Greetings Upcoming Fayette Academy (FA) Dual Enrollment (DE) Mathematics Students,

I hope you enjoy your summer vacation and am looking forward to having you in my class.

Our Math DE classes are composed of 2 University of Tennessee Courses: MAT 140, "Precalculus College Algebra", offered this Fall 2021 MAT 170, "Precalculus Trigonometry", offered the following Spring 2022

UT Martin's MAT 140 published syllabus begins with Chapter 3 (Chapter R through Chapter 2 topics were covered in Honors PreCalculus and Honors Algebra 2):

UTM Math 140 Precalculus College Algebra Syllabus UTM Math 170 Precalculus Trigonometry Syllabus

Our FA syllabus incorporates UT's requirements and includes additional details about MAT 140 for Fall.

To help ensure your success in rigorous college-level mathematics, you have mandatory Summer work and preliminary preparations which must be completed prior to the first day of class, August 5, 2022.

- Purchase your Required online access the <u>24-month access</u> <u>Sullivan's Algebra and Trigonometry</u> <u>Enhanced with Graphing Utilities 10<sup>th</sup> Edition.</u> for \$109.99, ISBN-13: 9780135813041. Your Summer work utilizes the online component.
- Your MyLab Math Registration Instructions are on the next page.

\*\*<u>Mandatory</u> Dual Enrollment Summer Work due 8/5/2022: This is a review of Algebra II concepts:

- If you have access to a computer, please use MyLab Math.
  - Complete Chapter O MLM Homework
  - Summer Packet Read Chapter R, MLM Homework
  - Summer Packet Read Chapter 1, MLM Homework
  - Summer Packet Read Chapter 2, MLM Homework
- If you do not have access to a computer, you must complete the DE Summer Packet by hand. This is also on Google Classroom.
  - MAT 140 Summer Packet 1 from Chapter R
  - MAT 140 Summer Packet 2 from Chapter 1
  - MAT 140 Summer Packet 3 from Chapter 2

 Helpful Web sites:
 for Algebra <a href="http://www.purplemath.com/modules/index.htm">http://www.purplemath.com/modules/index.htm</a>

 for Trig:
 <a href="https://www.khanacademy.org/math/trigonometry">https://www.khanacademy.org/math/trigonometry</a>

If you have any questions, please email me at adavis@favikings.org

Cordially, Annita Davis, Ph.D.



**Student Registration Instructions** 

#### To register for 2022 Precalculus:

- 1. Go to <u>https://www.pearson.com/mylab</u>.
- 2. Under Register, select Student.
- 3. Confirm you have the information needed, then select **OK! Register now**.
- 4. Enter your instructor's **course ID**: davis89312 and **Continue**.
- 5. Enter your existing Pearson account username and password to Sign In.
  You have an account if you have ever used a MyLab or Mastering product.
  » If you don't have an account, select Create and complete the required fields.
- 6. Select an access option.

» Enter the access code that came with your textbook or that you purchased separately from the bookstore.

- » If available for your course,
  - Buy access using a credit card or PayPal.
  - Get temporary access.
- 7. From the You're Done! page, select **Go To My Courses**.
- On the My Courses page, select the course name 2022 Precalculus -Demana 10<sup>th</sup> ed to start your work.

#### To sign in later:

- 1. Go to https://www.pearson.com/mylab.
- 2. Select Sign In.
- 3. Enter your Pearson account **username** and **password**, and **Sign In**.
- 4. Select the course name **2022 Precalculus** to start your work.

#### To purchase a 3-hole punched loose-leaf edition for an additional amount

- 1. Go to https://www.pearson.com/mylab.
- 2. Select Sign In.
- 3. Enter your Pearson account username and password, and Sign In.
- 4. Select the course name **2022 Precalculus**.
- 5. Select Purchase Options
- 6. Select Pearson Learner store beneath the Purchase a Loose-Leaf Printed Text

#### To upgrade temporary access to full access:

- 1. Go to <u>https://www.pearson.com/mylab</u>.
- 2. Select Sign In.
- 3. Enter your Pearson account **username** and **password**, and **Sign In**.
- 4. Select Upgrade access for 2022 Precalculus.
- 5. Enter an access code or buy access with a credit card or PayPal.

Purchase the Required 10<sup>th</sup> edition access at the Pearson Book Store: IMPORTANT, be sure to purchase access for the **24** month option.

1<sup>st</sup>: <u>24-month access card including MyLab + etext</u>: ISBN-13: 9780135813041 **\$109.99** 

Then you may purchase a 3-hole punched loose-leaf edition for an additional amount. Log onto your MyLab Math 2022 Precalculus course, and select "Purchase Options"

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R. Review BasicsR.1 Real Numbers:LR.1 Video: Work with SetsR.1 Video: Evaluate NumericaR.1 Exercise # 11, 21, 29, 69,	earning Objectives: al Expressions 77, 89, 97.	<ol> <li>Work with sets</li> <li>Classify numbers</li> <li>Evaluate numerical expressions</li> <li>Work with properties of real number</li> </ol>	PTS
Skill Building	alono orizen dei Alizzaterne d	NIGOLISTICS - PERINT AND APPENDENT - S	-
In Problems 11–22, use $U =$ university find each set.	rsal set = $\{0, 1, 2, 3, 4, 5, 6,$	$\{7, 8, 9\}, A = \{1, 3, 4, 5, 9\}, B = \{2, 4, 6, 7, 8\}$	, and $C = \{1, 3, 4, 6\}$ to
<b>11.</b> $A \cup B$	<b>12.</b> $A \cup C$	<b>13.</b> $A \cap B$ <b>14</b>	$4. \ A \cap C$
15. $(A \cup B) \cap C$	<b>16.</b> $(A \cap B) \cup C$	17. Ā 18	8. <u>C</u>
19. $\overline{A \cap B}$	<b>20.</b> $\overline{B \cup C}$	<b>21.</b> $\overline{A} \cup \overline{B}$ <b>22</b>	<b>2.</b> $\overline{B} \cap \overline{C}$
29. 18.9526 30. 25.8 In Problems 51–88, evaluate each	36134 <b>31.</b> 28.653 expression.	<b>32.</b> 99.05249 . <b>33.</b> 0.06	291
<b>51.</b> 9 - 4 + 2	<b>52.</b> 6 – 4 + 3	<b>53.</b> -6 + 4 · 3	<b>54.</b> 8 – 4 · 2
<b>55.</b> 4 + 5 - 8	<b>56.</b> 8 - 3 - 4	<b>57.</b> $4 + \frac{1}{3}$	<b>58.</b> $2-\frac{1}{2}$
<b>59.</b> 6 - [3 · 5 + 2 · (3 - 2)]	<b>60.</b> $2 \cdot [8 - 3(4 + 2)]$	()] $-3$ <b>61.</b> $2 \cdot (3-5) + 8 \cdot 2 - 1$	<b>62.</b> 1 - (4 · 3 - 2
<b>63.</b> 10 - [6 - 2 · 2 + (8 - 3)]	·2	<b>64.</b> 2 - 5 • 4 - [6 • (3 - 4)]	
<b>65.</b> $(5-3)\frac{1}{2}$	66. $(5+4)\frac{1}{3}$	<b>67.</b> $\frac{4+8}{5-3}$	68. $\frac{2-4}{5-3}$
$\frac{3}{5} \cdot \frac{10}{21}$	<b>70.</b> $\frac{5}{9} \cdot \frac{3}{10}$	<b>71.</b> $\frac{6}{25} \cdot \frac{10}{27}$	<b>72.</b> $\frac{21}{25} \cdot \frac{100}{3}$
<b>73.</b> $\frac{3}{4} + \frac{2}{5}$	<b>74.</b> $\frac{4}{3} + \frac{1}{2}$	<b>75.</b> $\frac{5}{6} + \frac{9}{5}$	<b>76.</b> $\frac{8}{9} + \frac{15}{2}$
<b>77.</b> $\frac{5}{18} + \frac{1}{12}$	<b>78.</b> $\frac{2}{15} + \frac{8}{9}$	<b>79.</b> $\frac{1}{30} - \frac{7}{18}$	<b>80.</b> $\frac{3}{14} - \frac{2}{21}$
In Problems 89–100, use the Distr	ibutive Property to remov	ve the parentheses.	
<b>89.</b> $6(x+4)$	<b>90.</b> $4(2x-1)$	<b>91.</b> $x(x-4)$	
(3 1)	(2 1)		

<b>93.</b> $2\left(\frac{5}{4}x - \frac{1}{2}\right)$	<b>94.</b> $3\left(\frac{2}{3}x + \frac{1}{6}\right)$	<b>95.</b> $(x+2)(x+4)$
<b>97.</b> $(x-2)(x+1)$	<b>98.</b> $(x-4)(x+1)$	<b>99.</b> $(x-8)(x-2)$

<b><u>R.2 Algebra Essentials</u></b> <u>Learning Objectives</u> :	1. Graph inequalities
R.2 Video Laws of Exponents	2. Find distance on the real number line
R.2 Video Square Roots I	3. Evaluate algebraic expressions
R.2 Video Square Roots II	4. Determine the domain of a variable
	5. Use the laws of exponents
	6. Evaluate square roots
	7. Use a calculator to evaluate exponents
	8. Use scientific notation
R.2 Exercises # 17, 21, 61, 65, 69, 85, 89, 145	

1 Problems 15-24, replace the question mark by <, >, or =, whichever is correct. .

**15.** 
$$\frac{1}{2}$$
? 0
 **16.** 5 ? 6
 **17.** -1 ? -2

 **20.**  $\sqrt{2}$ ? 1.41
 **21.**  $\frac{1}{2}$ ? 0.5
 **22.**  $\frac{1}{3}$ ? 0.33

In Problems 59-66, determine which of the values (a) through (d), if any, must be excluded from the domain of the variable in each expression.

(a) $x = 3$	(b) $x = 1$	(c) $x = 0$	(d) $x = -1$				
<b>59.</b> $\frac{x^2-1}{x}$		<b>60.</b> $\frac{x^2+1}{x}$		<b>61.</b> $\frac{x}{x^2 - 9}$	62.	$\frac{x}{x^2+9}$	
<b>63.</b> $\frac{x^2}{x^2+1}$		<b>64.</b> $\frac{x^3}{x^2 - 1}$		65. $\frac{x^2 + 5x - 10}{x^3 - x}$	66.	$\frac{-9x^2-x+1}{x^3+x}$	
In Problems 67–70	), determine the d	lomain of the varial	ble x in each exp	ression.			

67. $\frac{4}{x-5}$	(	<b>68.</b> $\frac{-6}{x+4}$	<b>69.</b> $\frac{x}{x+4}$	<b>70.</b> $\frac{x}{x}$	$\frac{-2}{-6}$
In Problems 75–8	6, simplify each expre	ssion.			
<b>75.</b> $(-4)^2$	<b>76.</b> -4 <sup>2</sup>	77. 4 <sup>-2</sup>	<b>78.</b> -4 <sup>-2</sup>	79. 3-6.34	80. $4^{-2} \cdot 4^{3}$
<b>81.</b> $(3^{-2})^{-1}$	82. $(2^{-1})^{-3}$	<b>83.</b> $\sqrt{25}$	<b>84.</b> √36	<b>85.</b> $\sqrt{(-4)^2}$	86. $\sqrt{(-3)^2}$

In Problems 87-96, simplify each expression. Express the answer so that all exponents are positive. Whenever an exponent is 0 or negative, we assume that the base is not 0.

**87.**  $(8x^3)^2$  **88.**  $(-4x^2)^{-1}$  **89.**  $(x^2y^{-1})^2$  **90.**  $(x^{-1}y)^3$  **91.**  $\frac{x^2y^3}{xy^4}$ 

145. Volume of a Cube The volume V of a cube is the cube of the length x of a side.



<b>R.3</b> Geometry Essentials <u>Learning Objectives</u> :	1. Use the Pythagorean Theorem and its converse
R.3 Video: Pythagorean Theorem	2. Know geometry formulas
	3. Understand congruent triangles and similar triangles
R.3 Exercises #: 19, 25, 31, 33, 47, 51,	

In Problems 19–26, the lengths of the sides of a triangle are given. Determine which are right triangles. For those that are, identify the hypotenuse.

19. 3, 4, 5	20, 6, 8, 10	<b>21.</b> 4, 5, 6	<b>22.</b> 2, 2, 3
23 7 24 25	<b>24.</b> 10. 24. 26	25. 6.4.3	26. 5, 4, 7

27. Find the area A of a rectangle with length 4 inches and width 2 inches.

28. Find the area A of a rectangle with length 9 centimeters and width 4 centimeters.

29. Find the area A of a triangle with height 4 inches and base 2 inches.

30. Find the area A of a triangle with height 9 centimeters and base 4 centimeters.

31. Find the area A and circumference C of a circle of radius 5 meters.

32. Find the area A and circumference C of a circle of radius 2 feet.

33. Find the volume V and surface area S of a closed rectangular box with length 8 feet, width 4 feet, and height 7 feet.

- **47.** How many feet has a wheel with a diameter of 16 inches traveled after 4 revolutions?
- 51. Architecture A Norman window consists of a rectangle surmounted by a semicircle. Find the area of the Norman window shown in the illustration. How much wood frame is needed to enclose the window?



<b>R.4 Polynomials</b> <u>Learning Objectives</u> :	1. Recognize monomials
R.4 Video Monomials	2. Recognize polynomials
R.4 Video: Polynomials	3. Add and subtract polynomials
R.4 +/- Polynomials	4. Multiply polynomials
R.4 Video Multiplying Polynomials	5. Know formulas for special products
R.4 Special Products (FOIL)	6. Divide polynomials using long division
R.4 More Special Products	7. Work with polynomials in two variables
R.4 Video: Polynomial Long Division	
R.4 Exercises #: 37, 47, 69, 83, 95	

In Problems 29-48, add, subtract, or multiply, as indicated. Express your answer as a single polynomial in standard form.

**37.**  $6(x^3 + x^2 - 3) - 4(2x^3 - 3x^2)$  **47.**  $(x + 1)(x^2 + 2x - 4)$ 

In Problems 67–90, multiply the polynomials using the special product formulas. Express your answer as a single polynomial in standard form.

69. (2x+3)(2x-3) 83.  $(x+y)^2$ 

In Problems 91-106, find the quotient and the remainder. Check your work by verifying that

Quotient · Divisor + Remainder = Dividend

95.  $5x^4 - 3x^2 + x + 1$  divided by  $x^2 + 2$ 

R.5 Factoring Polynomials- Facto	or the following		
Learning Objectives:	1. Factor the difference	of 2 squares and the sum and differe	nce of 2 cubes
R.5 Video: Difference of 2 Squares	2. Factor perfect square	28	
R. 5 Video + or - of 2 Cubes	3. Factor a second-deg	ree polynomial: $x^2 + Bx + C$	
R.5 Video: Perfect Squares	4. Factor by grouping		
R.5 2 <sup>nd</sup> Degree Polynomial Intro	5. Factor a second-deg	ree polynomial: $Ax^2 + Bx + C$ , $A \neq$	±1
R.5 Video: Factor by Grouping	6. Complete the square	;	
R.5 Video: Factor a 2 <sup>nd</sup> Degree Poly	ynomial by Grouping		
R.5 Video: Complete the Square			
R.5 Exercises #: 25, 29, 55, 81, 87	, 91, 103, 115.		
In Problems 19–26, factor the differ	rence of two squares.	100 M 20	
19. $x^2 - 1$	<b>20.</b> $x^2 - 4$	<b>21.</b> $4x^2 - 1$	
<b>23.</b> $x^2 - 16$	<b>24.</b> $x^2 - 25$	<b>25.</b> $25x^2 - 4$	
In Problems 27–36, factor the perfe	ect squares.		
<b>27.</b> $x^2 + 2x + 1$	<b>28.</b> $x^2 - 4x + 4$	<b>29.</b> $x^2 + 4x + 4$	
In Problems 55-60, factor by group	ping.		
<b>55.</b> $2x^2 + 4x + 3x + 6$	56. $3x^2 - 3x +$	2x - 2	
Mixed Practice —	htee CollS20ere=2		
In Problems 79–126, factor each p	olynomial completely. If the	polynomial cannot be factored, say it is	prime.
70 + 2 - 26	<b>80</b> <sup>2</sup> 0	<b>et</b> 2 _ e. <sup>2</sup>	82 2
19. x - 30	<b>ou</b> , <i>x</i> <sup>-</sup> - 9	<b>61.</b> 2 - 6x <sup>-</sup>	04. 3 - 21X-
103. $x^6 - 2x^3 + 1$	<b>115.</b> $x(x+3) - 6(x$	+ 3)	

R.6 Synthetic Division <u>Learning Objectives</u>: 1. Divide polynomials using synthetic division
 R.6 Video: Divide Polynomials Using Synthetic Division
 R.6 Exercise #: 19.

In Problems 19–28, use synthetic division to determine whether x - c is a factor of the given polynomial. **19.**  $4x^3 - 3x^2 - 8x + 4$ ; x - 2**20.**  $-4x^3 + 5x^2 + 8$ ; x + 3

<b>R.7 Rational Expressions</b> <u>Learning Objectives</u> :	1. Reduce a rational expression to lowest terms
R.7 Video: Reduce to Lowest Terms	2. Multiply and divide rational expressions
R.7 Video Multiply Rational Expressions	3. Add and subtract rational expressions
R.7 Divide Rational Expressions	4. Use the Least Common Multiple Method
<u>R.7 + &amp; - Rational Expressions</u>	5. Simplify complex rational expressions
R.7 Video: Least Common Denominator	
R.7 Video: +/- Rational Expressions Using LCM	
R.7 Video: Simplify Complex Rational Expressions	
R.7 Exercise #: 63, 69, 69, 73, 75, 77.	
In Problems 63-74, perform the indicated operations and simplify the resu	It. Leave your answer in factored form.
<b>63.</b> $\frac{x}{x^2 - 7x + 6} - \frac{x}{x^2 - 2x - 24}$ <b>64.</b> $\frac{x}{x - 3} - \frac{x + 1}{x^2 + 5x - 24}$	$65. \frac{4x}{x^2-4} - \frac{2}{x^2+x-6}$

60	x + 4	2x + 3	<b>73.</b> $\frac{1}{(-1)} - \frac{1}{(-1)}$
09.	$x^2 - x - 2$	$\frac{1}{x^2+2x-8}$	h(x+h-x)

In Problems 75–86, perform the indicated operations and simplify the result. Leave your answer in factored form.

1	1	x+1	. x
$\frac{1+-x}{x}$	76. $\frac{4+x^2}{x^2}$	77. <u>x</u>	78. $\frac{1-\frac{1}{x+1}}{1-\frac{1}{x+1}}$
$1-\frac{1}{x}$	$3 - \frac{1}{x^2}$	$3 + \frac{x-1}{x+1}$	$2 - \frac{x-1}{x}$

R.8 nth Roots; Rational Exponents	Learning Objectives:	
R.8 Video Work with nth Roots	1.	Work with <i>n</i> th roots
R.8 Video: Simplify Radicals I	2.	Simplify radicals
R.8 Video: Simplify Radicals II	3.	Rationalize denominators
R.8 Video: Simplify Rational Exponents	4.	Simplify expressions with rational exponents
R.8 Exercises #: 55, 59, 63, 77, 103, 111		

In Problems 55-68, rationalize the denominator of each expression. Assume that all variables are positive when they appear.

<b>55.</b> $\frac{1}{\sqrt{2}}$	<b>56.</b> $\frac{2}{\sqrt{3}}$	<b>57.</b> $\frac{-\sqrt{3}}{\sqrt{5}}$	<b>58.</b> $\frac{-\sqrt{3}}{\sqrt{8}}$
<b>59.</b> $\frac{\sqrt{3}}{5-\sqrt{2}}$	<b>60.</b> $\frac{\sqrt{2}}{\sqrt{7}+2}$	<b>61.</b> $\frac{2-\sqrt{5}}{2+3\sqrt{5}}$	<b>62.</b> $\frac{\sqrt{3}-1}{2\sqrt{3}+3}$
63. $\frac{5}{\sqrt{2}-1}$	64. $\frac{-3}{\sqrt{5}+4}$	<b>65.</b> $\frac{5}{\sqrt[3]{2}}$	<b>66.</b> $\frac{-2}{\sqrt[3]{9}}$
In Problems 77–92, sin	nplify each expression.		

77. 82/3 78. 43/2

#### **Applications and Extensions**

In Problems 101–114, expressions that occur in calculus are given. Write each expression as a single quotient in which only positive exponents and/or radicals appear.

**103.** 
$$2x(x^2+1)^{1/2} + x^2 \cdot \frac{1}{2}(x^2+1)^{-1/2} \cdot 2x$$
 **111.**  $\frac{x^2}{(x^2-1)^{1/2}} - (x^2-1)^{1/2}}{x^2}$   $x < -1$  or  $x > 1$ 

1. Graphs, Equations, & Inequalities				
1.1 Graphing Utilities; Introduction to Graphing Equations:				
Learning Objectives	1. Graph Equations by Plotting Points			
1.1 Video Plot Points	2. Graph Equations Using a Graphing Utility			
1.1 Video Graphing Utility	3. Use a Graphing Utility to Create Tables			
1.1 Video: Tables	4. Find Intercepts from a Graph			
<u>1.1 Video Intercepts I</u>	5. Use a Graphing Utility to Approximate Intercepts			
1.1 Video: Intercepts II				
1.1 Video: Intercepts III				
1.1 Exercises: # 33, 37, 39, 43, 45, 47, 63.				

In Problems 33-40, the graph of an equation is given. List the intercepts of the graph.



In Problems 41-52, graph each equation by plotting points. Verify your results using a graphing utility.

<b>41.</b> $y = x + 2$	<b>42.</b> $y = x - 6$	<b>43.</b> $y = 2x + 8$	44. $y = 3x - 9$	45. $y = x^2 - 1$
47. $y = -x^2 + 4$	<b>48.</b> $y = -x^2 + 1$	<b>49.</b> $2x + 3y = 6$	50. $5x + 2y = 10$	<b>51.</b> $9x^2 + 4y = 36$

63. Shot-put Throw The graph below shows the height y, in feet, of a shot (metal ball) thrown by a shot-putter after it has traveled x feet horizontally.



- (a) What is the height of the shot after it has traveled 10 feet horizontally?
- (b) How far has the shot traveled when its height is at a maximum? What is the maximum height?
- (c) Identify and interpret the intercepts.

<b>1.2 Solve Equations Using a Graphing Utility; Linear &amp; Rational Equations</b>			
Learning Objectives:	1. Solve Equations Using a Graphing Utility		
1.2 Solv Equations with a Grapher I	2. Solve Linear Equations		
1.2 Solv Equations with a Grapher II	3. Solve Rational Equations		
1.2 Linear Equations	4. Solve Problems That Can Be Modeled by Linear Equations		
1.2 Rational Equations I			
1.2 Equations with Rational Expressions			
1.2 Exercises: 15, 17, 19, 49, 65, 89, 93			
46. 4868 27870 MAR 17870 West 22 22	10		

In Problems 11–18, mentally solve each equation.

**15.** 
$$2x - 3 = 0$$
 **17.**  $\frac{1}{3}x = \frac{5}{12}$ 

In Problems 19–30, use a graphing utility to approximate the real solutions, if any, of each equation rounded to two decimal places. All 'utions lie between -10 and 10.

19.  $x^3 - 4x + 2 = 0$ 

In Problems 31-76, solve each equation algebraically. Verify your results using a graphing utility.

**49.** 
$$\frac{x+1}{3} + \frac{x+2}{7} = 2$$
 **65.**  $\frac{x}{x+2} = \frac{3}{2}$ 

Problems 89-94 list some formulas that occur in applications. Solve each formula for the indicated variable.

89. Electricity  $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$  for R 93. Mathematics  $S = \frac{a}{1-r}$  for r

1.3 Quadratic Equations <u>Learning O</u>	<b>bjectives:</b> 1. Solve quadratic equations by factoring
1.3 Solve by Factoring	2. Solve quadratic equations by the square root method
1.3 Square Root Method	3. Solve quadratic equations by completing the square
1.3 Solve by Complete the Square	4. Solve quadratic equations using the quadratic formula
1.3 Quadratic Formula I	5. Solve problems that can be modeled by quadratic equations
1.3 Quadratic Formula II	
1.3 Exercises: # 13, 21, 33, 51, 61	

In Problems 11-30, solve each equation by factoring. Verify your solution using a graphing utility.

**13.**  $x^2 - 25 = 0$  **21.** x(x - 8) + 12 = 0

In Problems 31-36, solve each equation by the Square Root Method. Verify your solution using a graphing utility.

33.  $(x-1)^2 = 4$ 

In Problems 43-66, find the real solutions, if any, of each equation. Use the quadratic formula. Verify your solution using a graphing utility.

**51.**  $4x^2 = 1 - 2x$  **61.** 2x(x+2) = 3

1.4 Complex Numbers; Quadratic Equations in the Complex Number System		
Learning Objectives:	1.	Add, subtract, multiply, and divide complex numbers
1.4 Add or Subtract Complex Numbers	2.	Solve quadratic equations in the complex number system
1.4 Multiply Complex Numbers		
1.4 Divide Complex Numbers		
<u>1.4 Evaluate the Powers of i</u>		
<u>1.4 Complex Numbers</u>		
1.4 Quadratic Equations with Complex Solutions		
1.4 Exercises: # 13, 25, 33, 35, 37, 43, 59, 65, 71		

In Problems 11–48, write each expression in the standard form a + bi. Verify your results using a graphing utility.

**13.** 
$$(-3+2i) - (4-4i)$$
  
**25.**  $\frac{10}{3-4i}$ 
**33.**  $(1+i)^2$ 
**35.**  $i^{23}$ 
**37.**  $i^{-15}$ 
**43.**  $(1+i)^3$ 

In Problems 59-78, solve each equation in the complex number system. Check your results using a graphing utility.

**59.**  $x^2 + 4 = 0$  **65.**  $x^2 - 6x + 10 = 0$  **71.**  $x^2 + x + 1 = 0$ 

1.5 Radical Equations; Equations Quadratic in Form; Absolute Value Equations; Factorable Equations			
Learning Objectives:	1. Solve radical equations		
1.5 Solve Radical Equations I	2. Solve equations quadratic in form		
1.5 Solve Equations Quadratic in Form	3. Solve absolute value equations		
1.5 Solve 2-Radical Equations	4. Solve equations by factoring		
1.5 Solve Absolute Value Equations			
1.5 Solve Equations by Factoring			
1.5 Exercises: 19, 33, 47, 55, 71, 73, 81, 85, 93, 95			

In Problems 11-44, find the real solutions of each equation. Verify your results using a graphing utility.

**19.** 
$$\sqrt[4]{5x-4} = 2$$
 **33.**  $\sqrt{2x+3} - \sqrt{x+1} = 1$ 

In Problems 45-70, find the real solutions of each equation. Verify your results using a graphing utility.

**47.** 
$$x^4 - 5x^2 + 4 = 0$$
 **55.**  $2(s+1)^2 - 5(s+1) = 3$ 

In Problems 71-88, solve each equation. Verify your results using a graphing utility.

**71.** |2x + 3| = 5 **73.** |1 - 4t| + 8 = 13 **81.**  $\left|\frac{x}{3} + \frac{2}{5}\right| = 2$ **85.**  $|x^2 - 9| = 0$ 

In Problems 89-98, find the real solutions of each equation by factoring. Verify your results using a graphing utility.

**93.** 
$$x^3 + x^2 - x - 1 = 0$$
  
**95.**  $x^3 - 3x^2 - 4x + 12 = 0$ 

# 1.6 Problem solving: Interest, Mixture, Uniform Motion, Constnt Rate Job Applications Learning Objectives: 1. Translate verbal descriptions into mathematical expressions 1.6 Solve Interest Problems 2. Solve interest problems

1.6 Solve Mixture Problems	3. Solve mixture problems
1.6 Solve Uniform Motion Problems	4. Solve uniform motion problems
1.6 Model & Solve Work Problems	5. Solve constant rate job problems
1.6 Exercises: 25, 37, 41	

23. Blending Teas The manager of a store that specializes in selling tea decides to experiment with a new blend. She will mix some Earl Grey tea that sells for \$5 per pound with some Orange Pekoe tea that sells for \$3 per pound to get 100 pounds of the new blend. The selling price of the new blend is to be \$4.50 per pound, and there is to be no difference in revenue between selling the new blend and selling the other types. How many pounds of the Earl Grey tea and of the Orange Pekoe tea are required?

- 37. Enclosing a Garden A gardener has 46 feet of fencing to be used to enclose a rectangular garden that has a border 2 feet wide surrounding it. See the figure.
  - (a) If the length of the garden is to be twice its width, what will be the dimensions of the garden?
  - (b) What is the area of the garden?
  - (c) If the length and width of the garden are to be the same. what will be the dimensions of the garden?
  - (d) What will be the area of the square garden?



41. Mixing Water and Antifreeze How much water should be added to 1 gallon of pure antifreeze to obtain a solution that is 60% antifreeze?

#### **1.7 Solving Inequalities**

Learning Objectives: 1. Use interval notation

- 1.7 Use Interval Notation
- 2. Use properties of inequalities
- **1.7 Properties of Inequalities**
- 3. Solve linear inequalities algebraically and graphically
- **1.7 Solve Inequalities**
- 1.7 Solve Absolute Value Inequalities
- 1.7 Exercises: 67, 83 103
- 4. Solve combined inequalities algebraically and graphically 5. Solve absolute value inequalities algebraically and graphically

In Problems 51-88, solve each inequality algebraically. Express your answer using set notation or interval notation. Graph the solution set. Verify your results using a graphing utility.

**67.** 
$$-3 < \frac{2x-1}{4} < 0$$
 **83.**  $|5-2x| > |-7|$ 

In Problems 89-108, solve each inequality algebraically. Express your answer using set notation or interval notation. Graph the solution set. Verify your results using a graphing utility.

**103.** 
$$7 - |x - 1| > 4$$

2. Graphs 2.1 The Distance & Midpoint Formulas: 2.1 Video Distance Formula 2.1 Midpoint Formula 2.1 Exercises: # 13, 15, 35, 61

Learning Objectives: 1. Use the Distance Formula 2. Use the Midpoint Formula

In Problems 11-24, find the distance d between the points P1 and P2.

**13.** 
$$P_2 = (-2, 2) \begin{pmatrix} y \\ 2 \\ -p_1 = (1, 1) \end{pmatrix}$$
  
**15.**  $P_1 = (3, -4); P_2 = (5, 4)$ 

In Problems 31–38, find the midpoint of the line segment joining the points  $P_1$  and  $P_2$ . 35.  $P_1 = (7, -5); P_2 = (9, 1)$ 

61. Distance between Moving Objects A Ford Focus and a Freightliner Cascadia truck leave an intersection at the same time. The Focus heads east at an average speed of 60 miles per hour, while the Cascadia heads south at an average speed of 45 miles per hour. Find an expression for their distance apart d (in miles) at the end of t hours.

2.2 Intercepts; Symmetry; Graphing Key Equations				
Learning Objectives:	1. Find intercepts algebraically from an equation			
2.2 Find Intercepts from an Equation	2. Test for an equation for symmetry			
2.2 Symmetry	3. Know how to graph key equations			
2.2 Exercises: # 37, 41, 61, 63, 67,69,70				

In Problems 35–46, the graph of an equation is given. (a) Find the intercepts. (b) Indicate whether the graph is symmetric with respect to the x-axis, the y-axis, the origin or none of these.



2.3 Lines <u>I</u>	<u>earning Objectives:</u>	1.	Calculate and interpret the slope of a line
2.3 Video Slope of a	Line	2.	Graph lines given a point and the slope
2.3 Video Graph Line	es w a Point and Slope	3.	Find the equation of a vertical line
2.3 Point-Slope Form	; Horizontal Lines	4.	Use the point-slope form of a line; identify horizontal lines
2.3 Slope – Intercept	<u>form</u>	5.	Write the equation of a line in slope-intercept form
2.3 Equation of a line	w 2 points	6.	Find the equation of a line given two points
2.3 General Form of a	a Line	7.	Graph lines written in general form using intercepts
2.3 Equations of Para	llel Lines	8.	Find equations of parallel lines
2.3 Equations of Perp	endicular Lines	9.	Find equations of perpendicular lines
2.3 Exercises # 13, 21, 27, 29, 49, 51, 53, 57, 0		7,6	3, 67, 73, 97, 125

In Problems 13-16, (a) find the slope of the line and (b) interpret the slope.



In Problems 17-24, plot each pair of points and determine the slope of the line containing the points. Graph the line.

21. (-3, -1);(2, -1)

44 44 42 12

In Problems 25-32, graph the line that contains the point P and has slope m.

**27.**  $P = (2,4); m = -\frac{3}{4}$  **29.** P = (-1,3); m = 0

In Problems 45-52, find an equation of the line L.



In Problems 53–78, find an equation for the line with the given properties. Express your answer using either the general form or the slope-intercept form of the equation of a line, whichever you prefer.

53. Slope = 3; containing the point (-2, 3) 57. Containing the points (1, 3) and (-1, 2)

63. Slope undefined; containing the point (2, 4) 67. Parallel to the line y = 2x; containing the point (-1, 2)

73. Perpendicular to the line  $y = \frac{1}{2}x + 4$ ; containing the point (1, -2)

In Problems 79–98, find the slope and y-intercept of each line. Graph the line. 97. 2y - 3x = 0

125. Cost of Driving a Car The annual fixed costs of owning a small sedan are \$4252, assuming the car is completely paid for. The cost to drive the car is approximately \$0.14 per mile. Write a linear equation that relates the cost C and the number x of miles driven annually.

Source: AAA, 2017

2.4 Circles <u>Learning Objectives</u> :	1. Write the standard form of the equation of a circle	
2.4 Standard Equation of a Circle	2. Graph a circle by hand and by using a graphing utility	
2.4 Graph A Circle	3. Work with the general form of the equation of a circle	
2.4 General Equation of a Circle		
2.4 Exercises # 15, 19, 21, 23, 29, 33, 37		

In Problems 15–26, write the standard form of the equation and the general form of the equation of each circle of radius r and center (h, k). Graph each circle.

**15.** r = 2; (h, k) = (0, 0)**23.**  $r = \frac{1}{2}$ ;  $(h, k) = \left(\frac{1}{2}, 0\right)$ 

In Problems 27-40, (a) find the center (h, k) and radius r of each circle; (b) graph each circle; (c) find the intercepts, if any.

**29.**  $2(x-3)^2 + 2y^2 = 8$  **33.**  $x^2 + y^2 + 4x - 4y - 1 = 0$  **37.**  $2x^2 + 2y^2 - 12x + 8y - 24 = 0$ 

**19.** r = 5; (h, k) = (4, -3) **21.** r = 4; (h, k) = (-2, 1)

2.5 Variation	Learning Objectives:	1. Construct a model using direct variation
2.5 No Videos		2. Construct a model using inverse variation
		3. Construct a model using joint variation or combined variation
2.5 Exercises # 23	,	

23. Mortgage Payments The monthly payment p on a mortgage varies directly with the amount borrowed B. If the monthly payment on a 30-year mortgage is \$6.49 for every \$1000 borrowed, find a linear equation that relates the monthly payment p to the amount borrowed B for a mortgage with the same terms. Then find the monthly payment p when the amount borrowed B is \$145,000.

Read Ch 3.1