).pdf

Exponents: Product Rule (#1-2 on worksheet)

Exponents: Power Rule (#3-7 on worksheet)

Exponents: Quotient Rule (#8-9 on worksheet)

Zero Exponent Rule (#10 on worksheet)

Negative Exponent Rule (#11- 13 on worksheet)

Combining Exponent Rules (#14- 18 on worksheet)

Polynomials: Addition & Subtractions (#19 -20 on worksheet)

Polynomials: Multiplication (#21 - 22 on worksheet)

Polynomials: Advanced Multiplication (#23 on worksheet)

Polynomials: Dividing by a Monomial (#24 on worksheet)

Polynomials: Dividing by a Binomial (#25 on worksheet)

Module 6 : Factoring (19 topics)

WORKSHEET: Factoring (19 topics). YouTube Videos: *Note- these videos below do not have the exact same problems as the worksheet provided above. However, the problems are very similar and the topics correspond to the worksheet problems.*

Factoring Overview Sheet

Factoring Steps

Introduction to Factoring & Finding the Greatest Common Factor (GCF) (similar to #1 on worksheet)

Factoring out the GCF (# 2 -4 on worksheet)

Factor by Grouping (# 5-6 on worksheet)

Factoring a Trinomial using X-Box Method (#7 on worksheet)

Factoring a Trinomial using X-Box Method (#9 on worksheet)

Factoring a Trinomial using X-Box Method (#10 on worksheet)

Factor a Trinomial using X-Box Method (similar to # 7-10 on worksheet)

Another Example of Factoring using X-Box Method (similar to #7-10 on worksheet)

And Another Example of Factoring using X-Box Method (similar to #7-10 on worksheet)

[Factoring a Binomial using Difference of Two Squares (D.O.T.S) (#13 on worksheet)](#)

[Factor using Difference of Two Squares (D.O.T.S) (similar to #11-13 on worksheet)](#)

[Factor using Difference of Two Cubes (D.O.T.C). and Sum of Two Cubes (S.O.T.C) (similar to #14 on worksheet)](#)

[Solving a Quadratic Equation using Factoring (similar to #15)](#)

[Solving a Quadratic Equation using Factoring (similar to #16-18 on worksheet)](#)

[Another Example of Solving a Quadratic Equation using Factoring (similar to #15-18 on worksheet)](#)

[Solving a Right Triangle Word Problem using The Pythagorean Theorem (problem #19 on worksheet)](#)

Module 7 : Rationals - Part A (19 topics)

WORKSHEET: [Rationals - Part A](#)

YouTube Videos: *Note- these videos below do not have the exact same problems as the worksheet provided above. However, the problems are very similar and the topics correspond to the worksheet problems.*

[Introduction to Rationals](#) (Links to an external site.)

[Evaluating a Rational Function](#) *(similar to #3 on worksheet)* (Links to an external site.)

[Domain of a Rational Function](#) *(similar to #1-2, 4 on worksheet)* (Links to an external site.)

Simplifying Rationals *(similar to #5-8 on worksheet)* (Links to an external site.)

Simplifying Rationals - more challenging examples *(similar to #9-11 on worksheet)* (Links to an external site.)

Multiplying Rationals *(similar to #12-13 on worksheet)* (Links to an external site.)

Another Explanation of Multiplying Rationals *(similar to #12-13 on worksheet)* (Links to an external site.)

Dividing Rationals *(similar to #14-15 on worksheet)* (Links to an external site.)

[Adding & Subtracting Rationals](#) *(similar to #16-19 on worksheet)* (Links to an external site.)

[Another explanation of Adding Rationals](#) *(similar to #19 on worksheet)* (Links to an external site.)

[Live example of Adding Rationals](#) *(similar to #16-19 on worksheet)* (Links to an external site.)

[Live example 1 of Subtracting Rationals](#) *(similar to #16-19 on worksheet)* (Links to an external site.)

[Live example 2 of Subtracting Rationals](#) *(similar to #9-12 on worksheet)* (Links to an external site.)

Module 8 : Rationals - Part B (12 topics)

WORKSHEET: Rationals - Part B

YouTube Videos: *Note- these videos below do not have the exact same problems as the worksheet provided above. However, the problems are very similar and the topics correspond to the worksheet problems.*

Complex Rationals *(similar to #1-4 on worksheet)* (Links to an external site.)

Live Example 1 of Complex Rationals *(similar to #1-4 on worksheet)* (Links to an external site.)

Live Example 2 of Complex Rationals *(similar to #1-4 on worksheet)* (Links to an external site.)

Solving Rational Equations *(similar to #5-9 on worksheet)* (Links to an external site.)

Solving a PROPORTIONS word problem *(similar to #10 on worksheet)* (Links to an external site.)

Solving a WORK word problem *(similar to #11 on worksheet)* (Links to an external site.)

Solving a MOTION word problem *(similar to #12 on worksheet)*

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Module 9 : Radicals - Part A (17 topics)

WORKSHEET: Radicals - Part A

YouTube Videos: *Note- these videos below do not have the exact same problems as the worksheet provided above. However, the problems are very similar and the topics correspond to the worksheet problems.*

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Introduction to Radicals

How to Simplify a Radical *(similar to #1-8 on worksheet)*

How to Add and Subtract Radicals *(similar to #9-12 on worksheet)*

How to Multiply Radicals.(similar to #13-17 on worksheet)

Another Explanation of How to Multiply Radicals *(similar to #13-17 on worksheet)*

Review of Above Topics on Radical (Links to an external site.)

Module 10 : Radicals - Part B (20 topics)

WORKSHEET: Radicals - Part B

YouTube Videos: *Note- these videos below do not have the exact same problems as the worksheet provided above. However, the problems are very similar and the topics correspond to the worksheet problems.*

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How To Rationalize the Denominator (#1-7 on worksheet): This is our Class Zoom on Oct 26th, 2020 where I did a lecture covering the problems in this worksheet.

How to Rationalize the Denominator (similar to #1-7 on worksheet)

Another Explanation on How to Rationalize Radicals (similar to #1-7 on worksheet)

How To Solve Equations with Radicals (similar to #8-12 on worksheet)

Complex / Imaginary Numbers (#15-20 on worksheet): This is our Class Zoom on Oct 28, 2020 where I did a lecture covering the problems in this worksheet.

Complex or Imaginary Numbers (similar to #15 on worksheet)

[Example of Adding & Subtracting Complex Numbers (similar to #17 on worksheet)](#)

[Simplifying a Complex Number (similar to #20 on worksheet)](#)

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Module 11 : Quadratics (17 topics)

WORKSHEET: [Quadratics](#)

YouTube Videos: *Note- these videos below do not have the exact same problems as the worksheet provided above. However, the problems are very similar and the topics correspond to the worksheet problems.*

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- [Introduction to Quadratics & the 3 New Methods to Solve](#)
- Square Root Property / Method (4 examples) *(similar to #1-3 on worksheet)*
- [Completing the Square Method (3 examples)](#) *(similar to #4-5 on worksheet)*
- [Quadratic Formula (1 example).](#) *(similar to #6 on worksheet)*
- [Review of Quadratics (4 Methods of Solving Quadratic Equations)](#)
  [Solving "Quadratic-Like" Equations (2 examples & 2 You Try examples)](#) *(similar to #8-9 on worksheet)*
- [Intro to Parabolas - Vertex, Axis of Symmetry, Domain, Range (2 examples)](#) *(similar to #10 on worksheet)*
- [Graphing a Parabola in Vertex form: y=(ax-h)^2 +k (1 example](#) *(similar to #11 on worksheet)*
- [Graphing a Parabola in Standard form: y = ax^2 +bx+c, and interpreting maximum/minimum values (1 example)](#) *(similar to #12-13 on worksheet)*
- [Solving Quadratic Inequality (1 example)](#) *(similar to #16 on worksheet)*
- [Solving Rational Inequality (1 example)](#) *(similar to #17 on worksheet)*

In the videos below, your professor will be going over the topics in the following worksheets. It is recommended that you download the worksheet and take notes, follow along, as you are watching the videos corresponding to each topic. You will be doing these topics in your ALEKS homework, so if you get stuck on a topic, refer to the corresponding worksheet & video below.

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Module 12 : Functions & Exponentials (13 topics)

WORKSHEET: Functions & Exponentials

YouTube Videos: *Note- these videos below do not have the exact same problems as the worksheet provided above. However, the problems are very similar and the topics correspond to the worksheet problems.*

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- Class Zoom Lecture: Overview of Module 11 & Lecture on Composite Functions (#6-7 on worksheet plus 2 additional examples)
- Class Zoom Lecture: One-to-One Functions, Inverse Functions, and Compound Interest Word Problem (#8, 10, and 13 on worksheet plus 2 additional examples)

- Introduction - What is a Function / Domain / Range? (Links to an external site.)

- Another Introduction of Functions (Links to an external site.)
- Functions: Shifting / Translating Functions *(similar to #1-3 on worksheet)* (Links to an external site.)

- Functions: Adding, Subtracting, Multiplying Functions *(similar to #4 on worksheet)* (Links to an external site.)

- Dividing Functions *(similar to #5 on worksheet)* (Links to an external site.)
- Intro to Composite Functions - Pregnant Woman Analogy (Links to an external site.)

- Harder Example of Composite Functions *(similar to #7 on worksheet)* (Links to an external site.)

- Composite Functions *(similar to #6-7 on worksheet)* (Links to an external site.)
- Another example of Composite Functions, Domain, & Range *(similar to #7 on worksheet)* (Links to an external

site.)

- One-to-One Functions *(similar to #8 on worksheet)* (Links to an external site.)

- [Intro - What is an Inverse Function?](#) (Links to an external site.)

- [Inverse Functions](#) *(similar to #9a on worksheet)* (Links to an external site.)
- [Steps to Find the Inverse Function and its Domain and Range](#) *(similar to #9b and #10 on worksheet)* (Links to an

external site.)

- [Another Example of Finding the Inverse Function](#) (Links to an external site.)
- [Find the Composition of a Function & its Inverse - the long way and the shortcut way (3 examples)](#) *(similar to #9c

on worksheet) (Links to an external site.)
- [Graph an Exponential Function](#) *(similar to #11 on worksheet)* (Links to an external site.)

- Word Problems: Compounding *(similar to #12-13 on worksheet)* (Links to an external site.)

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<mark>Module 13 : Logarithms (14 topics)</mark>

WORKSHEET: Logarithms

YouTube Videos: *Note- these videos below do not have the exact same problems as the worksheet provided above. However, the problems are very similar and the topics correspond to the worksheet problems.*

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- *Class Zoom Lecture: Intro and Overview to Logarithm Functions. Relationship between Exponential & Log Functions (# 1-3 on worksheet plus 3 additional examples)*

- *Class Zoom Lecture: Properties of Logs and Solving Log Equations (# 5, 6, 9 on worksheet plus 3 additional examples)*

- Intro to Logarithms: Relationship between Exponential and Log Functions (Links to an external site.)

- Converting Logs to Exponents and vice versa *(similar to #1-3 on worksheet)* (Links to an external site.)

- Properties of Logarithms *(similar to #4 on worksheet)* (Links to an external site.)

- [Expanding a Log](#) *(similar to #5 on worksheet)* (Links to an external site.)

- [Condensing Logs](#) *(similar to #6 on worksheet)* (Links to an external site.)
- [Change of Base Log Formula](#) *(similar to #7 on worksheet)* (Links to an external site.)

- [Solving Log Equations](#) *(similar to #8-10 on worksheet)* (Links to an external site.)

- [Solving Exponential Equations](#) *(similar to #11-13 on worksheet)* (Links to an external site.)

- Word Problem: Continuous Exponential Growth *(similar to #14 on worksheet)* (Links to an external site.)

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WORKSHEET: Conics

YouTube Videos: *Note- these videos below do not have the exact same problems as the worksheet provided above. However, the problems are very similar and the topics correspond to the worksheet problems.*

_____

Finding the Vertex of a Parabola in Standard form and Vertex form (similar to #1-2 on worksheet) (Links to an external site.)

Graphing Parabolas. (Similar to #1-2 on worksheet) (Links to an external site.)

Finding the Midpoint of a Line Segment *(similar to #5 on worksheet)* (Links to an external site.)

[Calculating the Distance between Two Points](#) *(similar to #6 on worksheet)* (Links to an external site.)

[Graphing Circles (similar to #7-8 on worksheet)](#) (Links to an external site.)

[Graphing Ellipses (similar to #9-10 on worksheet)](#) (Links to an external site.)

[Graphing Hyberbolas (similar to #11-12 on worksheet)](#) (Links to an external site.)

II. CORRESPONDING WORKSHEETS

The following pages consist of the Worksheets that correspond to each of the Module videos.

![ALEKS®]

Class Name : **Beginning and Intermediate Algebra**

Instructor Name : **Professor Nancy Mahan**

Student Name : _____

Instructor Note :

Question 1 of 23

Find the perimeter of the following polygon. Be sure to include the correct unit in your answer.

14 ft

13 ft

13 ft

19 ft
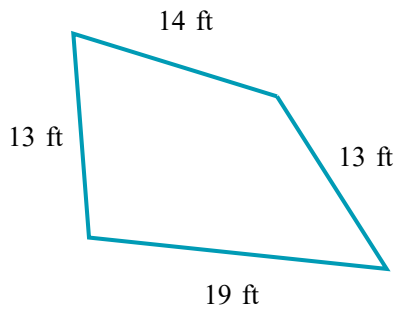
Question 2 of 23

Find the area of this rectangle.

12 ft

7 ft
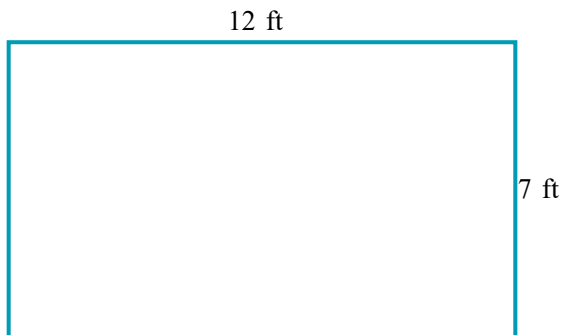
Question 3 of 23

Evaluate the following.

$$\left|5\right| = \underline{\hspace{1cm}}$$

$$\left|-10\right| = \underline{\hspace{1cm}}$$

Question 4 of 23

Write 30% as a decimal.

Question 5 of 23

Add.

$$3 + (-4) =$$
$$-3 + (-5) =$$

Question 6 of 23

Add.

$$-36 + 31 =$$
$$-28 + (-30) =$$

Question 7 of 23

Subtract.

$$-1 - (-4) = \underline{\hspace{2cm}}$$
$$6 - (-4) = \underline{\hspace{2cm}}$$

Question 8 of 23

Subtract.

$$-35 - 36 = \underline{\hspace{2cm}}$$
$$7 - (-2) = \underline{\hspace{2cm}}$$

Question 9 of 23

Compute.

$$7 - 3 - 10 + 9 - 8$$

Question 10 of 23

Evaluate the following.

$$-3 \times (-6) = \boxed{}$$

$$24 \div (-4) = \boxed{}$$

Question 11 of 23

Evaluate each expression below.

$$0 \div 3 =$$

$$\frac{5}{0} =$$

Question 12 of 23

Add.

$$-\frac{1}{7} + \frac{2}{3}$$

Write your answer in simplest form.

Question 13 of 23

Add.

$$\frac{6}{-5} + \frac{-2}{3}$$

Write your answer as a fraction in simplest form.

Question 14 of 23

Multiply.

$$\frac{4}{3}\left(-\frac{1}{8}\right)$$

Write your answer in simplest form.

Question 15 of 23

Divide. Write your answer as a fraction or mixed number in simplest form.

$$\frac{16}{21} \div \left(-\frac{8}{3} \right)$$

Question 16 of 23

Write $3\frac{5}{7}$ as an improper fraction.

Question 17 of 23

Evaluate.

$$-(7)^2 = \boxed{}$$
$$-(-3)^3 = \boxed{}$$

Question 18 of 23

Evaluate.

$$-\left(2-2^2\right)^2 - 5\cdot(-3)$$

Question 19 of 23

Evaluate the expression when $c = \frac{4}{15}$ and $x = -\frac{3}{10}$.

$$2x - c$$

Write your answer in simplest form.

Question 20 of 23

Simplify.

$$2y + 4y$$

Question 21 of 23

Simplify.

$$-4x - 10x$$

Question 22 of 23

Simplify.

$$4(w-5) - 6w$$

Question 23 of 23

Simplify the following expression.

$$6x^2 + 7 - 10x - 4x^2 - 11x$$

M1 Worksheet: Algebra Readiness #1 Answers for class Beginning and Intermediate Algebra

Question 1 of 23

59 ft

Question 2 of 23

84 ft^2

Question 3 of 23

$$\left|5\right| = 5$$
$$\left|-10\right| = 10$$

Question 4 of 23

0.3

Question 5 of 23

$$3+(-4) = -1$$
$$-3+(-5) = -8$$

Question 6 of 23

$$-36+31 = -5$$
$$-28+(-30) = -58$$

Question 7 of 23

$$-1-(-4) = 3$$
$$6-(-4) = 10$$

Question 8 of 23

$$-35-36 = -71$$
$$7-(-2) = 9$$

Question 9 of 23

-5

Question 10 of 23

$-3 \times (-6) = 18$

$24 \div (-4) = -6$

Question 11 of 23

$0 \div 3 = 0$

$\dfrac{5}{0}$ Undefined

Question 12 of 23

$\dfrac{11}{21}$

Question 13 of 23

$-\dfrac{28}{15}$

Question 14 of 23

$-\dfrac{1}{6}$

Question 15 of 23

$-\dfrac{2}{7}$

Question 16 of 23

$\dfrac{26}{7}$

Question 17 of 23

$$-(7)^2 = -49$$
$$-(-3)^3 = 27$$

Question 18 of 23

11

Question 19 of 23

$$-\frac{13}{15}$$

Question 20 of 23

$6y$

Question 21 of 23

$-14x$

Question 22 of 23

$-2w-20$

Question 23 of 23

$2x^2-21x+7$

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M2 Worksheet: Linear Equations and Inequalities #1

Class Name : **Beginning and Intermediate Algebra**

Instructor Name : **Professor Nancy Mahan**

Student Name : _____

Instructor Note :

Question 1 of 24

Solve for x.

$$-3(-7x+6)-7x=5(x-2)-2$$

Simplify your answer as much as possible.

Question 2 of 24

Solve for w.

$$-6w+\frac{5}{3}=-\frac{2}{3}w-\frac{6}{5}$$

Simplify your answer as much as possible.

Question 3 of 24

Solve for u.

$$\frac{5u-2}{2}+\frac{7u-4}{4}=32$$

Simplify your answer as much as possible.

Question 4 of 24

Solve for u.

$$\frac{2}{7}=\frac{u-5}{3}$$

Simplify your answer as much as possible.

Question 5 of 24

For each equation, choose the statement that describes its solution.
If applicable, give the solution.

$$4(u+1)+u=3(u-2)+2$$

○ No solution

○ $u=$

○ All real numbers are solutions

$$-2(x+1)+5x=3(x+1)-2$$

○ No solution

○ $x=$

○ All real numbers are solutions

Question 6 of 24

Solve for x.

$$z=(x-5)k$$

Question 7 of 24

Salma, Brian, and Reuben have a total of 82 in their wallets. Reuben has 2 times what Salma has. Brian has 6 less than Salma. How much does each have?

Question 8 of 24

Two trains leave stations 442 miles apart at the same time and travel toward each other. One train travels at 80 miles per hour while the other travels at 90 miles per hour. How long will it take for the two trains to meet?

Do not do any rounding.

☐ hours

Question 9 of 24

The perimeter of a rectangular garden is 286 feet. If the length of the garden is 79 feet, what is its width?

Question 10 of 24

An item is regularly priced at $35. Lisa bought it at a discount of 60% off the regular price. How much did Lisa pay?

Question 11 of 24

A laptop has a listed price of $653.95 before tax. If the sales tax rate is 6.5%, find the total cost of the laptop with sales tax included.

Round your answer to the nearest cent, as necessary.

Question 12 of 24

Graph the inequality below on the number line.

$$y \leq -8$$
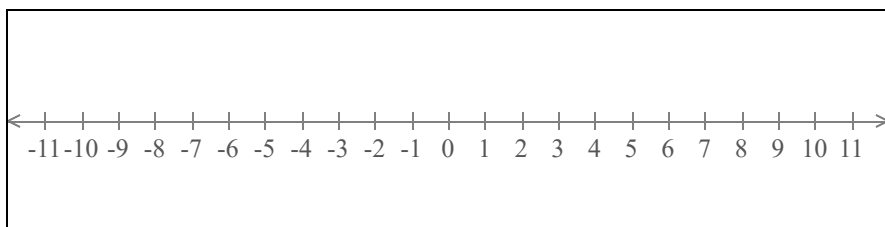
Question 13 of 24

Write an inequality for the graph shown below.
Use x for your variable.
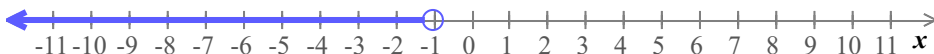
Question 14 of 24

Graph the compound inequality on the number line.

$$x \geq 4 \text{ and } x \leq 6$$
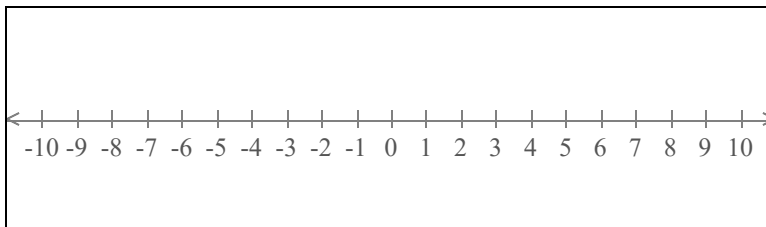
Question 15 of 24

Write a compound inequality for the graph shown below.
Use x for your variable.
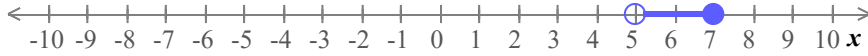
Question 16 of 24

Graph the set $\{x \mid 0 \leq x < 2\}$ on the number line.
Then, write the set using interval notation.
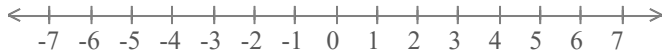
Question 17 of 24

The sets B and I are given below.

$$B = \{a,\, e,\, h\}$$
$$I = \{c,\, d,\, g\}$$

Find the union of B and I.
Find the intersection of B and I.
Write your answers using set notation (in roster form).

Question 18 of 24

C and D are sets of real numbers defined as follows.

$$C = \{w \mid w < 1\}$$
$$D = \{w \mid w \geq 9\}$$

Write $C \cup D$ and $C \cap D$ using interval notation.
If the set is empty, write $\varnothing$.

Question 19 of 24

Solve the inequality for u.

$$6u - 37 > -5(2 - 3u)$$

Simplify your answer as much as possible.

Question 20 of 24

Solve the inequality for u.

$$-\frac{9}{8}u - 1 \le \frac{5}{6}u + \frac{3}{8}$$

Simplify your answer as much as possible.

Question 21 of 24

Solve the compound inequality.

$$4y - 3 \le 1 \quad \text{and} \quad 2y - 4 < 4$$

Write the solution in interval notation.
If there is no solution, enter Ø.

Question 22 of 24

Solve for u.

$$-5\left|u + 3\right| = -50$$

Question 23 of 24

Solve for x.

$$4\left|x + 6\right| - 50 = -10$$

Question 24 of 24

Solve.

$$3\left|x - 2\right| - 7 > 11$$

M2 Worksheet: Linear Equations and Inequalities #1 Answers for class Beginning and Intermediate Algebra

Question 1 of 24

$$x = \frac{2}{3}$$

Question 2 of 24

$$w = \frac{43}{80}$$

Question 3 of 24

$$u = 8$$

Question 4 of 24

$$u = \frac{41}{7}$$

Question 5 of 24

$$4(u+1)+u = 3(u-2)+2$$

- ◯ No solution
- ⦿ u = -4
- ◯ All real numbers are solutions

$$-2(x+1)+5x = 3(x+1)-2$$

- ⦿ No solution
- ◯ x =
- ◯ All real numbers are solutions

Question 6 of 24

$$x = \frac{z}{k} + 5$$

Question 7 of 24

Amount in Salma's wallet: $22

Amount in Brian's wallet: $16

Amount in Reuben's wallet: $44

Question 8 of 24

2.6 hours

Question 9 of 24

64 feet

Question 10 of 24

$14

Question 11 of 24

$696.46

Question 12 of 24
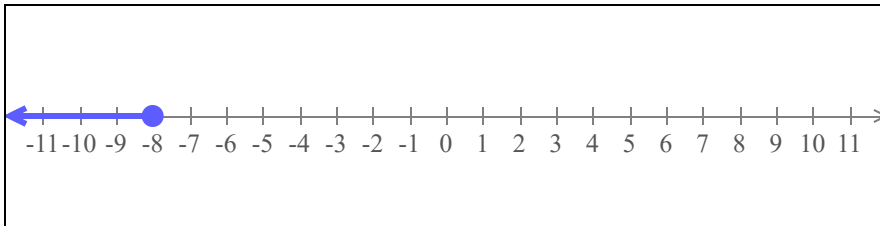
Question 13 of 24

$x < -1$

Question 14 of 24
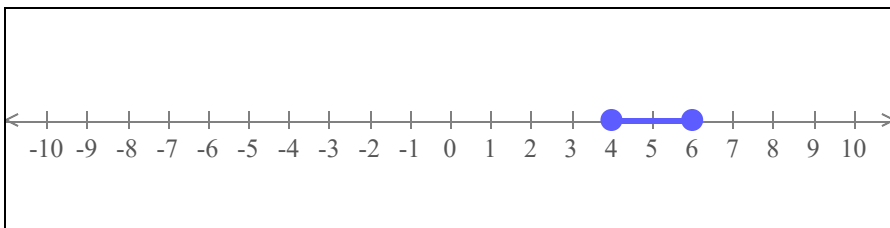
Question 15 of 24

$5 < x \leq 7$
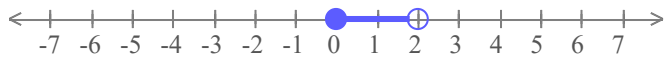
$$\{x \mid 0 \le x < 2\} = [0, 2)$$

Question 17 of 24

$$B \cup I = \{a, c, d, e, g, h\}$$
$$B \cap I = \varnothing$$

Question 18 of 24

$$C \cup D = (-\infty, \ 1) \cup [9, \ \infty)$$

$$C \cap D = \varnothing$$

Question 19 of 24

$$u < -3$$

Question 20 of 24

$$u \ge -\frac{33}{47}$$

Question 21 of 24

$$(-\infty, 1]$$

Question 22 of 24

$$u = 7, \ -13$$

Question 23 of 24

$$x = 4, \ -16$$

Question 24 of 24

$$x < -4 \quad \text{or} \quad x > 8$$

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Class Name : **Beginning & Intermediate Algebra**

Instructor Name : **Professor Nancy Mahan**

Student Name : _____

Instructor Note :

Question 1 of 26

Give the location of Atlanta as an ordered pair (x, y).
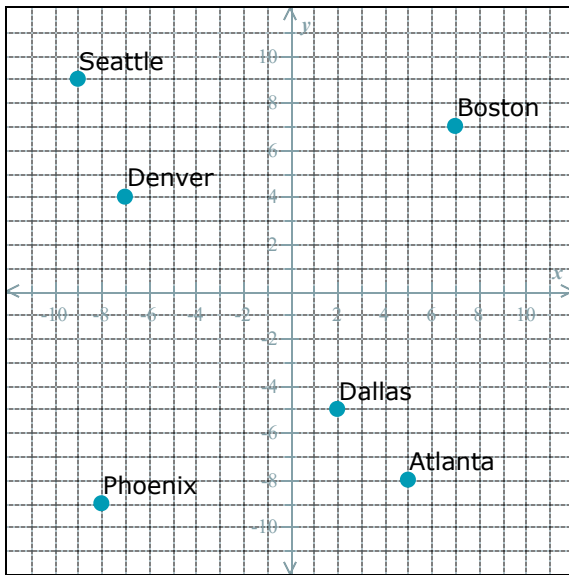
Question 2 of 26

Using the pencil, plot the point $(-5, 2)$.
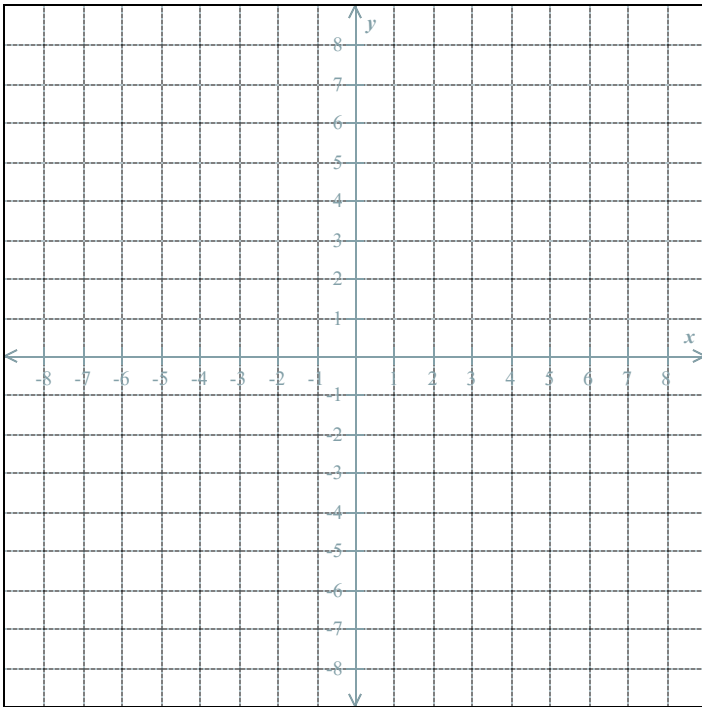
Question 3 of 26

Fill in the table using this function rule.

$$y = -3x + 5$$

x	y
-4	_____
-2	_____
0	_____
2	_____

Question 4 of 26

For each ordered pair, determine whether it is a solution to $4x + 7y = -19$.

(x, y)	Is it a solution?	
	Yes	No
(4, −5)	○	○
(6, 2)	○	○
(−8, 4)	○	○
(−3, −1)	○	○

Question 5 of 26

Graph the line.

$$y = 2x - 5$$
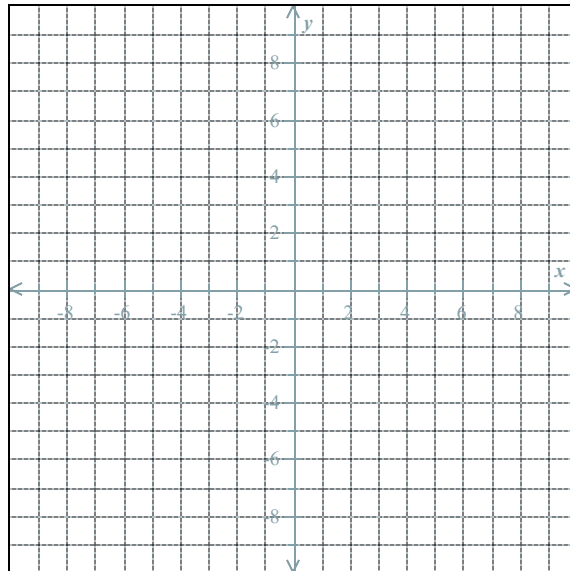
Question 6 of 26

Graph the line $y=4$.
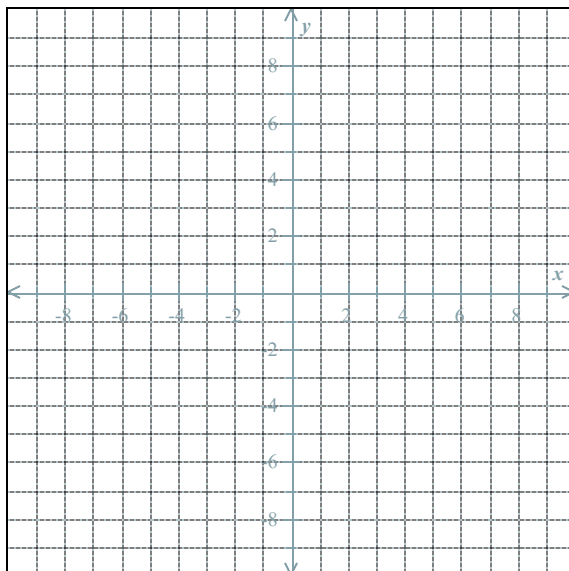
Question 7 of 26

Find the x-intercept and the y-intercept of the line below. Click on "None" if applicable.
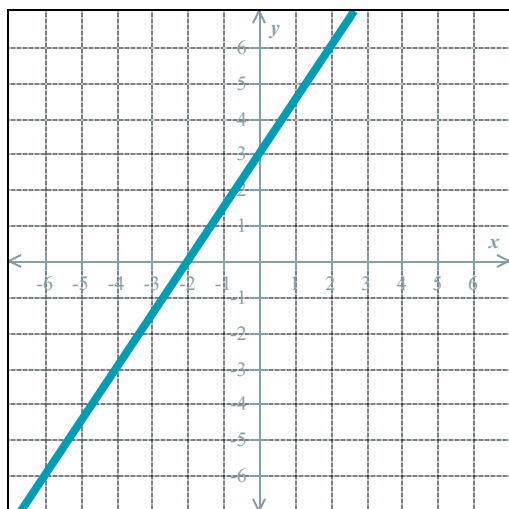
Question 8 of 26

Graph the line whose x-intercept is 1 and whose y-intercept is -1.
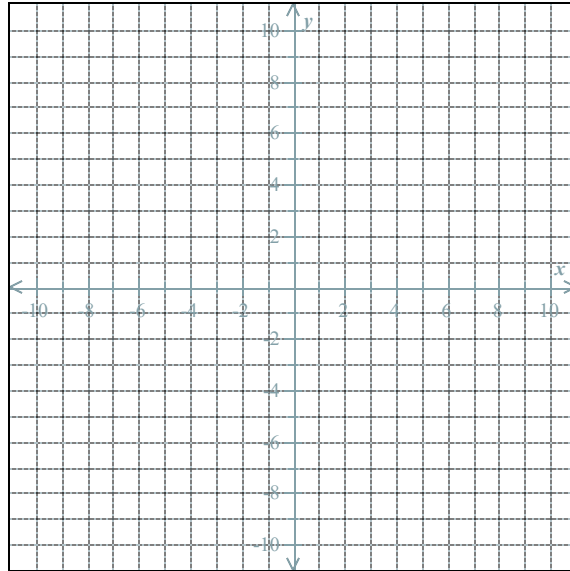
Question 9 of 26

The equation of a line is given below.

$$6x - 4y = 36$$

Find the x-intercept and the y-intercept.
Then use them to graph the line.
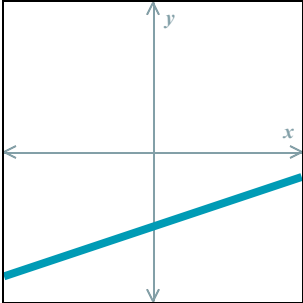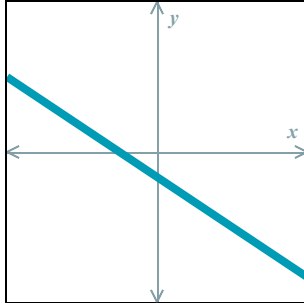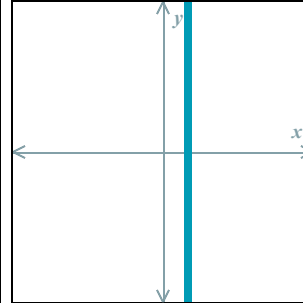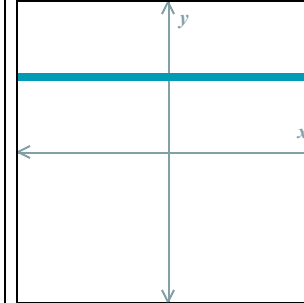
    x-intercept: _____

    y-intercept: _____
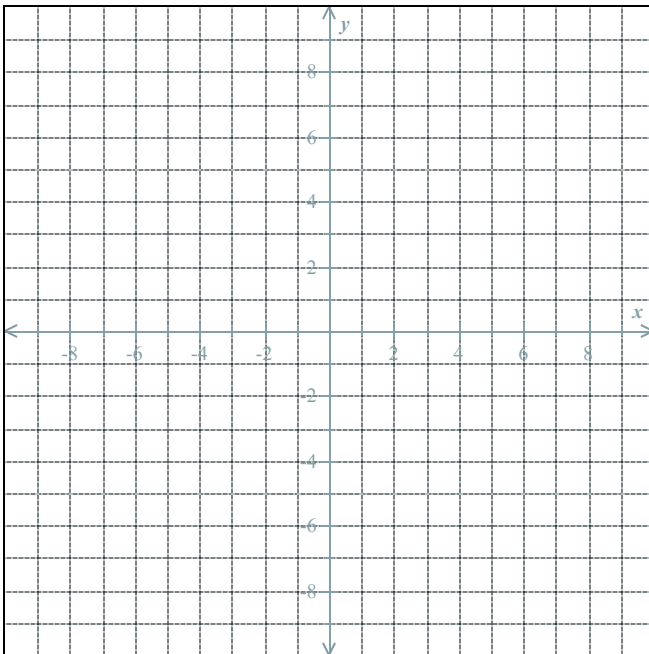
Question 10 of 26

For each line, determine whether the slope is positive, negative, zero, or undefined.

Line 1	Line 2	Line 3	Line 4
○ Positive ○ Negative ○ Zero ○ Undefined	○ Positive ○ Negative ○ Zero ○ Undefined	○ Positive ○ Negative ○ Zero ○ Undefined	○ Positive ○ Negative ○ Zero ○ Undefined

Question 11 of 26

Find the slope of the line graphed below.
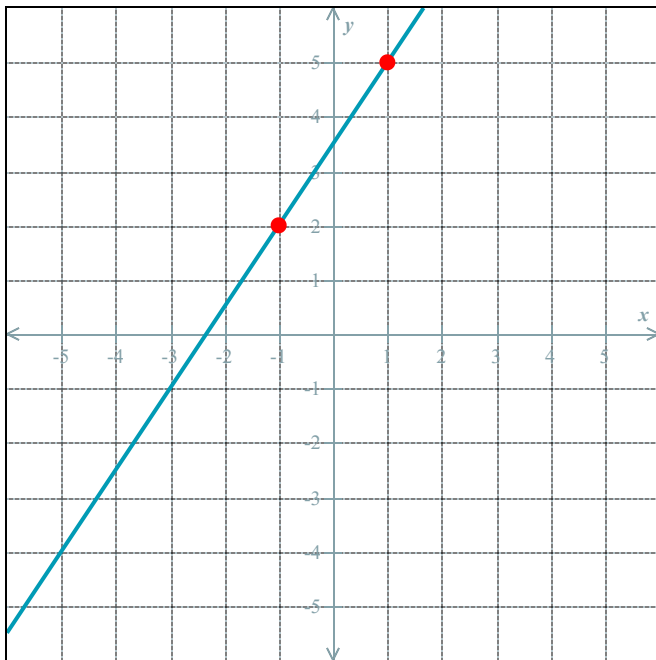
Question 12 of 26

Find the slope of the line passing through the points $(-7, 2)$ and $(9, 6)$.

Question 13 of 26

Fill in the blanks below.

Find the slope of the line passing through the points $(-7, -4)$ and $(3, -4)$.

slope: ☐

Find the slope of the line passing through the points $(2, 2)$ and $(2, -1)$.

slope: ☐

Question 14 of 26

Graph the line with slope -3 and y-intercept -2.
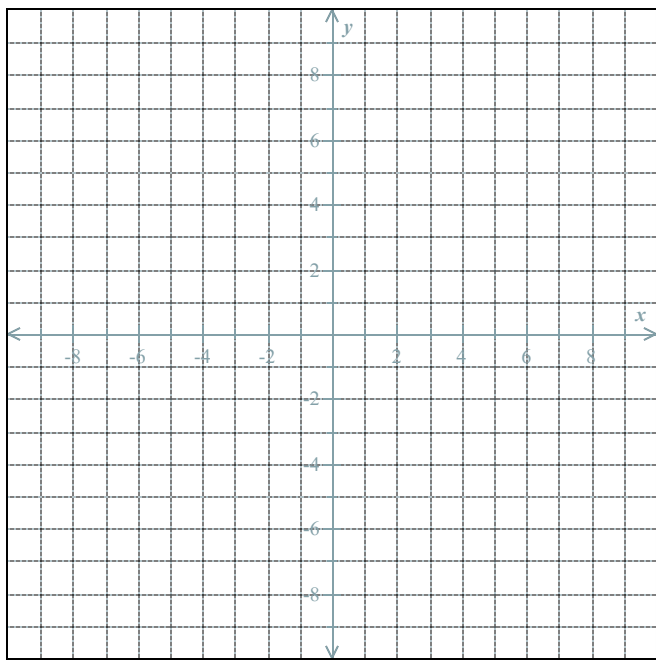
Question 15 of 26

Graph the line with slope 1 passing through the point $(-5, -5)$.
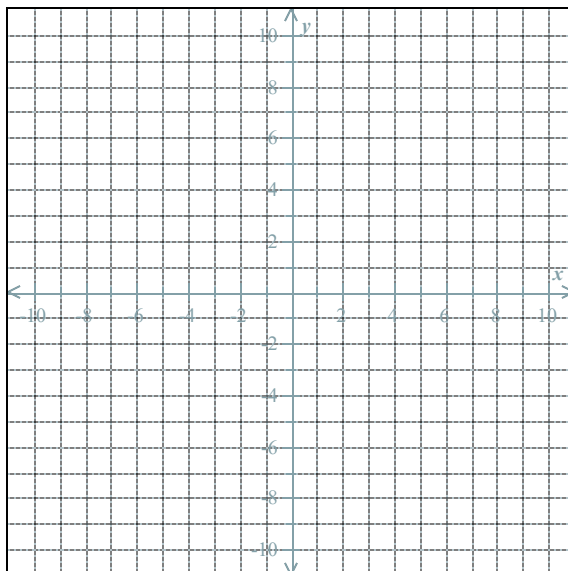
Question 16 of 26

The equation of a line is given below.

$$-9x + 3y = -12$$

Find the slope and the y-intercept.
Then use them to graph the line.

      slope: _____

      y-intercept: _____
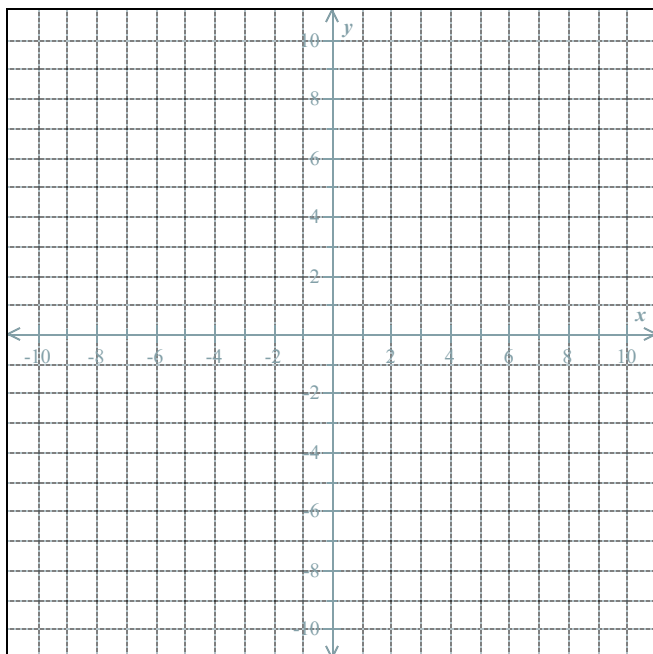
Question 17 of 26

Graph the line.

$$y - 5 = -\frac{1}{3}(x - 1)$$
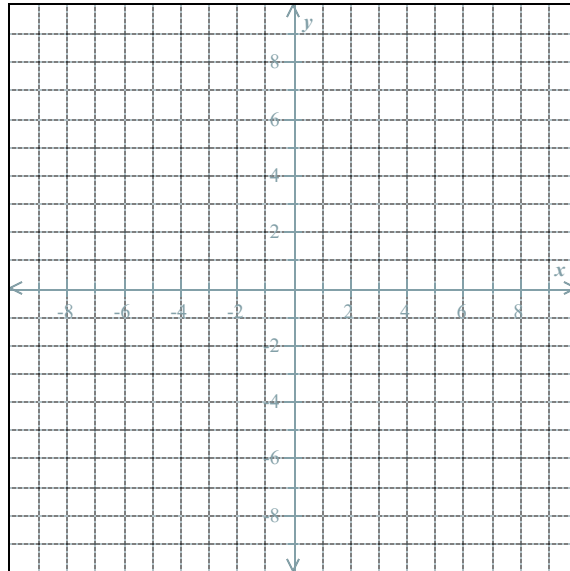
Question 18 of 26

Find an equation for the line below.
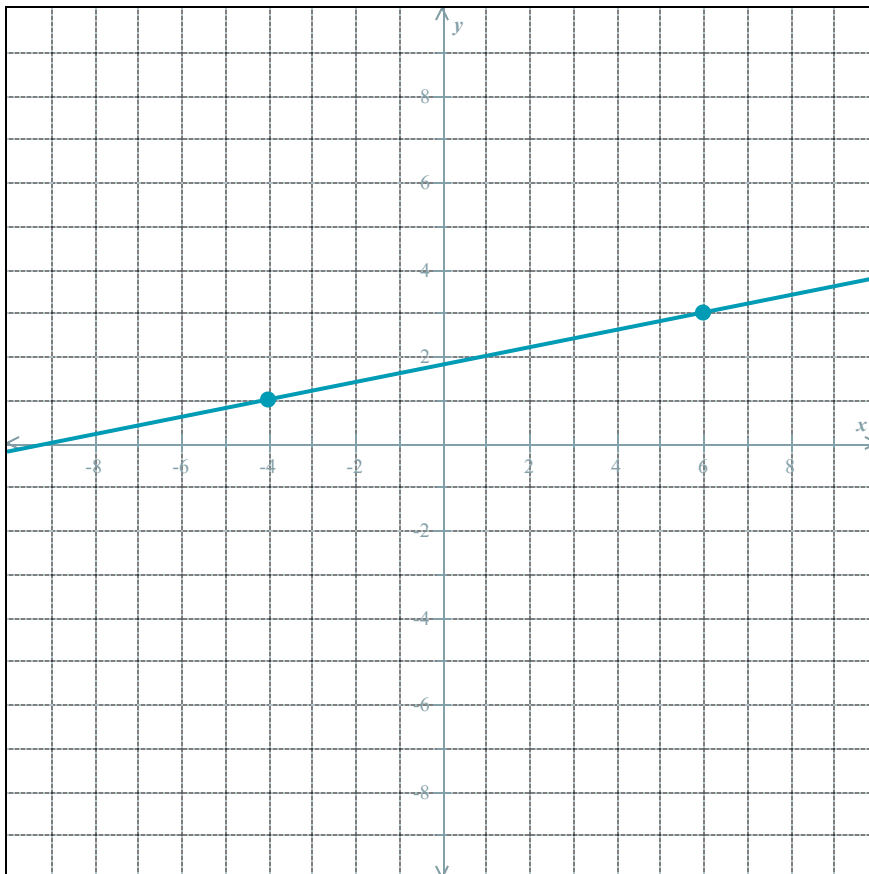
Question 19 of 26

Write equations for the horizontal and vertical lines passing through the point $(-8, 8)$.

 horizontal line:

 vertical line:

Question 20 of 26

Consider the line $y=2x-3$.

What is the slope of a line parallel to this line?

What is the slope of a line perpendicular to this line?

Question 21 of 26

Consider the line $y=-9x+2$.

(a) Find the equation of the line that is perpendicular to this line and passes through the point $(-4,\ 5)$.

(b) Find the equation of the line that is parallel to this line and passes through the point $(-4,\ 5)$.

Question 22 of 26
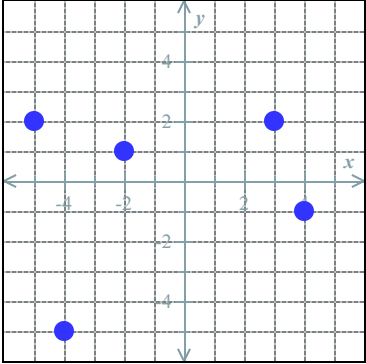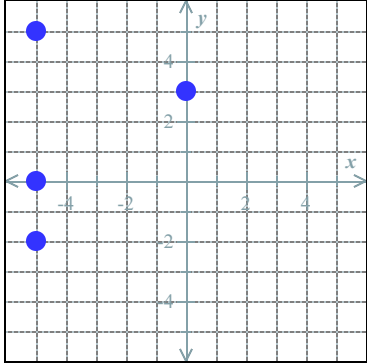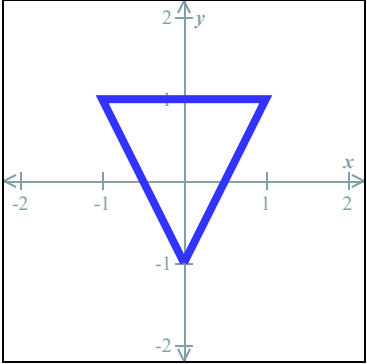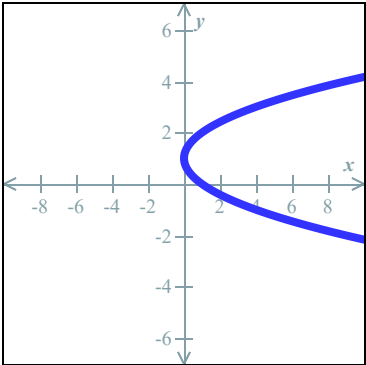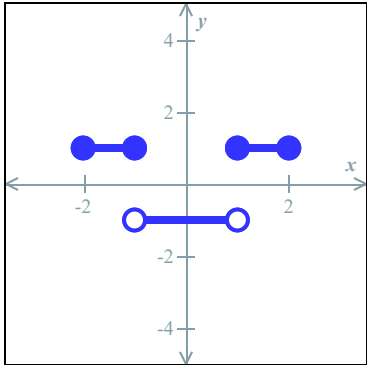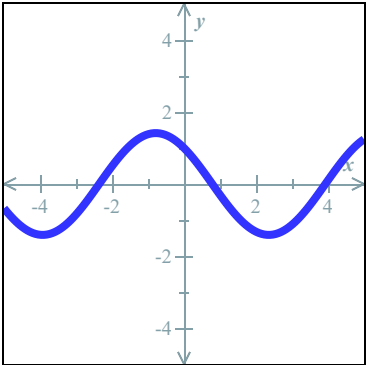
For each relation, decide whether or not it is a function.

Relation 1

Domain	Range
sky	-1
	2
pencil	9
	0
desk	-6

○ Function
○ Not a function

Relation 2

Domain	Range
9	0
	2
	9

○ Function
○ Not a function

Relation 3

$$\{(u, d),(a, z),(z, z),(d, z)\}$$

○ Function
○ Not a function

Relation 4

$$\{(5, s),(3, t),(-5, t),(5, t)\}$$

○ Function
○ Not a function

Question 23 of 26

For each graph below, state whether it represents a function.

	Graph 1	Graph 2	Graph 3
Function?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
	Graph 4	Graph 5	Graph 6
Function?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No

Question 24 of 26

Suppose that the relation S is defined as follows.

$$S = \{(6, -3), (6, 1), (4, 4)\}$$

Give the domain and range of S.
Write your answers using set notation.

Question 25 of 26

The functions f and g are defined as follows.

$$f(x) = 2x^2 - 3x \qquad g(x) = -4x + 2$$

Find $f(-3)$ and $g(7)$.

Simplify your answers as much as possible.

The entire graph of the function h is shown in the figure below.

Write the domain and range of h using interval notation.
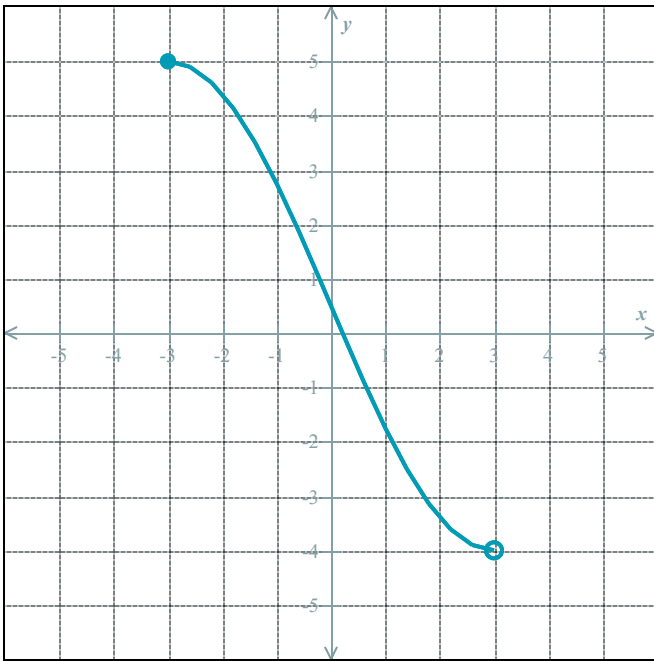
Lines and Functions Worksheet #1 Answers for class Math 130_Fall 2020 (Prof. Mahan) - #73399, #73431, #73455

Question 1 of 26

$$(x, y) = (5, -8)$$

Question 2 of 26
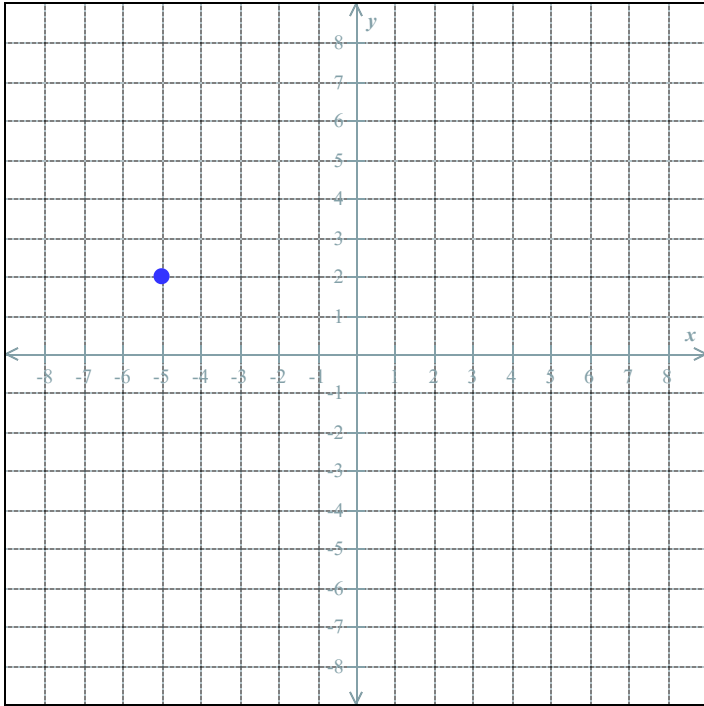
Question 3 of 26

x	y
-4	17
-2	11
0	5
2	-1

Question 4 of 26

	Is it a solution?	
(x, y)	**Yes**	**No**
$(4, -5)$	⦿	○
$(6, 2)$	○	⦿
$(-8, 4)$	○	⦿
$(-3, -1)$	⦿	○

Question 5 of 26

Question 6 of 26
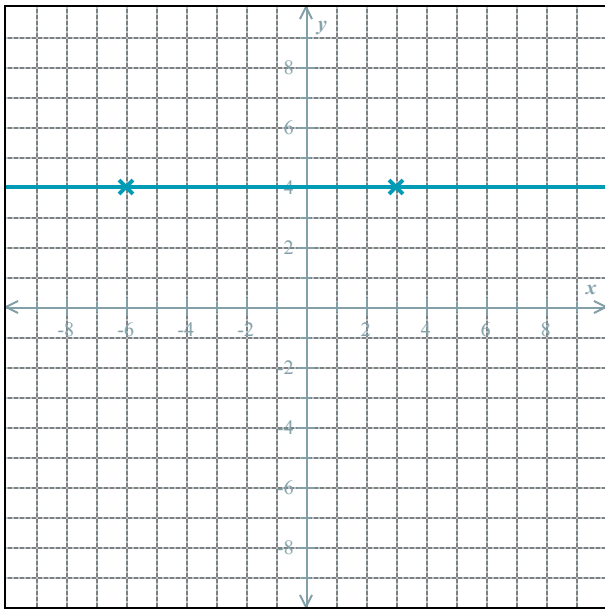
Question 7 of 26

(a) x-intercept: -2

(b) y-intercept: 3

Question 8 of 26
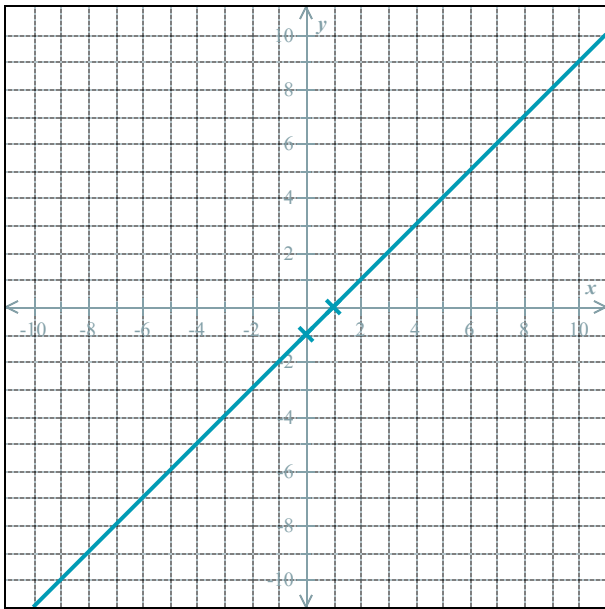
Question 9 of 26

x-intercept: 6

y-intercept: -9
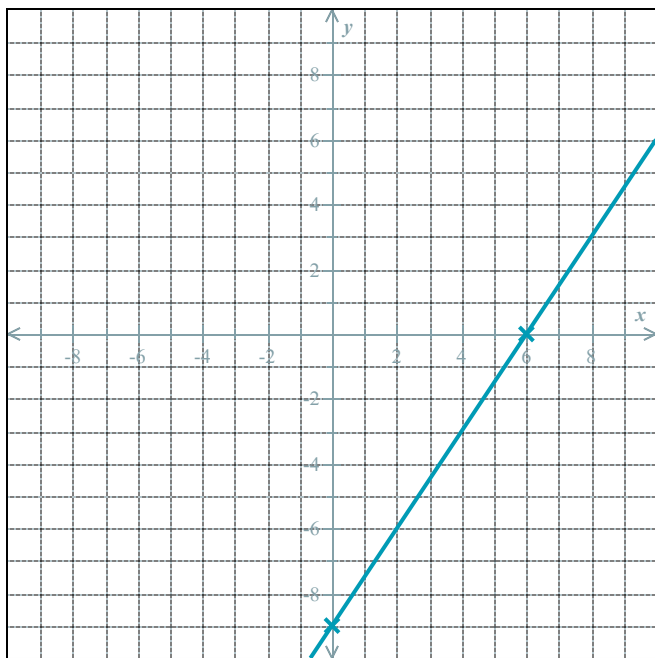
Question 10 of 26

Line 1	Line 2	Line 3	Line 4
◉ Positive ○ Negative ○ Zero ○ Undefined	○ Positive ◉ Negative ○ Zero ○ Undefined	○ Positive ○ Negative ○ Zero ◉ Undefined	○ Positive ○ Negative ◉ Zero ○ Undefined

Question 11 of 26

$$\frac{3}{2}$$

Question 12 of 26

$$\frac{1}{4}$$

Find the slope of the line passing through the points $(-7, -4)$ and $(3, -4)$.

slope: 0

Find the slope of the line passing through the points $(2, 2)$ and $(2, -1)$.

slope: Undefined

Question 14 of 26
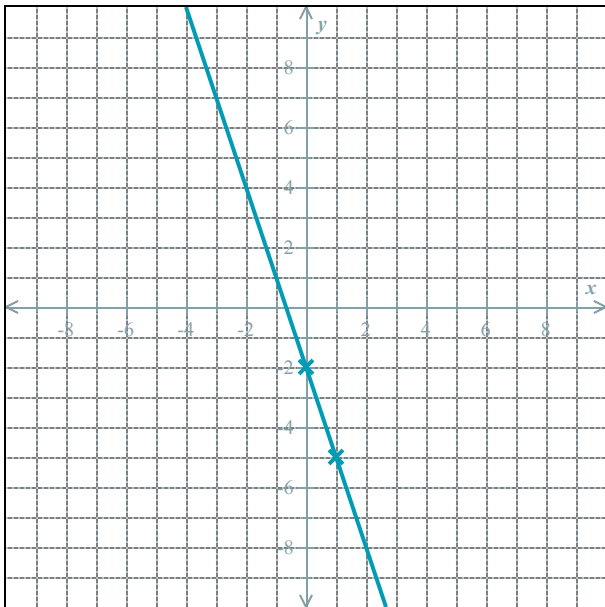
Question 15 of 26
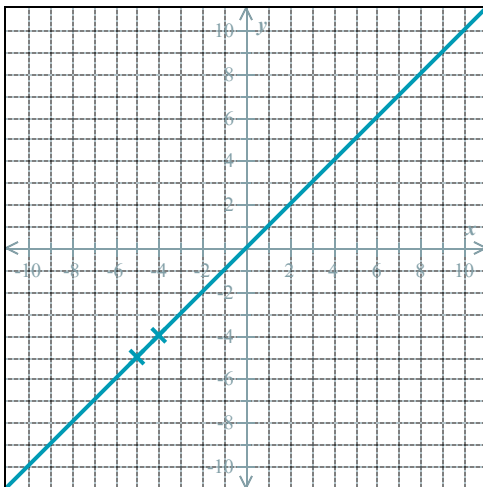
Question 16 of 26

slope: 3

y-intercept: -4
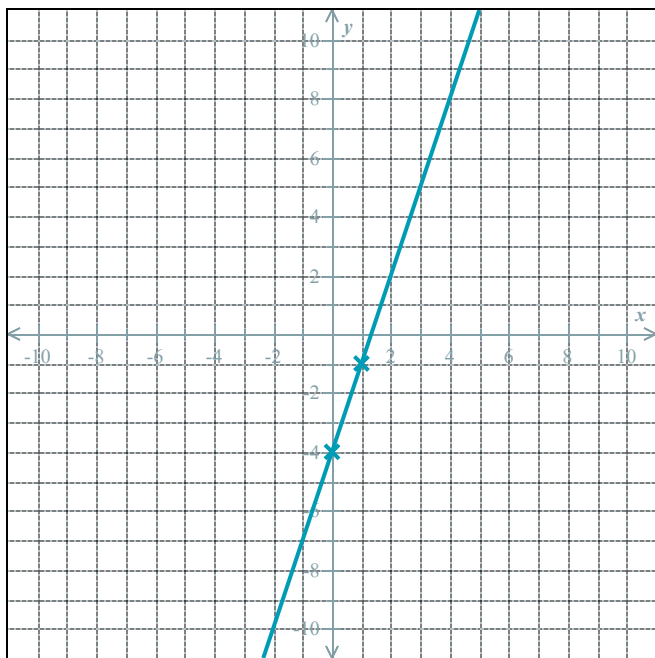
Question 17 of 26
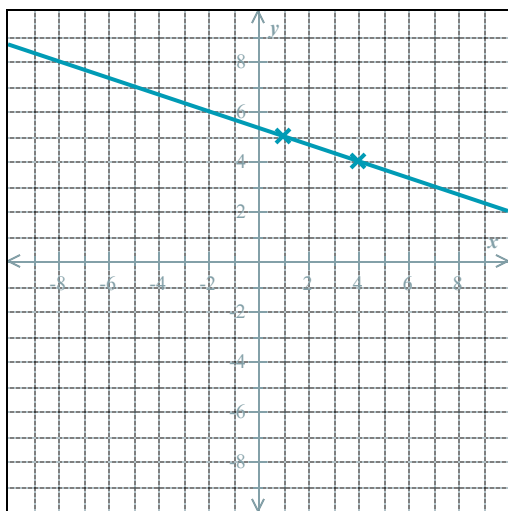
Question 18 of 26

$$y = \frac{1}{5}x + \frac{9}{5}$$

Question 19 of 26

horizontal line: $y = 8$

vertical line: $x = -8$

Question 20 of 26

Slope of a parallel line: 2

Slope of a perpendicular line: $-\dfrac{1}{2}$

Question 21 of 26

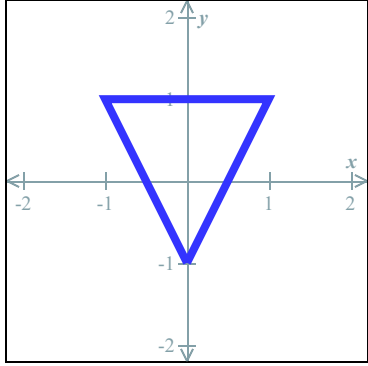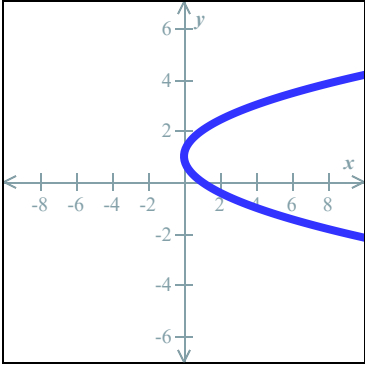Equation of perpendicular line: $y = \dfrac{1}{9}x + \dfrac{49}{9}$
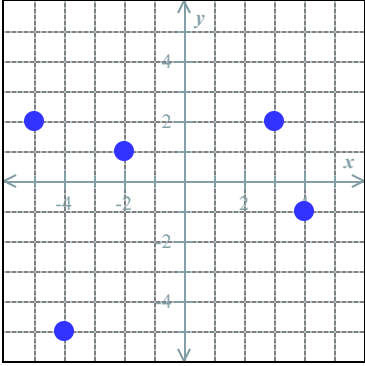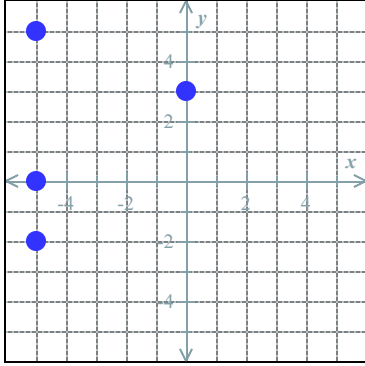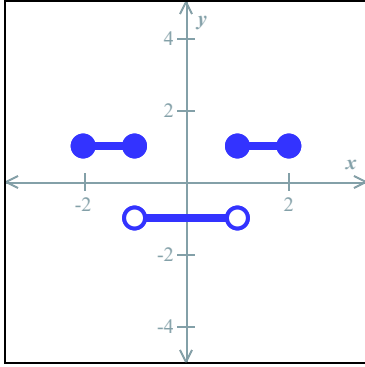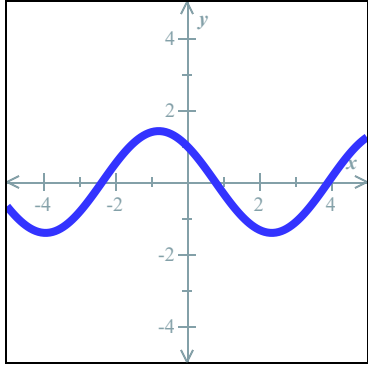
Equation of parallel line: $y = -9x - 31$

Question 22 of 26

Relation 1	Relation 2
Domain Range	Domain Range

Relation 1

Domain   Range

sky → −1, 2

pencil → 9, 0

desk → −6

○ Function
◉ Not a function

Relation 2

Domain   Range

9 → 0, 2, 9

○ Function
◉ Not a function

Relation 3

$\{(u, d), (a, z), (z, z), (d, z)\}$

◉ Function
○ Not a function

Relation 4

$\{(5, s), (3, t), (-5, t), (5, t)\}$

○ Function
◉ Not a function

Question 23 of 26

For each graph below, state whether it represents a function.

	Graph 1	Graph 2	Graph 3
Function?	● Yes ○ No	○ Yes ● No	○ Yes ● No
	Graph 4	Graph 5	Graph 6
Function?	○ Yes ● No	● Yes ○ No	● Yes ○ No

Question 24 of 26

domain $= \{6, 4\}$
range $= \{-3, 1, 4\}$

Question 25 of 26

$f(-3) = 27$
$g(7) = -26$

Question 26 of 26

(a)   domain $= [-3, \ 3)$
(b)   range $= (-4, \ 5]$

ALEKS®

Systems of Linear Equations Worksheet

Class Name : **Beginning & Intermediate Algebra**

Instructor Name : **Professor Nancy Mahan**

Student Name : _____

Instructor Note :

Question 1 of 15

Graph the system below and write its solution.

$$\begin{cases} 3x+y=-6 \\ y=-\dfrac{1}{2}x-1 \end{cases}$$

Note that you can also answer "No solution" or "Infinitely many" solutions.
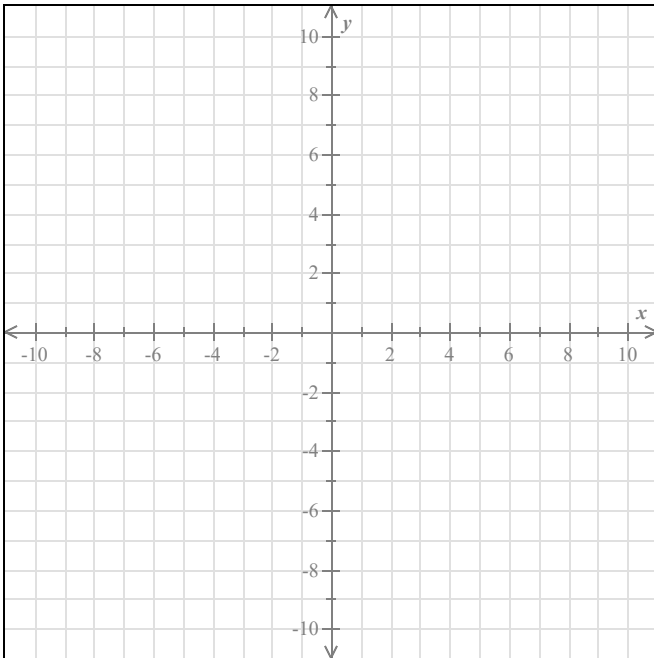
Question 2 of 15

Use substitution to solve the system.

$$5x-3y = 13$$
$$x = 3y+5$$

$x = \boxed{}$

$y = \boxed{}$

Question 3 of 15

Solve the following system of equations.

$$5x+3y=-6$$
$$2x-3y=27$$

Question 4 of 15

Solve the following system of equations.

$$5x-8y=-17$$
$$-7x+6y=3$$

Question 5 of 15

Solve the following system of equations.

$$-\frac{2}{3}x+\frac{1}{2}y=6$$

$$\frac{1}{2}x+\frac{1}{4}y=-2$$

Question 6 of 15

Two systems of equations are given below.
For each system, choose the best description of its solution.
If applicable, give the solution.

$-x + 2y = 8$ $x - 2y = 8$	○ The system has no solution. ○ The system has a unique solution: $(x, y) = (\boxed{}, \boxed{})$ ○ The system has infinitely many solutions. They must satisfy the following equation: $y = \boxed{}$
$-x + 5y = 5$ $x - 5y = -5$	○ The system has no solution. ○ The system has a unique solution: $(x, y) = (\boxed{}, \boxed{})$ ○ The system has infinitely many solutions. They must satisfy the following equation: $y = \boxed{}$

Question 7 of 15

Solve the system.

$$-x + y + 2z = -3$$
$$3x - y + z = -2$$
$$2x - 3y - 4z = 1$$

Question 8 of 15

A party rental company has chairs and tables for rent. The total cost to rent 3 chairs and 5 tables is $\$38$. The total cost to rent 6 chairs and 2 tables is $\$26$. What is the cost to rent each chair and each table?

Question 9 of 15

Two mechanics worked on a car. The first mechanic worked for 20 hours, and the second mechanic worked for 5 hours. Together they charged a total of $\$2050$. What was the rate charged per hour by each mechanic if the sum of the two rates was $\$155$ per hour?

    First mechanic:
    Second mechanic:

A chef is going to use a mixture of two brands of Italian dressing. The first brand contains 7% vinegar, and the second brand contains 12% vinegar. The chef wants to make 320 milliliters of a dressing that is 11% vinegar. How much of each brand should she use?

First brand: _____ milliliters
Second brand: _____ milliliters

Question 11 of 15

Flying against the wind, an airplane travels 5130 kilometers in 9 hours. Flying with the wind, the same plane travels 7280 kilometers in 8 hours. What is the rate of the plane in still air and what is the rate of the wind?

Rate of the plane in still air: $\boxed{}$ $\dfrac{\text{km}}{\text{h}}$

Rate of the wind: $\boxed{}$ $\dfrac{\text{km}}{\text{h}}$

Question 12 of 15

Graph the inequality.

$$y \geq -5x - 4$$
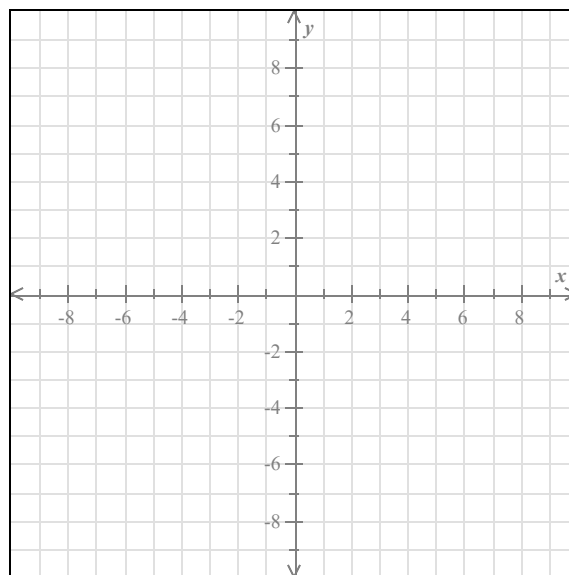
Question 13 of 15

Graph the inequality.

$$-2x+5y<-5$$
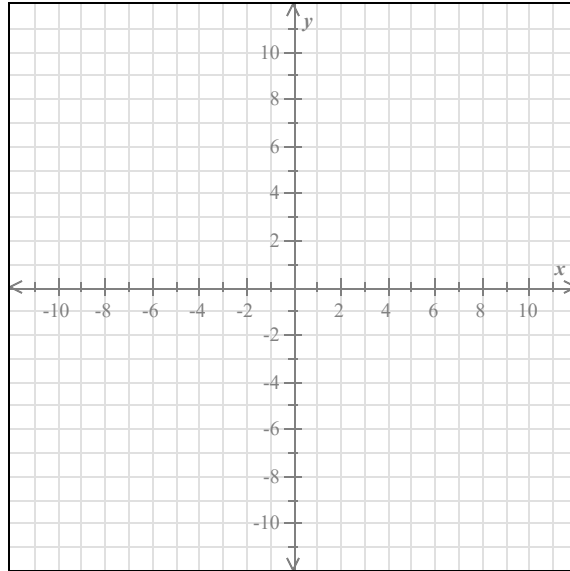
Question 14 of 15

Graph the solution to the following system of inequalities.

$$y \geq 3x+7$$
$$y < -3x-2$$
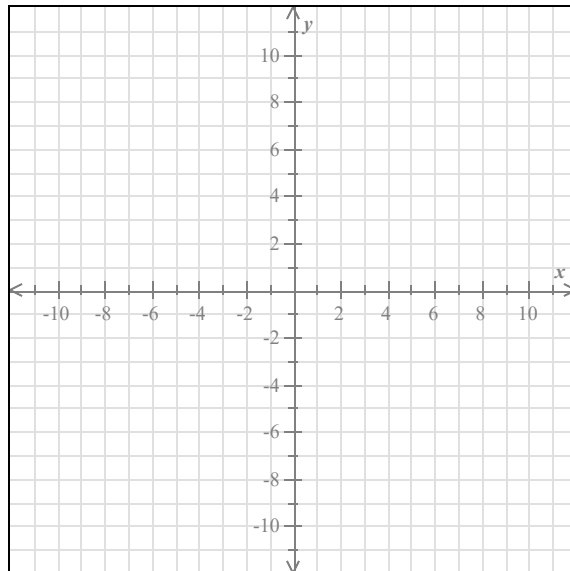
Question 15 of 15

Graph the solution to the following system of inequalities.

$$-4x+3y<6$$
$$5x+6y\geq-12$$

Then give the coordinates of one point in the solution set.
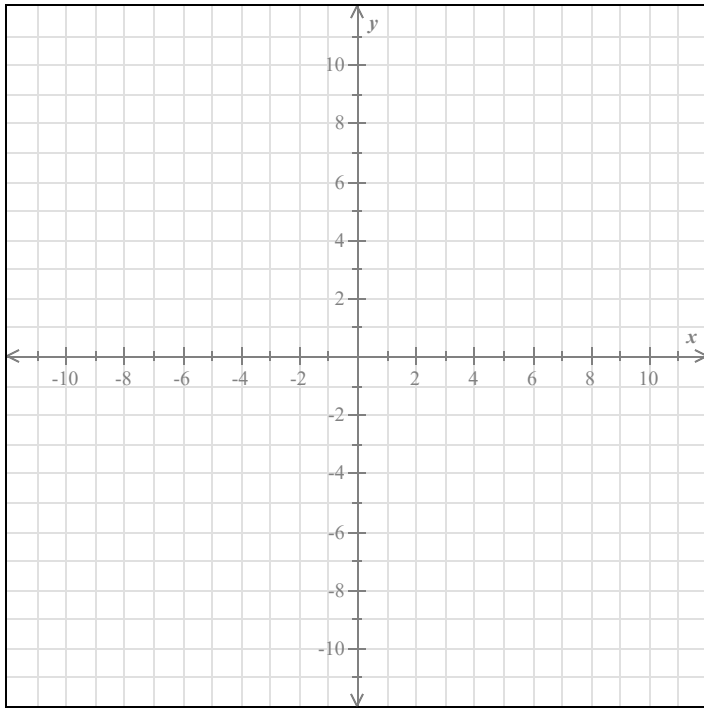
Point in the solution set: _____

Systems of Equations Worksheet #5 Answers for class Math 130_Fall 2020 (Prof. Mahan) - #73399, #73431, #73455

Question 1 of 15
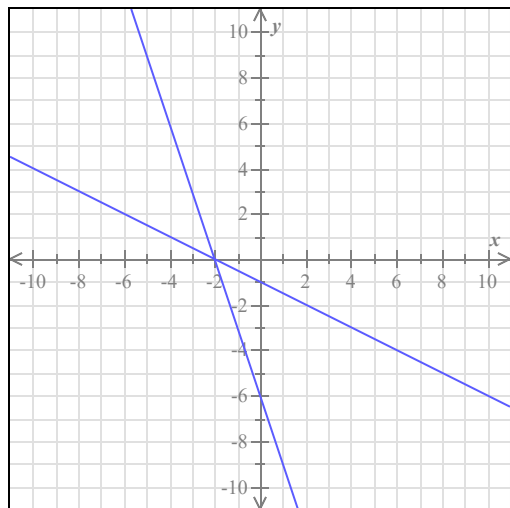
Solution: $(-2, 0)$

Question 2 of 15

$x = 2$
$y = -1$

Question 3 of 15

$x = 3$
$y = -7$

Question 4 of 15

$x = 3$
$y = 4$

Question 5 of 15

$x = -6$

$y = 4$

Question 6 of 15

$-x + 2y = 8$ $x - 2y = 8$	⦿ The system has no solution. ○ The system has a unique solution: $(x, y) = (\boxed{}, \boxed{})$ ○ The system has infinitely many solutions. They must satisfy the following equation: $y = \boxed{}$
$-x + 5y = 5$ $x - 5y = -5$	○ The system has no solution. ○ The system has a unique solution: $(x, y) = (\boxed{}, \boxed{})$ ⦿ The system has infinitely many solutions. They must satisfy the following equation: $y = \dfrac{x}{5} + 1$

Question 7 of 15

$x = 2$

$y = 5$

$z = -3$

Question 8 of 15

Cost to rent each chair: $2.25
Cost to rent each table: $6.25

Question 9 of 15

First mechanic: $85 per hour
Second mechanic: $70 per hour

Question 10 of 15

First brand: 64 milliliters

Second brand: 256 milliliters

Question 11 of 15

Rate of the plane in still air: $740 \ \dfrac{\text{km}}{\text{h}}$

Rate of the wind: $170 \ \dfrac{\text{km}}{\text{h}}$

Question 12 of 15
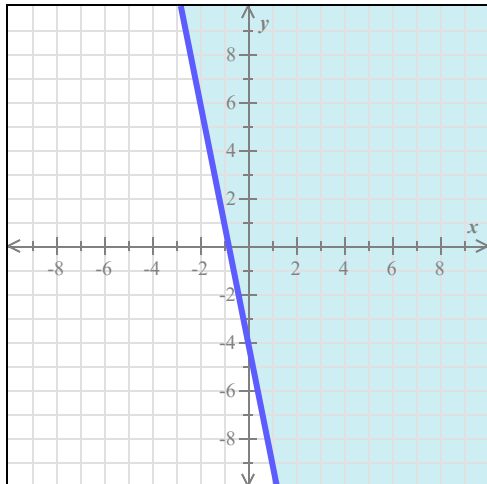
Question 13 of 15
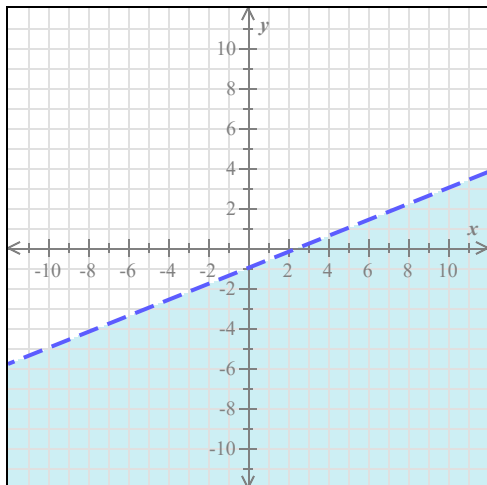
Question 14 of 15
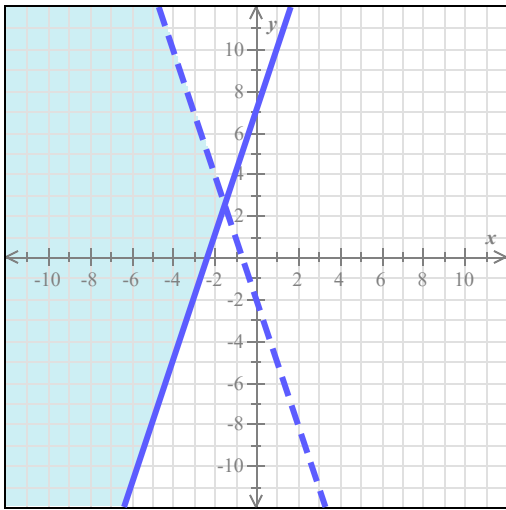
Question 15 of 15
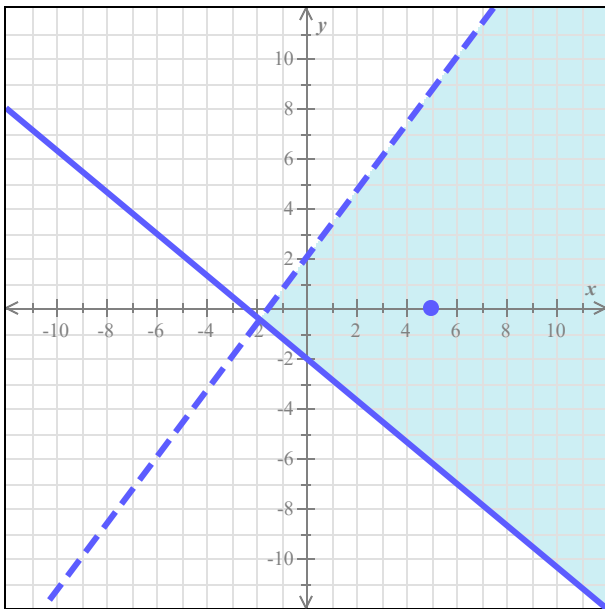
Point in the solution set : $(5, 0)$

Class Name : **Beginning & Intermediate Algebra**

Instructor Name : **Prof. Mahan**

Student Name : _____

Instructor Note :

Question 1 of 25

Simplify.

$$w \cdot w^5 \cdot w^4$$

Question 2 of 25

Multiply.

$$4 y^5 u^5 \cdot 2 u^4 \cdot 3 y$$

Simplify your answer as much as possible.

Question 3 of 25

Simplify.

$$\left(y^5 \right)^3$$

Write your answer without parentheses.

Question 4 of 25

Simplify.

$$\left(4 w \right)^2$$

Write your answer without parentheses.

Question 5 of 25

Simplify.

$$\left(-7 u^4 v \right)^2$$

Write your answer without parentheses.

Simplify.

$$\left(\dfrac{y^4}{-7x^2}\right)^2$$

Write your answer without parentheses.

Simplify.

$$(-2xy)^2\left(3x^2y^3z^4\right)$$

Simplify.

$$\dfrac{12\,w\,x^4}{18\,w^3\,x^4}$$

Simplify.

$$\left(\dfrac{3a^3}{4a^5b^2}\right)^2$$

Write your answer using only positive exponents.

Evaluate the expressions.

$$\left(\dfrac{2}{9}\right)^0 = \Box$$

$$-(7)^0 = \Box$$

Question 11 of 25

Rewrite the following without an exponent.

$$5^{-2}$$

Question 12 of 25

Rewrite the following without an exponent.

$$\left(\frac{3}{5}\right)^{-1}$$

Question 13 of 25

Rewrite the following without an exponent.

$$(-6)^{-1}$$

Question 14 of 25

Simplify.

$$6x^{-9}w^6w^{-1}\cdot 2u^{-2}\cdot 8x^{10}u$$

Use only positive exponents in your answer.

Question 15 of 25

Simplify.

$$\frac{3a^9b^8c^{-6}}{18a^{-7}b^{-2}}$$

Write your answer using only positive exponents.

Question 16 of 25

Simplify.

$$\left(2x^{-5}y^2\right)^{-4}$$

Write your answer using only positive exponents.

Question 17 of 25

Simplify.

$$\left(\frac{3z^3}{z^{-5}}\right)^{-2}$$

Write your answer using only positive exponents.

Question 18 of 25

Simplify.

$$\left(\frac{3x^{-3}y}{z^{-2}}\right)^3 \left(y^3z^{-1}\right)$$

Write your answer using only positive exponents.

Question 19 of 25

Simplify.

$$\left(5w^2+7w-7\right)+\left(7w^2-5w-7\right)-\left(8w^2-3w+3\right)$$

Question 20 of 25

Simplify.

$$\left(6x^2y^3 - 3y^2 + 7x^3\right) - \left(2x^3y^2 + x^3 - 4x^2y^3\right)$$

Question 21 of 25

Rewrite without parentheses.

$$-5x^2y^6\left(9y^4 - 6x + 3\right)$$

Simplify your answer as much as possible.

Rewrite without parentheses and simplify.

$$(y+2)^2$$

Multiply.

$$(7x-2)(4x-5w+5)$$

Simplify your answer.

Divide.

$$\frac{20z^3 - 16z^2}{4z^2}$$

Simplify your answer as much as possible.

Divide.

$$\left(6x^2 + 28x + 18\right) \div (x+4)$$

Your answer should give the quotient and the remainder.

Quotient:

Remainder:

Exponents and Polynomials #1 Answers for class Math 130_Summer 2020 (Prof. Mahan) - Section #50981

Question 1 of 25

$$w^{10}$$

Question 2 of 25

$$24\,y^6\,u^9$$

Question 3 of 25

$$y^{15}$$

Question 4 of 25

$$16\,w^2$$

Question 5 of 25

$$49\,u^8\,v^2$$

Question 6 of 25

$$\frac{y^8}{49\,x^4}$$

Question 7 of 25

$$12\,x^4\,y^5\,z^4$$

Question 8 of 25

$$\frac{2}{3\,w^2}$$

Question 9 of 25

$$\frac{9}{16\,a^4\,b^4}$$

Question 10 of 25

$$\left(\frac{2}{9}\right)^0 = 1$$

$$-(7)^0 = -1$$

Question 11 of 25

$$\frac{1}{25}$$

Question 12 of 25

$$\frac{5}{3}$$

Question 13 of 25

$$-\frac{1}{6}$$

Question 14 of 25

$$\frac{96\,x\,w^5}{u}$$

Question 15 of 25

$$\frac{a^{16}\,b^{10}}{6\,c^6}$$

Question 16 of 25

$$\frac{x^{20}}{16\,y^8}$$

$$\frac{1}{9z^{16}}$$

$$\frac{27y^6z^5}{x^9}$$

$$4w^2 + 5w - 17$$

$$10x^2y^3 - 3y^2 + 6x^3 - 2x^3y^2$$

$$-45x^2y^{10} + 30x^3y^6 - 15x^2y^6$$

$$y^2 + 4y + 4$$

$$28x^2 - 35xw + 27x + 10w - 10$$

$$5z - 4$$

Quotient: $6x + 4$

Remainder: 2

Class Name : **Beginning & Intermediate Algebra**

Instructor Name : **Prof. Nancy Mahan**

Student Name : _____

Instructor Note :

Question 1 of 19

Find the greatest common factor of these two expressions.

$$12u^6w^2 \text{ and } 20u^4v^7w^5$$

Question 2 of 19

Factor $15a^3 + 6a^2$.

Question 3 of 19

Factor the following expression.

$$24u^9v^6 - 30u^5v^3w^4$$

Question 4 of 19

Rewrite the expression by factoring out $(x-5)$.

$$3x^2(x-5) - 7(x-5)$$

Question 5 of 19

Factor by grouping.

$$4v^3 + 7v^2 + 12v + 21$$

Question 6 of 19

Factor by grouping.

$$vx - 5v - 2x + 10$$

Question 7 of 19

Factor.

$$x^2 - xy - 20y^2$$

Question 8 of 19

Factor completely.

$$6y^2 + 66y - 72$$

Question 9 of 19

Factor.

$$2x^2 - 5x + 3$$

Question 10 of 19

Factor.

$$3x^2 - 11xy + 6y^2$$

Question 11 of 19

Factor.

$$25u^2 - 36$$

Question 12 of 19

Factor.

$$9u^2 - 49w^2$$

Question 13 of 19

Factor completely:

$$3x^2y^4 - 3x^2.$$

Question 14 of 19

Factor.

$$64 - 27u^3$$

Question 15 of 19

Solve.

$$(5-u)(4u+3)=0$$

(If there is more than one solution, separate them with commas.)

Question 16 of 19

Solve for y.

$$3y^2 - 21y = 0$$

Question 17 of 19

Solve for y.

$$3y^2 - 5 = 2y$$

Question 18 of 19

Solve for y.

$$2y^2 + 11y + 21 = (y+7)^2$$

If there is more than one solution, separate them with commas.

Question 19 of 19

A kite flying in the air has a 9-ft line attached to it. Its line is pulled taut and casts a 7-ft shadow. Find the height of the kite. If necessary, round your answer to the nearest tenth.
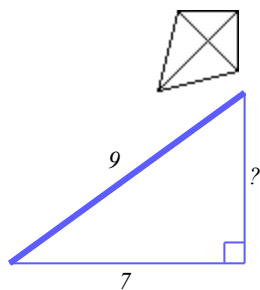
Worksheet: Factoring #1 Answers for class Math 130_Fall 2020 (Prof. Mahan) - #73399, #73431, #73455

Question 1 of 19

$4u^4w^2$

Question 2 of 19

$3a^2(5a+2)$

Question 3 of 19

$6u^5v^3\left(4u^4v^3-5w^4\right)$

Question 4 of 19

$(x-5)\left(3x^2-7\right)$

Question 5 of 19

$(4v+7)\left(v^2+3\right)$

Question 6 of 19

$(x-5)(v-2)$

Question 7 of 19

$(x+4y)(x-5y)$

Question 8 of 19

$6(y-1)(y+12)$

Question 9 of 19

$(x-1)(2x-3)$

Question 10 of 19

$(3x-2y)(x-3y)$

Question 11 of 19

$(5u+6)(5u-6)$

Question 12 of 19

$(3u+7w)(3u-7w)$

Question 13 of 19

$3x^2(y-1)(y+1)(y^2+1)$

Question 14 of 19

$(4-3u)(16+12u+9u^2)$

Question 15 of 19

$u=5, -\dfrac{3}{4}$

Question 16 of 19

$y=0, 7$

Question 17 of 19

$\dfrac{5}{3}, -1$

Question 18 of 19

$y=7, -4$

Question 19 of 19

5.7 ft

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Student Name : _____

Class Name : **Beginning and Intermediate Algebra**

Number of Questions: **19**

Instructor Name : **Nancy Mahan**

Question 1 of 19

Find all excluded values for the expression.
That is, find all values of y for which the expression is undefined.

$$\frac{8y+1}{4y-12}$$

If there is more than one value, separate them with commas.

Question 2 of 19

Find all excluded values for the expression.
That is, find all values of w for which the expression is undefined.

$$\frac{w-5}{w^2+2w-48}$$

If there is more than one value, separate them with commas.

Question 3 of 19

The function h is defined as follows.

$$h(x) = \frac{x-12}{4x+2}$$

Find $h(7)$.

Simplify your answer as much as possible.

Question 4 of 19

The function h is defined below.

$$h(x) = \frac{x^2 - 10x + 24}{x^2 - 4}$$

Find all values of x that are NOT in the domain of h.
If there is more than one value, separate them with commas.

Question 5 of 19

Simplify.

$$\frac{56(y-7)(3y-5)}{7(3y-5)(y+2)}$$

You may leave the numerator and denominator of your answer in factored form.

Question 6 of 19

Simplify.

$$\frac{12w^2 - 8w}{4w^2 - 20w}$$

Question 7 of 19

For each expression, simplify if possible.

$$\frac{2x+5}{5x+2} =$$

$$\frac{8x-3}{3-8x} =$$

Question 8 of 19

Simplify.

$$\frac{x-7}{x^2-49}$$

Question 9 of 19

Simplify.

$$\frac{y^2 - 9y + 20}{4y^2 - 52y + 160}$$

Question 10 of 19

Simplify.

$$\frac{2x^2 + 13x + 15}{4x^2 - 9}$$

Question 11 of 19

Simplify.

$$\frac{20u^6 x^6}{10u^3 v^3 - 5u^4}$$

Question 12 of 19

Multiply.

$$\frac{x+4}{3x-21} \cdot \frac{6x-42}{5x+20}$$

Simplify your answer as much as possible.

Question 13 of 19

Multiply.

$$\frac{x^2 - 5x + 6}{x^2 + 3x + 2} \cdot \frac{x+2}{4x-12}$$

Simplify your answer as much as possible.

Question 14 of 19

Divide.

$$\frac{4x+8}{x^2-2x-3} \div \frac{x+2}{x^2+4x+3}$$

Simplify your answer as much as possible.

Question 15 of 19

Divide.

$$\frac{5x-45y}{x^2-16y^2} \div \frac{x-9y}{x^2+xy-12y^2}$$

Simplify your answer as much as possible.

Question 16 of 19

Subtract.

$$\frac{x^2-3x}{x^2+4x+4} - \frac{10}{x^2+4x+4}$$

Simplify your answer as much as possible.

Question 17 of 19

Subtract.

$$\frac{x}{4x-9} - \frac{x+6}{5x}$$

Simplify your answer as much as possible.

Question 18 of 19

Subtract.

$$\frac{4x}{5x+15} - \frac{x-5}{2x+6}$$

Simplify your answer as much as possible.

Add.

$$\frac{2}{3x^2+8x+5} + \frac{1}{3x^2+11x+10}$$

Simplify your answer as much as possible.

Class Name : **Beginning and Intermediate Algebra**

Number of Questions: **19**

Question 1 of 19

$y = 3$

Question 2 of 19

$w = -8, \ 6$

Question 3 of 19

$h(7) = -\dfrac{1}{6}$

Question 4 of 19

$x = -2, 2$

Question 5 of 19

$\dfrac{8(y-7)}{y+2}$

Question 6 of 19

$\dfrac{3w-2}{w-5}$

Question 7 of 19

$\dfrac{2x+5}{5x+2}$ Cannot be simplified

$\dfrac{8x-3}{3-8x} = -1$

Question 8 of 19

$$\frac{1}{x+7}$$

Question 9 of 19

$$\frac{(y-4)}{4(y-8)}$$

Question 10 of 19

$$\frac{x+5}{2x-3}$$

Question 11 of 19

$$\frac{4u^3x^6}{2v^3-u}$$

Question 12 of 19

$$\frac{2}{5}$$

Question 13 of 19

$$\frac{x-2}{4(x+1)}$$

Question 14 of 19

$$\frac{4(x+3)}{x-3}$$

Question 15 of 19

$$\frac{5(x-3y)}{x-4y}$$

Question 16 of 19

$$\frac{x-5}{x+2}$$

$$\frac{(x-6)(x-9)}{5x(4x-9)}$$

$$\frac{3x+25}{10(x+3)}$$

$$\frac{1}{(x+2)(x+1)}$$

Student Name : _____

Class Name : **Beginning and Intermediate Algebra**

Number of Questions: **12**

Instructor Name : **Professor Nancy Mahan**

Question 1 of 12

Simplify.

$$\frac{\dfrac{u^2+7u+10}{12u^5}}{\dfrac{u+5}{4u^3}}$$

Question 2 of 12

Simplify.

$$\frac{\dfrac{x}{49}-\dfrac{1}{x}}{\dfrac{5}{49}-\dfrac{5}{7x}}$$

Question 3 of 12

Simplify.

$$\frac{\dfrac{6}{u-3}+\dfrac{1}{u+4}}{\dfrac{9}{u-3}-\dfrac{2}{u+4}}$$

Question 4 of 12

Simplify.

$$\dfrac{\dfrac{5}{v^2 u}}{\dfrac{3}{u^2} + \dfrac{1}{v}}$$

Question 5 of 12

Solve for x.

$$-6 = \dfrac{3}{x}$$

Simplify your answer as much as possible.

Question 6 of 12

Solve for w.

$$4 = \dfrac{3}{w-8}$$

Simplify your answer as much as possible.

Question 7 of 12

Solve for x.

$$\dfrac{3}{x-4} + \dfrac{6}{x^2 - 16} = \dfrac{1}{x+4}$$

Question 8 of 12

Solve for x.

$$\dfrac{x}{x+6} = \dfrac{-3}{x+8}$$

Solve for x.

$$x + \frac{7}{x} = -8$$

Question 10 of 12

Sam drove 420 miles using 18 gallons of gas. At this rate, how many gallons of gas would he need to drive 357 miles?

Question 11 of 12

Working together, two pumps can drain a certain pool in 6 hours. If it takes the older pump 14 hours to drain the pool by itself, how long will it take the newer pump to drain the pool on its own?

Do not do any rounding.

Question 12 of 12

A plane has a cruising speed of 100 miles per hour when there is no wind. At this speed, the plane flew 600 miles with the wind in the same amount of time it flew 400 miles against the wind. Find the speed of the wind.

Class Name : **Beginning and Intermediate Algebra**

Number of Questions: **12**

Question 1 of 12

$$\frac{u+2}{3u^2}$$

Question 2 of 12

$$\frac{x+7}{5}$$

Question 3 of 12

$$\frac{u+3}{u+6}$$

Question 4 of 12

$$\frac{5u}{v\left(3v+u^2\right)}$$

Question 5 of 12

$$x=-\frac{1}{2}$$

Question 6 of 12

$$w=\frac{35}{4}$$

Question 7 of 12

$$x=-11$$

Question 8 of 12

$x = -9, \ -2$

Question 9 of 12

$x = -7, \ -1$

Question 10 of 12

15.3 gallons

Question 11 of 12

10.5 hours

Question 12 of 12

Speed of the wind: 20 miles/hour

Class Name : **Beginning & Intermediate Algebra**   Instructor Name : **Prof. Nancy Mahan**

Student Name : _____

Question 1 of 17

Simplify.

$$\sqrt{x^6}$$

Assume that the variable represents a positive real number.

Question 2 of 17

Find the value of $\sqrt[3]{8}$.

Question 3 of 17

Simplify.

$$\sqrt{8}$$

Question 4 of 17

Simplify.

$$\sqrt{128}$$

Question 5 of 17

Simplify.

$$\sqrt{8x^6}$$

Assume that the variable X represents a positive real number.

Question 6 of 17

Simplify.

$$\sqrt{54x^5}$$

Assume that the variable represents a positive real number.

Simplify.

$$\sqrt{20s^{11}t^{10}}$$

Assume that all variables represent positive real numbers.

Question 8 of 17

Write the following in simplified radical form.

$$\sqrt[4]{162y^{10}}$$

Assume that the variable represents a positive real number.

Question 9 of 17

Simplify.

$$8\sqrt{2} + 4\sqrt{2}$$

Question 10 of 17

Simplify.

$$13\sqrt{3} + 5\sqrt{75} - \sqrt{27}$$

Question 11 of 17

Simplify.

$$5y\sqrt{80y} + \sqrt{45y^3}$$

Assume that the variable represents a positive real number.

Question 12 of 17

Simplify as much as possible.

$$x\sqrt{27v^5} + 2v^2\sqrt{48vx^2}$$

Assume that all variables represent positive real numbers.

Question 13 of 17

Simplify.

$$\sqrt{80} \times 2\sqrt{18}$$

Question 14 of 17

Simplify.

$$\sqrt{3x^4}\sqrt{6x^2}$$

Assume that the variable represents a positive real number.

Question 15 of 17

Simplify.

$$\sqrt{2u^3y^2}\sqrt{8uy^3}$$

Assume that all variables represent positive real numbers.

Question 16 of 17

Multiply.

$$\sqrt{7}\left(\sqrt{2} - 12\right)$$

Simplify your answer as much as possible.

Question 17 of 17

Multiply.

$$\left(9\sqrt{3} + 7\sqrt{10}\right)\left(9\sqrt{10} - 4\sqrt{3}\right)$$

Simplify your answer as much as possible.

Radicals Part A Worksheet #1 Answers for class Math 130_Fall 2020 (Prof. Mahan) - #73399, #73431, #73455

Question 1 of 17

x^3

Question 2 of 17

2

Question 3 of 17

$2\sqrt{2}$

Question 4 of 17

$8\sqrt{2}$

Question 5 of 17

$2x^3\sqrt{2}$

Question 6 of 17

$3x^2\sqrt{6x}$

Question 7 of 17

$2s^5t^5\sqrt{5s}$

Question 8 of 17

$3y^2\sqrt[4]{2y^2}$

Question 9 of 17

$12\sqrt{2}$

Question 10 of 17

$35\sqrt{3}$

Question 11 of 17

$$23y\sqrt{5y}$$

Question 12 of 17

$$11v^2x\sqrt{3v}$$

Question 13 of 17

$$24\sqrt{10}$$

Question 14 of 17

$$3x^3\sqrt{2}$$

Question 15 of 17

$$4u^2y^2\sqrt{y}$$

Question 16 of 17

$$\sqrt{14} - 12\sqrt{7}$$

Question 17 of 17

$$522 + 53\sqrt{30}$$

Module 10: Radicals Part B Worksheet

Class Name : **Beginning & Intermediate Algebra**

Instructor Name : **Professor Nancy Mahan**

Student Name : _____

Instructor Note :

Question 1 of 20

Simplify.

$$\frac{\sqrt{60}}{\sqrt{15}}$$

Question 2 of 20

Rationalize the denominator and simplify.

$$\frac{\sqrt{2}}{\sqrt{5}}$$

Question 3 of 20

Rationalize the denominator and simplify.

$$\sqrt{\frac{5}{2}}$$

Question 4 of 20

Rationalize the denominator and simplify.
Assume that the variable represents a positive real number.

$$\frac{\sqrt{2}}{\sqrt{3y}}$$

Question 5 of 20

Rationalize the denominator and simplify.

$$\frac{3}{7 - 2\sqrt{5}}$$

Question 6 of 20

Rationalize the denominator and simplify.

$$\frac{\sqrt{11} - \sqrt{3}}{\sqrt{11} + \sqrt{3}}$$

Question 7 of 20

Rationalize the denominator and simplify.

$$\frac{-7}{3\sqrt{x} + 1}$$

Assume that the variable represents a positive real number.

Question 8 of 20

Solve for u, where u is a real number.

$$\sqrt{u + 8} = 5$$

Question 9 of 20

Solve for u, where u is a real number.

$$1 = \sqrt{4u - 15} - 2$$

Question 10 of 20

Solve for u, where u is a real number.

$$\sqrt{11u - 30} = u$$

Question 11 of 20

Solve for w, where w is a real number.

$$w - 4 = \sqrt{-w + 34}$$

Question 12 of 20

Solve for v, where v is a real number.

$$3v = \sqrt{10v^2 - 8v + 12}$$

Question 13 of 20

Solve for y, where y is a real number.

$$\sqrt[3]{y} = 3$$

Question 14 of 20

Solve for w, where w is a real number.

$$w^{\frac{1}{3}} = 5$$

Question 15 of 20

Write in terms of i.
Simplify your answer as much as possible.

$$\sqrt{-75}$$

Question 16 of 20

Simplify the expressions below as much as possible.

Leave no negative numbers under radicals and no radicals in denominators.

$$\frac{\sqrt{-48}}{\sqrt{-16}} = \boxed{}$$

$$\sqrt{-32} \cdot \sqrt{-2} = \boxed{}$$

Question 17 of 20

Subtract.

$$(4-6i)-(-6+3i)$$

Write your answer as a complex number in standard form.

Question 18 of 20

Multiply.

$$(5-6i)(6-4i)$$

Write your answer as a complex number in standard form.

Question 19 of 20

Divide.

$$\frac{-2}{-5+4i}$$

Write your answer as a complex number in standard form.

Question 20 of 20

Simplify the complex number i^{65} as much as possible.

Radicals Part B Worksheet #1 Answers for class Math 130_Fall 2020 (Prof. Mahan) - #73399, #73431, #73455

Question 1 of 20

2

Question 2 of 20

$$\frac{\sqrt{10}}{5}$$

Question 3 of 20

$$\frac{\sqrt{10}}{2}$$

Question 4 of 20

$$\frac{\sqrt{6y}}{3y}$$

Question 5 of 20

$$\frac{21+6\sqrt{5}}{29}$$

Question 6 of 20

$$\frac{7-\sqrt{33}}{4}$$

Question 7 of 20

$$\frac{-21\sqrt{x}+7}{9x-1}$$

Question 8 of 20

$u=17$

Question 9 of 20

$u=6$

Question 10 of 20

$u = 6, \ 5$

Question 11 of 20

$w = 9$

Question 12 of 20

$v = 6, \ 2$

Question 13 of 20

$y = 27$

Question 14 of 20

$w = 125$

Question 15 of 20

$5i\sqrt{3}$

Question 16 of 20

$$\frac{\sqrt{-48}}{\sqrt{-16}} = \sqrt{3}$$

$$\sqrt{-32} \cdot \sqrt{-2} = -8$$

Question 17 of 20

$10 - 9i$

Question 18 of 20

$6 - 56i$

Question 19 of 20

$$\frac{10}{41} + \frac{8}{41}i$$

i