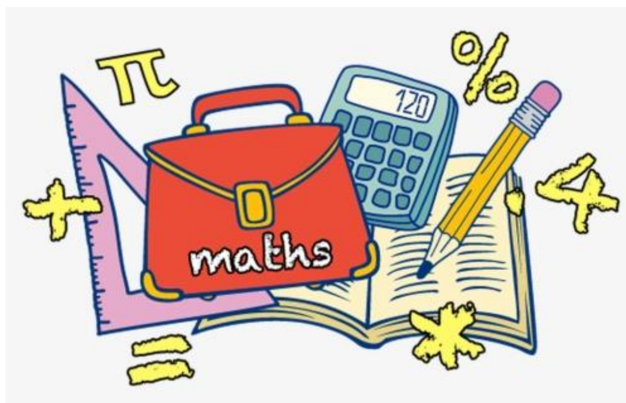
CURRICULUM & INSTRUCTION



High School Math
Jan 4th – Jan 29th

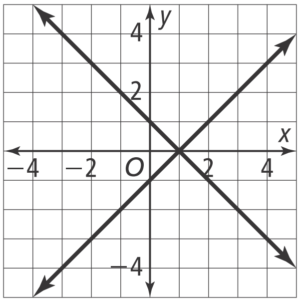
High School Math Learning Plan		
Date	**Topic/Standard**	**Instructional Activity**
Week of Jan 4th	A1.REI.B.3*** Solve a system of linear equations algebraically and/or graphically	Student will complete practice worksheet. 4-1 Solving systems of equations by graphing. 4-2 Solve system of equations by substitution 4-3 Solving systems of equations by eliminating.
Week of Jan 11th	A1.CED.A.3*Represent constraints by equations or inequalities and by systems of equations or inequalities and interpret the data points as a solution or non-solution in a modeling context. A1.REI.C.8**Solve problems involving a system of linear inequalities.	Student will complete practice worksheet. 4-4 Linear Inequalities in two variables 4-5 Systems of Linear Inequalities
Week of Jan 18th	A1.NQ.A.1* Explain how the meaning of rational exponents extends from the properties of integer exponents. A1.NQ.A.2* Rewrite expressions involving radicals and rational exponents using the properties of exponents. Limit to rational exponents with a numerator of 1.	Student will complete practice worksheet. 6-1 Rational Exponents and Properties of Exponents 6-2 Exponential Functions
Week of Jan 25th	A1.LQE.A.3 **Exponential***** Construct linear, quadratic and exponential equations given graphs, verbal descriptions or tables. A1.CED.A.2 **Exponential***** Create and graph linear, quadratic and exponential equations in two variables.	Student will complete practice worksheet. 6-3 Exponential Growth and Decay 6-4 Geometric Sequences 6-5 Transformations of Exponential Functions.

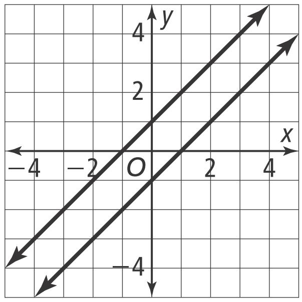
Name ______________________

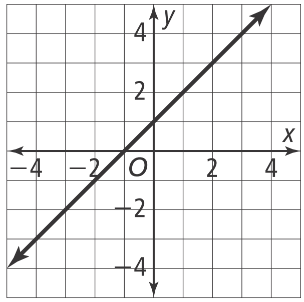
4-1 Reteach to Build Understanding

Solving Systems of Equations by Graphing

1. The graphs shown are of linear systems that have different numbers of solutions. A point of intersection shows a solution. Draw a line from the graph of each linear system to the correct number of solutions.



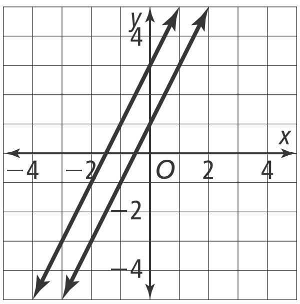




infinitely many   no solution   one solution

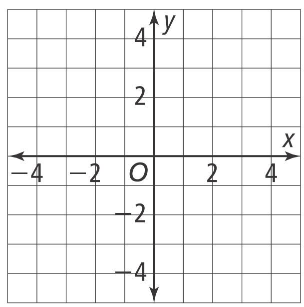
2. Jenna incorrectly solved the system of equations $\begin{cases} y = 2x + 3 \\ -y = 2x + 1 \end{cases}$.

Find and correct her error.



The lines are parallel, so there is no point of intersection.
This system has no solutions.

3. Solve the system of equations $\begin{cases} 8x + 2y = 6 \\ y = -4x + 3 \end{cases}$.



Graph the line for each equation in the system.

The slopes of the lines for both equations ______________.

The y-intercepts of the lines for both equations ______________.

The lines that represent both equations ______________.

So, this system of equations has ______________ solution(s).

Name ____________________

4-2 Reteach to Build Understanding

Solving Systems of Equations by Substitution

1. Circle the correct answer for each statement.

Solve the system of linear equations $\begin{cases} 4x + 3y = 9 \\ x - 2y = 5 \end{cases}$ using substitution.

The easiest variable to isolate is (x, y) in the (first, second) equation).

Rewrite the equation in terms of the variable, $x = 2y + 5$.

Since x was isolated in the (first, second) equation, substitute that expression for x into the (first, second) equation.

2. Complete the steps for solving the system of linear equations in Exercise 1.

Substitute $2y + 5$ for x in the first equation.

$4(\_\_\_\_\_\_) + 3y = 9$

$8y + \_\_\_\_\_\_ + \_\_\_\_\_\_ = 9$

$\_\_\_\_\_\_ y = \_\_\_\_\_\_$

$y = \_\_\_\_\_\_$

Then, $x = 2(\_\_\_\_\_\_) + 5 = \_\_\_\_\_\_ + 5 = \_\_\_\_\_\_$.

The solution is ______.

3. Joseph solved the system of equations $\begin{cases} 2x + 5y = 3 \\ 3x + y = 11 \end{cases}$ as shown.

$\begin{cases} 2x + 5y = 3 \\ 3x + y = 11 \rightarrow y = -3x + 11 \end{cases}$

$3x + (-3x + 11) = 11$

$11 = 11$

There are infinitely many solutions.

What is Joseph's error? Explain.

Name ____________________

4-3 Reteach to Build Understanding

Solving Systems of Equations by Elimination

1. Match each system of equations with the method you would use to solve it. Each method matches with two systems.

Substitution
Solve a system of linear equations using substitution when an equation is already solved for one variable, or if it is easy to solve for one variable.

Elimination
Solve a system of linear equations using elimination if you can multiply either equation by a constant to get coefficients that are opposite.

$\begin{cases} y = 4x - 7 \\ 2x - 3y = 1 \end{cases}$ $\begin{cases} 4x + 3y = 8 \\ 5x - 3y = 1 \end{cases}$ $\begin{cases} 4x + 3y = 7 \\ 2x - 7y = 1 \end{cases}$ $\begin{cases} 2y + 1 = x \\ 2x - 3y = 1 \end{cases}$

2. Brad incorrectly solved the system of equations $\begin{cases} 6x - 7y = 5 \\ 3x - 5y = 1 \end{cases}$.

The answers should be integers. Find and correct his error.

$$\begin{cases} 6x - 7y = 5 \\ 3x - 5y = 1 \end{cases} \xrightarrow{\text{Multiply by 2}} \begin{cases} 6x - 7y = 5 \\ 2(3x - 5y) = 2(1) \end{cases}$$

Add the new equations to eliminate x.

$$\begin{array}{r} 6x - 7y = 5 \\ 6x - 10y = 2 \\ \hline -17y = 7 \\ y = -\frac{7}{17} \end{array}$$

3. Beatrice wanted to solve the system of equations $\begin{cases} 4x - 3y = 9 \\ 3x + 2y = 11 \end{cases}$ by elimination.

To eliminate the x-terms, Beatrice could multiply the first equation by ________ and the second equation by ________ and add equations.

To eliminate the y-terms, Beatrice could multiply the first equation by ________ and the second equation by ________ and add equations.

Name ____________________

4-4 Reteach to Build Understanding

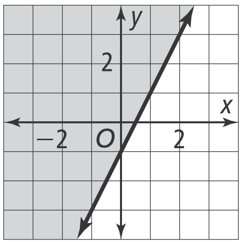
Linear Inequalities in Two Variables

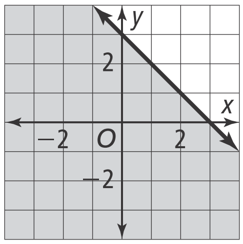
1. Match each inequality with its graph.

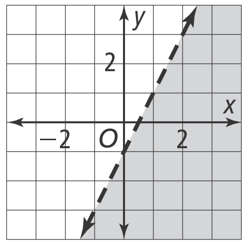
A boundary line that includes the points on the line is solid ($\leq$ or $\geq$).

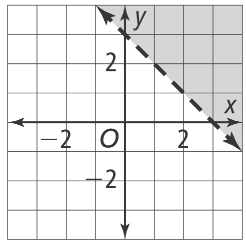
A boundary line that does not include the points on the line is dashed ($<$ or $>$).

$y < 2x - 1$ $\qquad$ $y > -x + 3$ $\qquad$ $y \geq 2x - 1$ $\qquad$ $y \leq -x + 3$

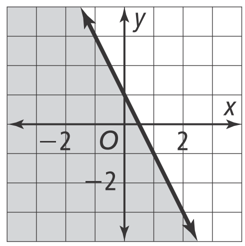








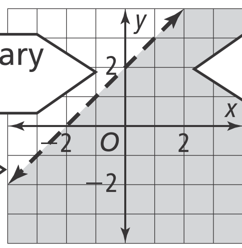
2. Anthony graphed the inequality $y < -2x + 1$ as shown. What error did Anthony make?



3. Use the diagram to complete each statement.

The equation of the boundary line is ____________.

The boundary line is ____________.



The graph is shaded ____________ the line.

The inequality shown by the graph is ____________.

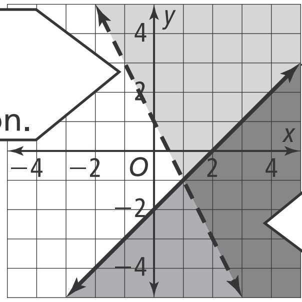
Name ______________________

4-5 Reteach to Build Understanding

Systems of Linear Inequalities

1. Use the diagram to complete each statement.

The line is ____________, so the points on the line are not included in the solution.



The line is ____________, so the points on the line are included in the solution.

The ____________ of the system of linear inequalities is the overlapping shaded region.

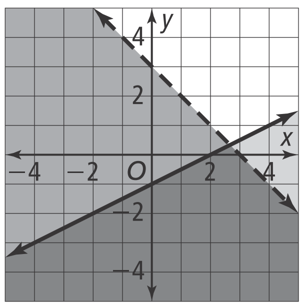
2. Complete the statement about each inequality in the system of inequalities from Exercise 1.

$\begin{cases} y > -2x + 1 \\ y \leq x - 2 \end{cases}$

All points will be ________________ the dashed line.

All points will be ________________ the solid line.

3. Sheryl made two incorrect statements about the system of inequalities shown in the graph. Put an X next to the incorrect statements. Correct her errors. Explain your reasoning.



a. One of the inequalities in the system is $y < \frac{1}{2}x - 1$.

b. One of the inequalities in the system is $y < -x + 3$.

c. The points on the line $y = -x + 3$ are solutions of the system.

d. (2, −2) is a solution of the system.

e. (−4, −3) is a solution of the system.

6-1 Additional Practice

Rational Exponents and Properties of Exponents

Write each radical using a rational exponent.

1. $\sqrt[4]{7}$

2. $\sqrt[9]{10^5}$

3. $\sqrt{a^{-3}}$

4. $\sqrt[3]{b^a}$

Solve each equation.

5. $\left(4^{\frac{x}{2}}\right)\left(4^{\frac{x}{5}}\right) = 4^{14}$

6. $(2^{2x+2})(2^{3x-7}) = 2^{25}$

7. $\dfrac{8^{\frac{x}{2}}}{4^{\frac{x}{3}}} = 2^{-\frac{5}{2}}$

8. $\left(\frac{1}{64}\right)^{\frac{x}{2}+1} = \left(\frac{1}{16}\right)^{\frac{x}{3}-3}$

9. $3 = \left(5^{\frac{1}{3}}\right)\left(x^{\frac{1}{3}}\right)$

10. $36^{2x-7} = 6^{x-5}$

11. Explain how to solve an equation of the form $x^{\frac{p}{q}} = a$ for nonzero integers x, p, q, and a. What is x in terms of a, p, and q?

12. A triangle has a base of $x^{\frac{1}{2}}$ m and a height of $x^{\frac{3}{4}}$ m. If the area of the triangle is 16 m^2, what are the base and the height of the triangle?

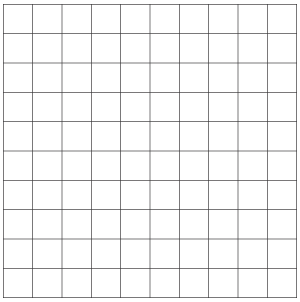
Name ______________________________

6-2 Additional Practice

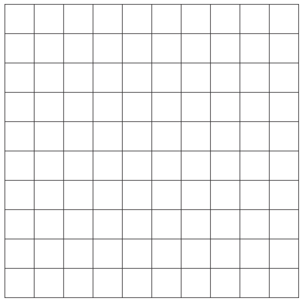
Exponential Functions

Graph each exponential function.

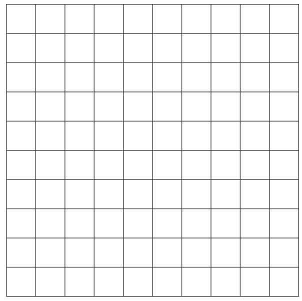
1. $f(x) = 3^x$



2. $f(x) = \left(\frac{1}{4}\right)^x$

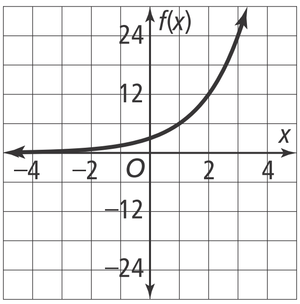


3. $f(x) = 8 \cdot 1.2^x$



Write an equation for each exponential function.

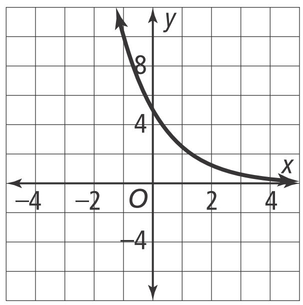
4.



5.

x	y
0	5
1	10
2	20
3	40

6.



7. Explain the key features of the exponential function $y = a \cdot b^x$, including the asymptote, key points on the graph, domain, and range.

8. The function $f(x) = 5{,}000 \cdot 1.05^x$ models an investment of \$5,000 earning 5% annually. Identify and interpret the values of a and b. What is the balance of the investment after 15 years, assuming no further deposits or withdrawals?

Name ______________________________

6-3 Additional Practice

Exponential Growth and Decay

Write an exponential growth model for each situation.

1. initial value: 2,000
growth rate: 6%

2. initial value: 50
growth rate: 75%

3. initial value: 40
growth rate: 100%

Write an exponential decay model for each situation. The value of *x* for each value of *f*(*x*) will lie between two consecutive whole numbers. List the whole numbers.

4. initial value: 1,000
decay rate: 20%
$f(x) = 500$

5. initial value: 1,800
decay rate: 7%
$f(x) = 400$

6. initial value: 1,200
decay rate: 12.5%
$f(x) = 450$

7. Suppose the function f has an initial value of 1,000 and a decay rate of 5%. Let the function g have an initial value of 400 and increase at a growth rate of 17%. Estimate a value of x, to the nearest tenth, for which $f(x) = g(x)$.

8. An exponential function has an initial value of 500 and a decay rate of 15%. Compare the average rate of change for the interval $0 < x < 4$ to the average rate for the interval $4 < x < 8$. What do you think will happen to the average rate of change for intervals beyond $x = 8$? Explain.

9. Harrison is comparing two certificates of deposit, one at a local financial institution and the other at an online financial institution. The local institution offers a rate of 6% compounded annually while the online institution offers a rate of 6% compounded quarterly. If Harrison has a principal amount of \$5,000, which institution offers the better deal, assuming he makes no further deposits or withdrawals? Explain.

Name ______________________________

6-4 Additional Practice

Geometric Sequences

Is the sequence a geometric sequence? If it is, give the common ratio.

1. 1, 49, 98, 147, …

2. 4, 12, 36, 108, …

3. 16, 12, 9, $\frac{27}{4}$, …

Write a recursive formula and an explicit formula for each geometric sequence.

4. 9, 18, 36, 72, …

Recursive:

Explicit:

5. 540, 180, 60, 20, …

Recursive:

Explicit:

Write a recursive formula for each explicit formula.

6. $a_n = -4 \cdot 3^{n-1}$

7. $a_n = 5 \cdot \left(\frac{2}{3}\right)^{n-1}$

Write an explicit formula for each recursive formula.

8. $a_1 = 50$
$a_n = 0.5a_{n-1}$

9. $a_1 = 2$
$a_n = 6a_{n-1}$

10. How are geometric sequences and exponential functions alike? How are they different?

11. The number of subscribers for an online periodical doubles each month. The first month of publication, there were only 100 subscribers. How many subscribers will there be in one year?

Name ____________________

6-5 Additional Practice

Transformations of Exponential Functions

Consider $f(x) = 3^x$. Describe how the graph of each function compares to f.

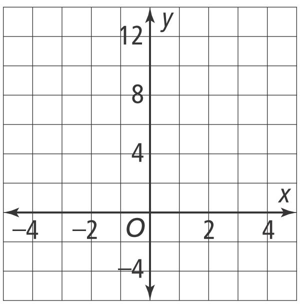
1. $g(x) = 3^x + 4$

2. $h(x) = \left(\frac{1}{4}\right)^{x-5}$

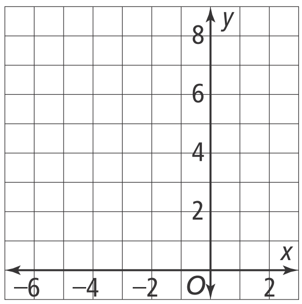
3. $j(x) = 3^{x+6} - 2$

Graph each function.

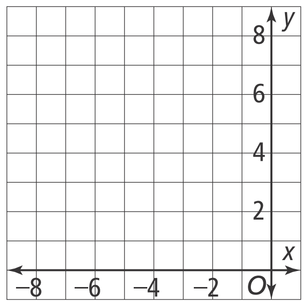
4. $g(x) = 2^x - 3$



5. $h(x) = \left(\frac{1}{2}\right)^{x+3}$



6. $j(x) = 4^{x+4} + 3$



Consider $g(x) = 3^x - 3$. What is an equation for each graph in terms of g?

7. y-intercept is 0

8. y-intercept is 8

9. y-intercept is –3

10. Is the asymptote of an exponential function transformed by a horizontal or vertical translation? Explain.

11. In Major League Baseball, excluding the wildcard round, a total of 8 teams participate in the postseason playoffs. Teams pair up each round to play against each other. The winner of each round goes on to play another winning team. In each round, the losing team is eliminated from the playoffs. Discuss the features of the graph that models the playoff scenario. Is the playoff graph a continuous or discrete graph? Explain.