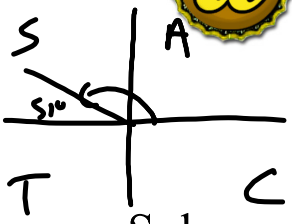
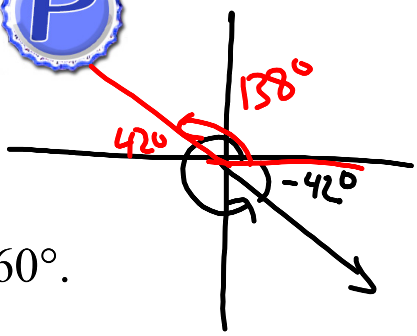
WARM UP





Solve each equation, for $0° \leq \theta < 360°$.

$\tan^{-1}(.9004) = -42°$

a) $\sin\ \theta = 0.7760$ b) $\tan\ \theta = -\ 0.9004$

$\sin^{-1}(.7760) = 51°$

or

$129°$

$\theta = 318°$

or

$138°$

Solve

$$\frac{3x}{x+2} - \frac{5}{x-3} = \frac{-25}{x^2 - x - 6}$$

$x \neq 2, 3$

$(x-3)(x+2)$

$$\frac{3x(x-3)}{(x-3)(x+2)} - \frac{5(x+2)}{(x-3)(x+2)} = \frac{-25}{(x-3)(x+2)}$$

$3x(x-3) - 5(x+2) = -25$

$3x^2 - 9x - 5x - 10 = -25$

$p = 45$
$s = -14$
$(-9, -5)$

$3x^2 - 14x + 15 = 0$

$3x^2 - 9x, -5x + 15 = 0$

$3x(x-3) - 5(x-3) = 0$

$(x-3)(3x-5) = 0$

$x = \cancel{3}$ or $\boxed{5/3}$

Pre-Calculus 110
Exam Review

June 7, 2018: Day #2

1. Exam Review

Suggestions for studying...

1. Do review
2. If you get stuck, look over class examples
3. Look over old quizzes.
4. Look over old tests.
5. Ask questions (to each other and me)
6. Extra help

Radicals

- Compare and order radical expressions with numerical radicands in a given set.
- Express an entire radical with a numerical radicand as a mixed radical.
- Express a mixed radical with a numerical radicand as an entire radical.
- Perform one or more operations to simplify radical expressions with numerical or variable radicands.
- Rationalize the denominator of a rational expression with monomial or binomial denominators.
- Describe the relationship between rationalizing a binomial denominator of a rational expression and the product of the factors of a difference of squares expression.
- ~~Explain, using examples, that $(-x)^2 = x^2$, $\sqrt{x^2} = |x|$, and $\sqrt{x^2} \neq \pm x$ (e.g., $\sqrt{9} \neq \pm 3$)~~.
- Identify the values of the variable for which a given radical expression is defined.
- Solve both equality and inequality problems that involve radical expressions.
- Solve a problem that involves radical expressions
- Determine any restrictions on values for the variable in a radical equation.
- Determine the roots of a radical equation algebraically, and explain the process used to solve the equation.
- Verify, by substitution, that the values determined in solving a radical equation algebraically are roots of the equation.
- Explain why some roots determined in solving a radical equation algebraically are extraneous.
- Solve problems by modeling a situation using a radical equation

$\sqrt{8} \rightleftarrows 2\sqrt{2}$

Jun 3-1:54 PM

Jun 4-1:39 PM

$$\frac{2\sqrt{3}}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{15}}{5}$$

$$\frac{3\sqrt{7}}{2-\sqrt{5}} \times \frac{2+\sqrt{5}}{2+\sqrt{5}} = \frac{6\sqrt{7}+3\sqrt{35}}{4-5} = -6\sqrt{7}-3\sqrt{35}$$

$$\sqrt{2x+5}$$

$$2x+5 \geq 0$$
$$2x \geq -5$$
$$x \geq -5/2$$

Rationals

Topics:
1. Identifying non-permissible roots
2. Simplifying rational expressions
3. Multiplying and dividing rational expressions
4. Adding and subtracting rational expressions
5. Solving rational equations
6. Identify the error and correct
7. Word Problem

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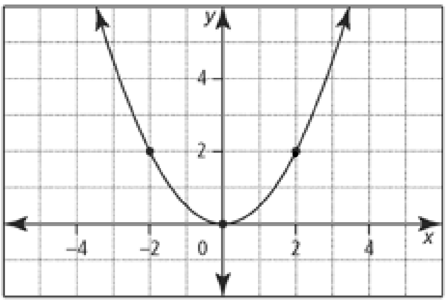
Unit 2: Quadratic Functions

1. a) Write a quadratic function in vertex form for the parabola shown on the graph.



$y = a(x-p)^2 + q$

$y = ax^2$

$2 = a(2)^2$

$2 = 4a \quad a = 1/2$

$y = \frac{1}{2}x^2$

b) Suppose the parabola is reflected about the *x*-axis. Write the quadratic function in vertex form of the new parabola. $y = -1/2\, x^2$

c) Suppose the parabola in the graph is translated 6 units to the left. Write the quadratic function in vertex form of the new parabola. $y = 1/2(x+6)^2$

d) Suppose the parabola in the graph is translated 3 units down. Write the quadratic function in vertex form of the new parabola. $y = 1/2\, x^2 - 3$

2. Sketch each function using transformations.

a) $f(x) = (x + 7)^2 - 3$ **b)** $f(x) = -2x^2 + 5$ **c)** $f(x) = (x - 3)^2$ **d)** $f(x) = 4(x + 2)^2 - 1$

3. Without graphing each function, identify the location of its vertex and axis of symmetry, direction of opening, maximum or minimum value, domain, range, and the number of *x*-intercepts.

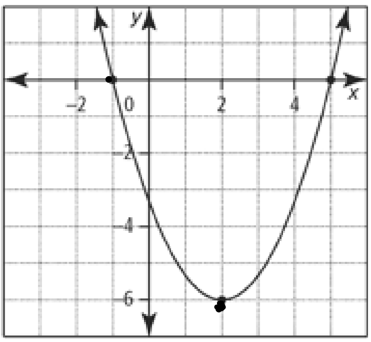
a) $y = 3(x - 5)^2 + 1$ **b)** $y = -\frac{1}{2}(x + 2)^2$

vertex $(5,1)$

4. Determine a quadratic function in vertex form that has the given characteristics.

a) its vertex at (–2, 3) and passes through the point (–1, 1)

5. Determine a quadratic function in vertex form for the parabola.



(4) $y = a(x-p)^2 + q$

$y = a(x+2)^2 + 3$

$1 = a(-1+2)^2 + 3$

$1 = a + 3$

$a = -2$

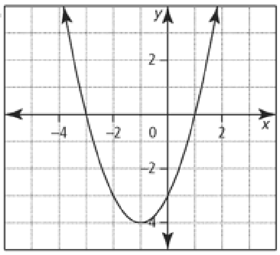
$\boxed{y = -2(x+2)^2 + 3}$

6. For each graph, identify the following:

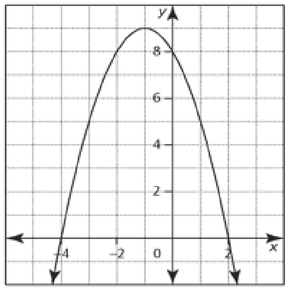
- the coordinates of the vertex
- the equation of the axis of symmetry
- the x-intercepts and y-intercept
- the direction of opening
- the maximum or minimum value
- the domain and range

$x \in R$

a)



b)

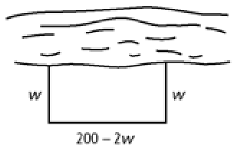


7. Write each quadratic function in standard form, $y = ax^2 + bx + c$.

a) $y = (x + 7)^2 - 10$ **b)** $f(x) = (2x + 5)(6 - 3x)$ **c)** $h(t) = -9(t + 1)^2 + 50$

$y = x^2 + 14x + 49 - 10$
$y = x^2 + 14x + 39$

8. A farmer has 200 m of fencing material to enclose a rectangular field adjacent to a river. No fencing is required along the river.



a) What does w represent in the diagram? Why is the length equal to $200 - 2w$?
b) Write a function that can be used to represent the area of the field.
c) Sketch the graph of the function.
d) Determine the maximum area of the field using a graphing calculator.
e) Determine the dimensions of the region that give the maximum area.

$A = w(200 - 2w)$
$A = -2w^2 + 200w$
$A = -2(w^2 - 100w)$
$A = -2(w^2 - 100w + 2500 - 2500)$
$A = -2(w - 50)^2 + 5000$

9. A projectile is fired out of a cannon at 105 m/s from a 100-m cliff. The function that models the height, h, of the trajectory in relation to time, t, is $h(t) = -5t^2 + 105t + 100$.
a) Sketch the graph of the function on a graphing calculator.
b) Determine the h-intercept of the function. What does the h-intercept represent?
c) Determine the t-intercept of the function. What does the t-intercept represent?
d) Determine the maximum height of the projectile and when it occurs.

10. Write each function in vertex form by completing the square. Use your answer to identify the vertex of the function.

a) $y = x^2 + 2x - 4$ **b)** $y = x^2 - 6x + 13$

$y = (x^2 - 6x + 9 - 9) + 13$
$y = (x^2 - 6x + 9) + 13 - 9$
$y = (x - 3)^2 + 4$

11 b) $y = -2x^2 - 20x - 56$
$y = -2(x^2 + 10x + 25 - 25) - 56$
$y = -2(x + 5)^2 - 56 + 50$
$y = -2(x + 5)^2 - 6$

Unit 1: Cartesian Trigonometry

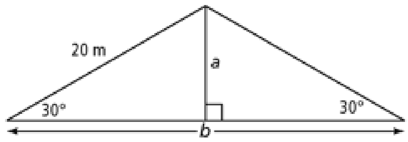
1. Sketch an angle in standard position with each given measure.
   a) 24° b) 204°

2. State the reference angle for each angle in standard position.
   a) 255° b) 355°

3. Complete the table. Determine the measure of each angle in standard position given its reference angle and the quadrant in which the terminal arm lies.

	Reference Angle	Quadrant	Angle in Standard Position
a)	30°	II	
b)	45°	III	
c)	60°	IV	

4. Determine the exact value of each indicated side.

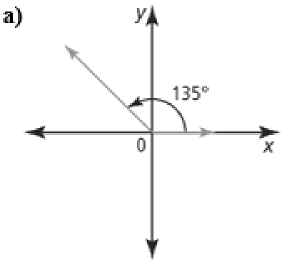


5. Sketch angles in standard position so that the terminal arm passes through each point.
   a) (1, 5) b) (4, –3)

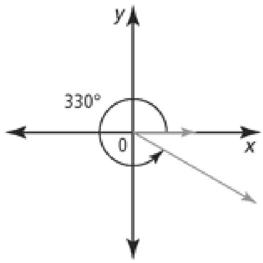
6. Determine the exact values of the sine, cosine, and tangent ratios for each angle in #7.

7. Determine the exact values of the sine, cosine, and tangent ratios for each angle.

a)



b)

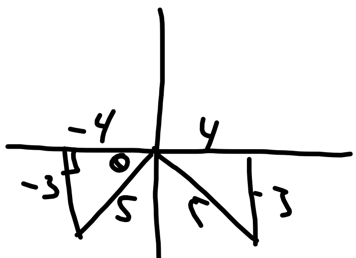


8. Without using a calculator, state whether each ratio is positive or negative.
   a) sin 100° b) cos 200° c) tan 300° d) sin 350°

9. An angle is in standard position with its terminal arm in the stated quadrant. Determine the exact values for the other two primary trigonometric ratios for each.
   a) $\sin \theta = \frac{-3}{5}$; quadrant III b) $\cos \theta = \frac{2}{3}$; quadrant IV

10. Solve each equation, for $0° \le \theta < 360°$. Use a diagram involving a special right triangle.
    a) $\sin \theta = \frac{-1}{\sqrt{2}}$ b) $\tan \theta = \frac{1}{\sqrt{3}}$ c) $\sin \theta = -1$

9 a) $\sin\theta: -3/5$



$\tan\theta: -3/-4 = 3/4$

$\cos\theta: -4/5$

Unit 5: Rational Expressions and Equations

1. Determine the non-permissible value(s) for each rational expression.

a) $\frac{5}{x+3}$ **b)** $\frac{7}{xy}$ **c)** $\frac{x+3}{(x+4)(x-5)}$ **d)** $\frac{1-x}{3x+5}$

2. Simplify each rational expression. State any non-permissible values.

a) $\frac{3(x+5)}{(x+5)(x-5)}$ **b)** $\frac{(x-7)(x+2)}{-5x(7-x)}$ **c)** $\frac{(x+3)^2}{3(x+3)(x-3)}$ d) $\frac{25(x-5)(x+1)}{10(2x+1)(x-5)}$

3. Simplify. State any non-permissible values.

a) $\frac{6r^2st}{10rs^2t^2}$ **b)** $\frac{3x-6}{x^2-4}$ c) $\frac{2x^2+5x+2}{5x^2-5x-30}$

Jun 2-12:53 PM

4.Simplify.

a) $\left(\frac{9x}{14y^2}\right)\left(\frac{7y^3}{3x^2}\right)$ b) $\left[\frac{(x+1)(x-6)}{(x-6)(x+6)}\right]\left[\frac{x(x+6)}{(1+x)}\right]$

5.Write each product in simplest form.

a) $\left(\frac{x-2}{x^2-4}\right)\left(\frac{x^2-2x-8}{x+2}\right)$ **b)** $\left(\frac{5y-5}{y^2+4y-5}\right)\left(\frac{y^2-25}{y^2-2y-15}\right)$

6. Divide. Express each quotient in simplest form.

a) $\left(\frac{5a}{3b}\right) \div \left(\frac{15c}{9a^2}\right)$ **b)** $\left(\frac{x+1}{3x+5}\right) \div \left(\frac{x+3}{3x+5}\right)$

7. What are the non-permissible values for

the quotient $\frac{x^2+8x+16}{(x-3)(x+5)} \div \frac{3x^2-3}{(x+4)}$. Explain your answer.

8. Simplify each quotient.

a) $\frac{x-x^2}{10x+8} \div \frac{(x-1)^2}{5x^2+4x}$ b) $\frac{x^2+8x+7}{x^2-6x-7} \div \frac{x^2+7x+6}{x^2-x-42}$

9. State the least common denominator.

a) $\frac{9x+y}{4x} + \frac{3y}{3y}$ **b)** $\frac{1}{x+4} - \frac{5}{3x+1}$ **c)** $\frac{9}{x^2-36} + \frac{3x}{x-6}$

10. Add or subtract. Express the answers in simplest form.

a) $\frac{x+1}{3x} + \frac{4x-5}{3x}$ **b)** $\frac{4x^2}{x+5} + \frac{x+1}{x+5} - \frac{x^2}{x+5}$

11. Simplify.

a) $\frac{x-4}{5xy} - \frac{3x+1}{y^2}$ b) $\frac{3}{x-5} + \frac{2}{x+7}$ **c)** $\frac{5x}{x+1} - \frac{x^2+4}{(x+1)(x-1)} + \frac{3}{x-1}$

12. Simplify.

a) $\frac{2a}{2a+6} - \frac{a^2+9}{a^2-9}$ **b)** $\frac{3y}{y^2-4} + \frac{6y}{y^2+5y+6}$ c) $\frac{x-6}{x^2-11x+28} - \frac{x-5}{x^2-8x+7}$

13. Solve and check each equation.

a) $\frac{2x}{3} = \frac{x}{4} + \frac{5}{6}$ b) $\frac{3}{x+3} = \frac{x+15}{x+3} - 5$ c) $\frac{2}{x-3} + \frac{3}{x} = 2$

d) $\frac{x+1}{x-3} = \frac{x}{x-5}$ e) $\frac{x}{x-3} + \frac{x^2+9}{x^2-9} = \frac{2x}{x+3}$ f) $\frac{x+5}{2x+4} = \frac{x}{x-3} - \frac{2x+9}{x^2-x-6}$

14. John's family travels 300 km from their home to a family reunion. His cousin Susan and her family take the same amount of time to travel 200 km from their home. Determine the speed of both vehicles given that one of the vehicles travels 30 km/h faster than the other.

Jun 8-2:08 PM

14. John's family travels 300 km from their home to a family reunion. His cousin Susan and her family take the same amount of time to travel 200 km from their home. Determine the speed of both vehicles given that one of the vehicles travels 30 km/h faster than the other.

Jun 7-10:42 AM

Attachments

Standard Form Demor.GSP

Warm ups.notebook