

Algebra Winter Benchmark Study Guide

Name

Key

Solving Multi-Step Inequalities

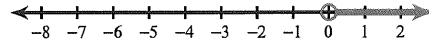
Solve each inequality and graph its solution.

1) $-11 \geq 6 - 2n - 5$



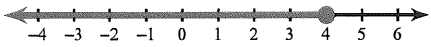
$n \geq 6$

2) $0 > -5x - 6x$



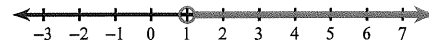
$x > 0$

3) $x + 1 + 4 \leq 9$



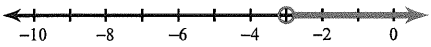
$x \leq 4$

4) $-9 > -5n - 4n$



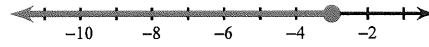
$n > 1$

5) $5k - 2k > -9$



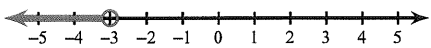
$k > -3$

6) $-2 \geq 4p + 6 + 4$



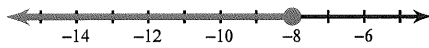
$p \leq -3$

7) $30 - 6a < -3(5 + 7a)$



$a < -3$

8) $33 + 4x \leq -(x + 7)$



$x \leq -8$

Solving Absolute Value Equations

Solve each equation.

1) $|3x| = 9$
 $\{3, -3\}$

2) $|-3r| = 9$
 $\{-3, 3\}$

3) $\left|\frac{b}{5}\right| = 1$
 $\{5, -5\}$

4) $|-6m| = 30$
 $\{-5, 5\}$

5) $\left|\frac{n}{3}\right| = 2$
 $\{6, -6\}$

6) $|-4 + 5x| = 16$
 $\left\{4, -\frac{12}{5}\right\}$

7) $|-2r - 1| = 11$
 $\{-6, 5\}$

8) $|1 - 5a| = 29$
 $\left\{-\frac{28}{5}, 6\right\}$

9) $|-2n + 6| = 6$
 $\{0, 6\}$

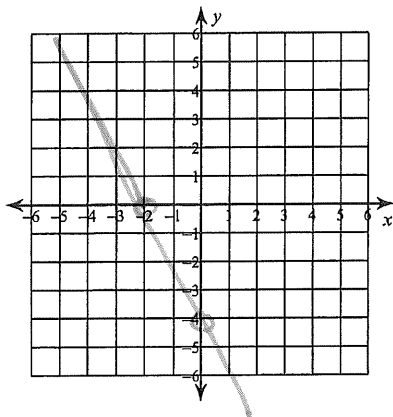
10) $|v + 8| - 5 = 2$
 $\{-1, -15\}$

Review: Graphing and Writing Linear Equations

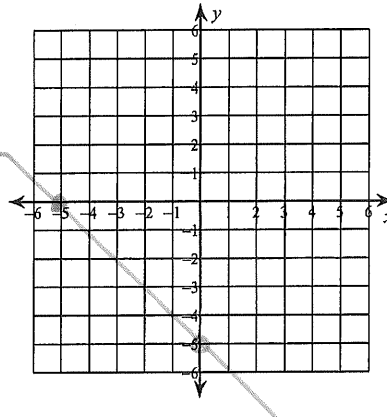
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Sketch the graph of each line.

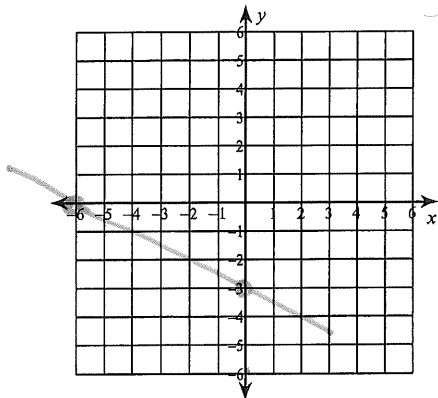
1) x -intercept = -2 , y -intercept = -4



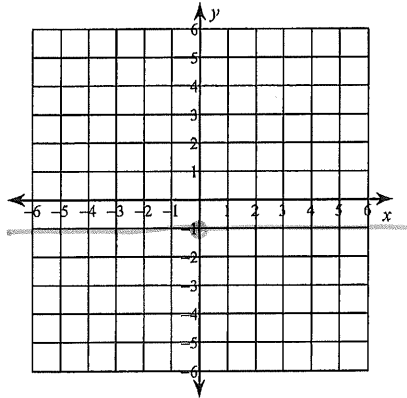
2) x -intercept = -5 , y -intercept = -5



3) $x + 2y = -6$

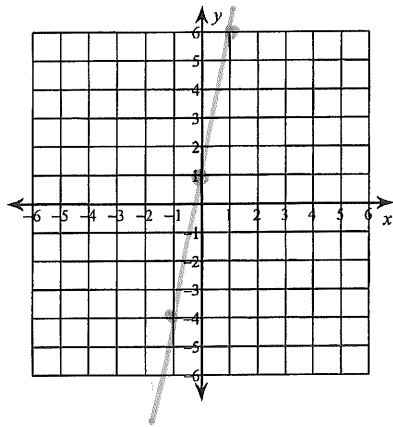


4) $y = -1$

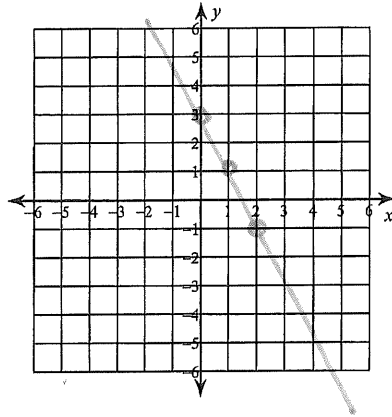


-1. (4)

5) $y = 5x + 1$

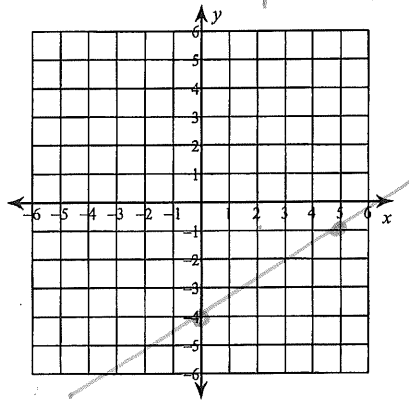


6) $y = -2x + 3$

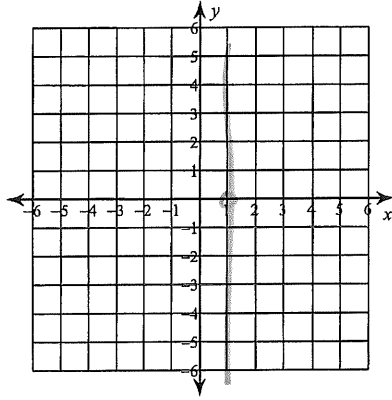


7) $5y = 3x - 20$

$y = \frac{3}{5}x - 4$



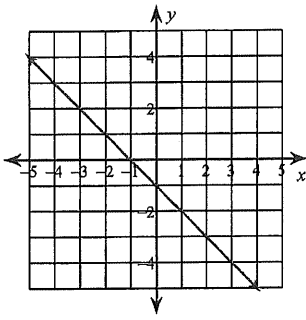
8) $-x = -1$ $x = 1$



5

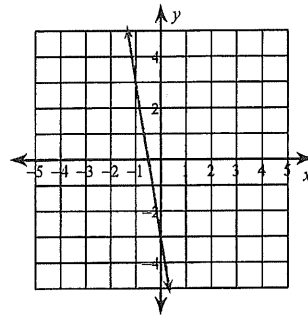
Write the slope-intercept form of the equation of each line.

9)



$$y = -x - 1$$

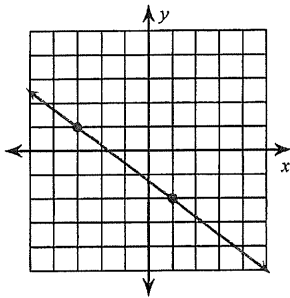
10)



$$y = -6x - 3$$

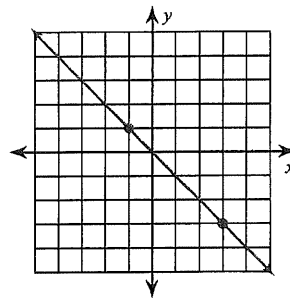
Find the slope of each line.

11)



$$m = -\frac{3}{4}$$

12)



$$m = -1$$

Find the slope of the line through each pair of points.

13) (14, 20), (19, 4)

$$m = -\frac{16}{5}$$

14) (-14, 0), (-13, -20)

$$m = -20$$



Write the slope-intercept form of the equation of each line.

15) $x + 8 = -2y$

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

16) $-9 = -x - 3y$

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

17) $y + 2 = -\frac{1}{2}(x - 2)$

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

18) $y = \frac{2}{3}(x - 3)$

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

Write the slope-intercept form of the equation of each line given the slope and y-intercept.

19) Slope = $-\frac{5}{3}$, y-intercept = 4

$$y = -\frac{5}{3}x + 4$$

20) Slope = 5, y-intercept = 5

$$y = 5x + 5$$

Write the ^{slope-int form} point-slope form of the equation of the line through the given point with the given slope.

21) through: $(-1, 3)$, slope = -2

$$3 = -2(-1) + b$$

$$3 = 2 + b$$

$$1 = b$$

$$y = -2x + 1$$

22) through: $(2, -5)$, slope = -3

$$-5 = -3(2) + b$$

$$-5 = -6 + b$$

$$1 = b$$

$$y = -3x + 1$$

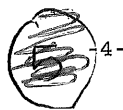
Write the slope-intercept form of the equation of the line through the given points.

23) through: $(-4, 3)$ and $(-2, 3)$

$$y = 3$$

24) through: $(5, 3)$ and $(-5, -4)$

$$y = \frac{7}{10}x - \frac{1}{2}$$



Slope-Intercept Form Word Problems

Name: _____ Date: _____

1. In order to join a dancing club, there is a \$30 startup fee and a \$4 monthly fee. Write an equation in slope-intercept form that models this situation.

$$y = 4x + 30$$

2. In order to join an online learning community, there is a \$20 startup fee and a \$5 monthly fee. Write an equation in slope-intercept form that models this situation.

$$y = 5x + 20$$

3. In order to become a member of the library-all-star-members club, there is a \$40 sign-up fee and a \$2 monthly fee. Write an equation in slope-intercept form that models this situation.

$$y = 2x + 40$$

4. Use equation you wrote in problem 3 to find the total cost of being an all-star library member for 19 months.

$$y = 2(19) + 40$$

$$y = 78$$

5. The U.S. Bureau of the Census predicted that the population of Florida would be about 17.4 million in 2010 and then would increase by about 0.22 million per year until 2015. Which of the following linear models predicts the population, y , of Florida (in millions) in terms of x , the number of years since 2010.

A. $y = 17.4x + 0.22$

B. $y = -0.22x + 17.4$

C. $y = 0.22x + 17.4$

D. $y = -17.4x + 0.22$

6. Suppose that a bike rents for \$4 plus \$1.50 per hour. Write an equation in slope-intercept form that models this situation.

$$y = 1.50x + 4$$

7. Use the equation you wrote in problem 6 to complete the table.

Hours (x)	2	4	6	8
Total Cost (y)	7	10	13	16

8. In order to join a yoga club there is a \$100 annual fee and a \$5 fee for each class you attend. Write an equation in slope-intercept form that models this situation.

$$y = 5x + 100$$

9. Cameron is designing a calendar as a fund-raising project for math class. The cost of printing is \$500, plus \$2.50 per calendar. Write an equation in slope-intercept form that models the total cost of printing the calendars.

$$y = 2.50x + 500$$

10. Each calendar will sell for \$5.00 each. Write an equation to model the total *income*, *y*, for selling *x* calendars.

$$y = 5x$$

11. Cameron estimates that the math class will sell 200 calendars. What will the total cost be? $\rightarrow x$

#9 equation
 $y = 2.5(200) + 50$
 $\$550$

12. Cameron estimates that the math class will sell 200 calendars. What will the total income be?

$$y = 5(200) = \$1,000$$

equation from #10

13. Determine how effective the fundraising project will be. Will there be a profit or a loss? If so, how much?

Profit.

There is \$450 more in income than cost.

14. When visiting Baltimore, MD, you need to rent a taxi to get from your hotel to the National Aquarium. The taxi company charges a flat fee of \$3.00 for using the taxi and \$0.75 per mile. Write an equation in slope-intercept form that models this situation.

$$y = .75x + 3$$

15. Use your equation from problem 14 to calculate the cost for using the taxi for 18 miles.

$$y = .75(18) + 3$$

\$16.50

16. An airplane 30,000 feet above the ground begins descending at a rate of 2,000 feet per minute. Write an equation to model the situation. Find the altitude of the plane after 5 $\rightarrow x$ minutes.

$$y = -2,000x + 30,000$$

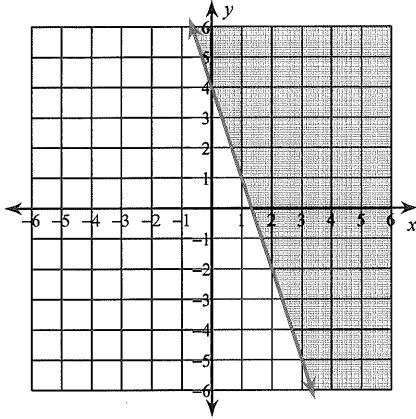
$$y = -2,000(5) + 30,000$$

\$20,000 ft

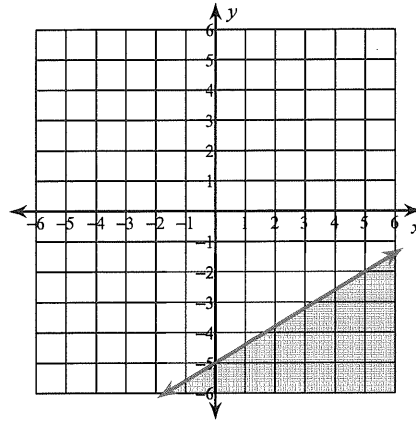
Graphing Linear Inequalities

Sketch the graph of each linear inequality.

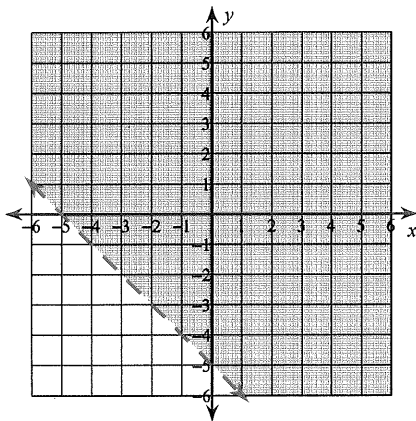
1) $y \geq -3x + 4$



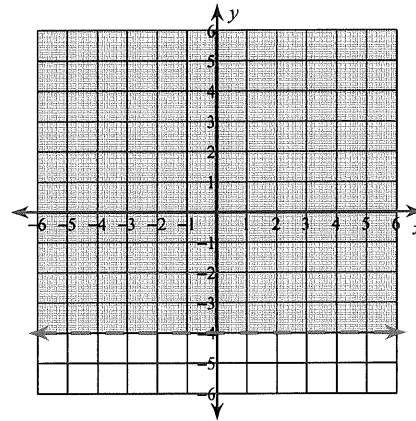
2) $y \leq \frac{3}{5}x - 5$



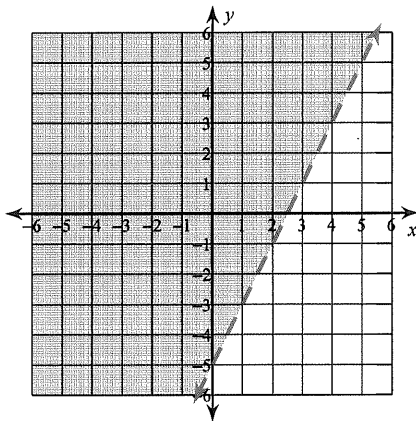
3) $y > -x - 5$



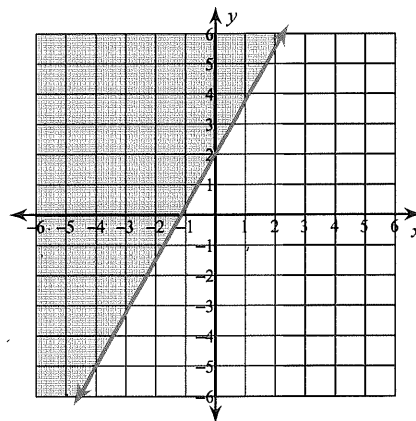
4) $y > -4$



5) $y > 2x - 5$



6) $y \geq \frac{7}{4}x + 2$



Algebra 361
 D-7, Sections 6.1-6.4: Review Worksheet
 Solving Systems of Equations

Name _____
 Date _____ Period _____

Choose the correct answer below to each question. Write your final answers on the line below.

1. If a system of linear equations has infinitely many solutions, then the graph of the system is: 1. C
 A. intersecting lines
 B. perpendicular lines
 C. the same line
 D. parallel lines.

2. When solving a system by substitution, one should: 2. B
 A. look for coefficients that are reciprocals
 B. solve for x or y in one equation first
 C. look for coefficients that are the same or opposites
 D. always multiply by -1

3. If the result, when solving a system by either elimination or substitution, is 4 = 4, the solution is: 3. D
 A. (-5, 4)
 B. \emptyset
 C. (4, -5)
 D. infinitely many

4. If there are no solutions to a system of linear equations then the graph of that system is: 4. D
 A. intersecting lines
 B. perpendicular lines
 C. the same line
 D. parallel lines.

5. When solving a system by either elimination or substitution, what does the solution represent? 5. C
 A. parallel lines
 B. the slope of the lines
 C. the point of intersection of the graphs of the system
 D. just the answer

Is the given point a solution to the system, yes or no? You must show work as proof of your answer in order to receive full credit.

6. $\begin{matrix} 2 \\ 6x - y = 4 \\ 7x + 2y = -5 \\ \hline + \\ 6x - 2y = 8 \end{matrix}$ (1, -1)
 $\begin{matrix} x = 3 \\ 9 - y = 4 \\ y = 5 \end{matrix}$ (3, 5)

7. $\begin{matrix} 3 \\ x + y = 3 \\ 2x - 3y = 1 \\ \hline + \\ 3x + 3y = 9 \end{matrix}$ (2, 1)
 $\begin{matrix} 5x = 10 \\ x = 2 \\ 2 + y = 3 \\ y = 1 \end{matrix}$ (2, 1)

6. NO
 7. YES

~~(1, -1)~~ (11)

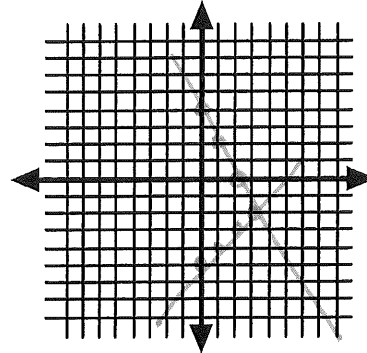
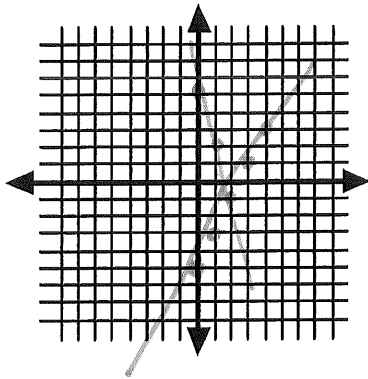
Solve the system by GRAPHING. Write the solution on the line provided.

8. $2x - y = 5 \rightarrow y = 2x - 5$
 $y = -3x + 5$

9. $y = x - 5$
 $2x + y = 4$
 $\rightarrow y = -2x + 4$

8. (2, -1)

9. (3, -2)



Solve the system by SUBSTITUTION. Write the solution on the line provided.

10. $4x - 3y = 5$
 $y = 2x - 3$

$4x - 3(2x - 3) = 5$
 $4x - 6x + 9 = 5$
 $-2x = -4$
 $x = 2$
 $y = 1$

11. $5x + 3y = 8$
 $3x + y = 8$

$\rightarrow y = -3x + 8$
 $5x + 3(-3x + 8) = 8$
 $5x - 9x + 24 = 8$
 $-4x = -16$
 $x = 4$
 $y = -4$

10. (2, 1)

11. (4, -4)

12. $x + 5y = 4$
 $2x + 10y = 8$
 $\rightarrow x = -5y + 4$

$2(-5y + 4) + 10y = 8$
 $-10y + 8 + 10y = 8$
 $8 = 8 \checkmark$

13. $3x - y = 4$
 $2x - 3y = -9$
 $\rightarrow y = 3x - 4$

$2x - 3(3x - 4) = -9$
 $2x - 9x + 12 = -9$
 $-7x = -21$
 $x = 3$
 $y = 5$

12. ∞ Many

13. (3, 5)

Solve the system by **ELIMINATION**. Write the solution on the line provided.

14. $x + 2y = 6$

+ $x - 2y = 2$

$$\begin{array}{r} 2x = 8 \\ x = 4 \end{array}$$

$4 + 2y = 6$

$2y = 2$

$y = 1$

15. $3x + 4y = 19$

- $3x + 6y = 33$

$$\begin{array}{r} -2y = -14 \\ y = 7 \end{array}$$

$3x + 28 = 19$

$3x = -9$

$x = -3$

14. (4, 1)

15. (-3, 7)

16. $9x - 6y = -12$

2 ($-2x + 3y = -4$)

$$\begin{array}{r} 9x - 6y = -12 \\ -4x + 6y = -8 \\ \hline 5x = -20 \\ x = -4 \end{array}$$

$8 + 3y = -4$

$3y = -12$

$y = -4$

17. $3x + 4y = 16$

4 ($2x - 3y = 22$)

$$\begin{array}{r} 9x + 12y = 48 \\ + 8x - 12y = 88 \\ \hline 17x = 136 \\ x = 8 \end{array}$$

$16 - 3y = 22$
 $-3y = 6$ $y = -2$

16. (-4, -4)

17. (8, -2)

Solve each system of equation using the **METHOD OF YOUR CHOICE**.

18. $4x - 3y = 1$

5 ($2x + y = 3$)

$$\begin{array}{r} 4x - 3y = 1 \\ 6x + 3y = 9 \\ \hline 10x = 10 \\ x = 1 \end{array}$$

$4 - 3y = 1$

$-3y = -3$

$y = 1$

19. $6x - 2y = 6$

$x + 4y = 14$

+ $12x - 4y = 12$

$13x = 28$

$x = \frac{28}{13}$

$x = 2$

$x = 4y + 14$

18. (1, 1)

19. (2, 3)

$-24y + 84 - 2y = 6$

$-26y = -78$

$y = 3$

~~10~~

13

$$\begin{array}{r}
 3 \\
 20. \left\{ \begin{array}{l} 5x+2y=7 \\ 3x+7y=10 \end{array} \right. \\
 \begin{array}{l} 5x+2=7 \\ 5x=5 \\ x=1 \end{array} \\
 + \begin{array}{r} \sqrt{5x+6y=21} \\ -15x-35y=50 \\ \hline -29y=-29 \\ y=1 \end{array}
 \end{array}$$

$$\begin{array}{r}
 -5 \\
 21. \left\{ \begin{array}{l} 2x-7y=3 \\ 5x-4y=-6 \end{array} \right. \\
 \begin{array}{r} -10x+35y=-15 \\ +10x-8y=-12 \\ \hline 27y=-27 \\ y=-1 \end{array}
 \end{array}$$

$$\begin{array}{l}
 20. \underline{(1, 1)} \\
 21. \underline{(-2, -1)} \\
 2x+7=3 \\
 2x=-4 \\
 x=-2
 \end{array}$$

Set up a system of equations that represents each situation. Then solve using the method of your choice.

22. A bicycle store costs \$2400 per month to operate. The store pays an average of \$60 per bike. The average selling price of each bicycle is \$120. How many bicycles must the store sell each month to break even?

~~work~~
~~bikes~~
~~cost~~

$$\begin{array}{l}
 y = 2400 + 60x \\
 y = 120x \\
 x = \text{bicycles} \\
 120x = 60x + 2400 \\
 60x = 2400 \\
 \boxed{x = 40 \text{ bikes}}
 \end{array}$$

23. The sum of two numbers is 27. The larger number is three more than the smaller number. What are the two numbers?

$$\begin{array}{l}
 x = \#1 \\
 y = \#2 \\
 x + y = 27 \\
 x + 3 = y \\
 \boxed{(12, 15)} \\
 x + x + 3 = 27 \\
 2x + 3 = 27 \\
 2x = 24 \\
 x = 12 \quad y = 15
 \end{array}$$

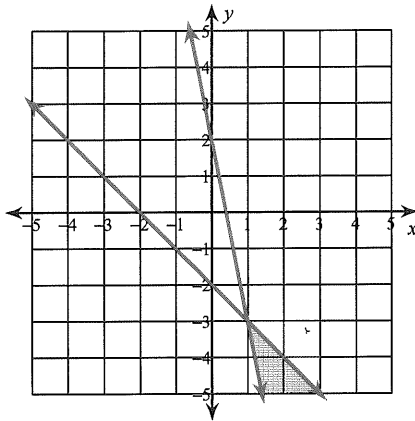
~~work~~
~~invest~~
~~money~~
~~invest~~
~~each~~
~~account~~

24. You have \$6000 to invest in two stock funds. The first fund pays 5% annual interest and the second account pays 9% annual interest. If after a year you have made \$380 in interest, how much money did you invest in each account?

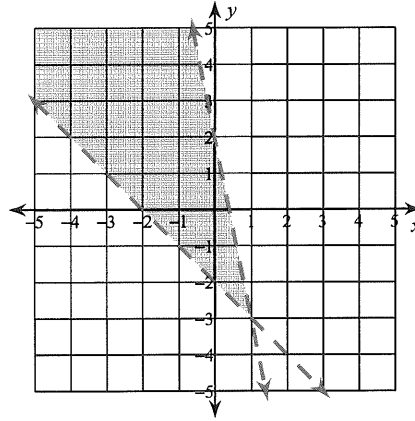
Solving Systems of Inequalities

Sketch the solution to each system of inequalities.

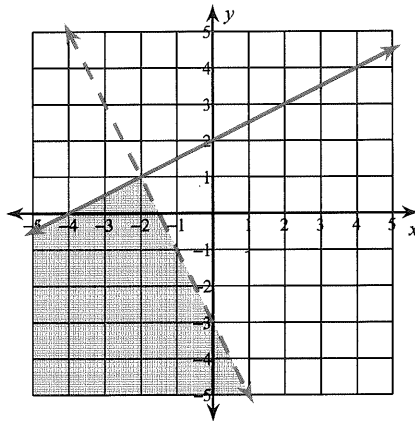
1) $y \leq -x - 2$
 $y \geq -5x + 2$



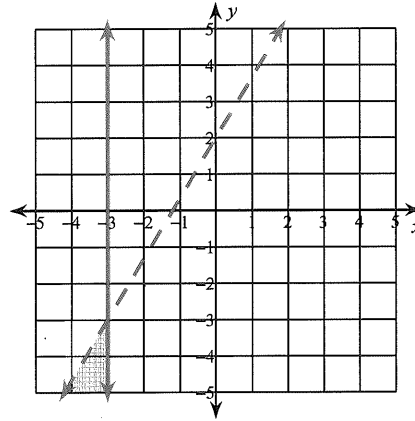
2) $y > -x - 2$
 $y < -5x + 2$



3) $y \leq \frac{1}{2}x + 2$
 $y < -2x - 3$



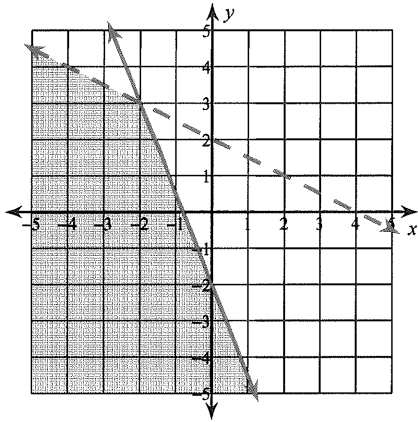
4) $x \leq -3$
 $y < \frac{5}{3}x + 2$



15

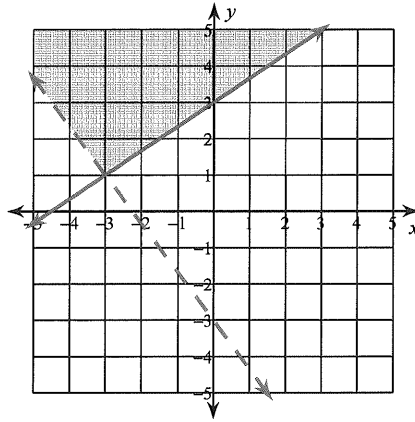
$$5) y \leq -\frac{5}{2}x - 2$$

$$y < -\frac{1}{2}x + 2$$



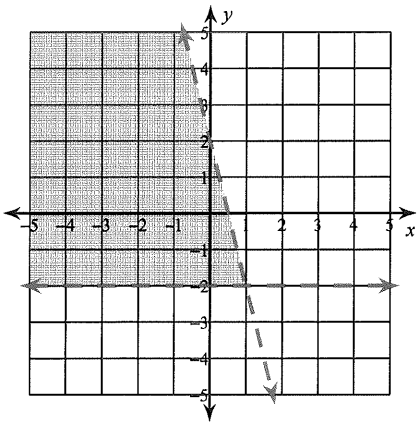
$$6) y \geq \frac{2}{3}x + 3$$

$$y > -\frac{4}{3}x - 3$$



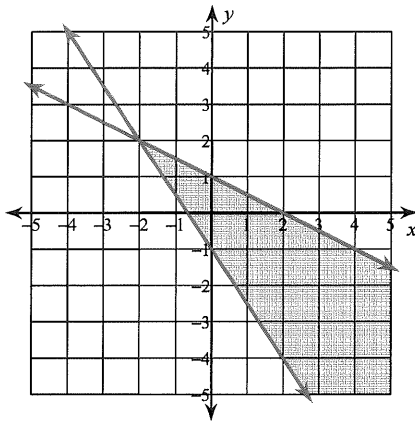
$$7) 4x + y < 2$$

$$y > -2$$



$$8) 3x + 2y \geq -2$$

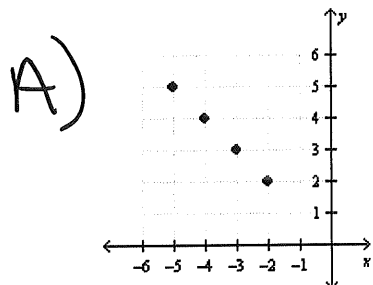
$$x + 2y \leq 2$$



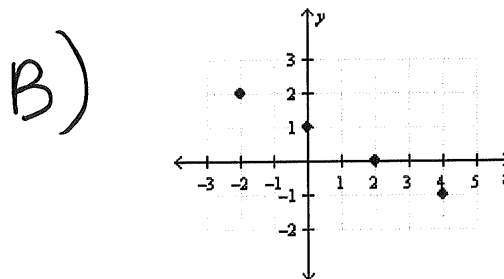
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FUNCTION REVIEW

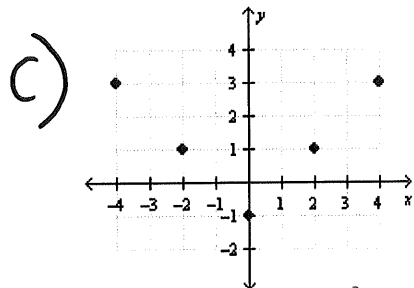
Find the domain and range:



D: $-5, -4, -3, -2$
 R: $2, 3, 4, 5$



D: $-2, 0, 2, 4$
 R: $-1, 0, 1, 2$



D: $-4, -2, 0, 2, 4$
 R: $-1, 1, 3$

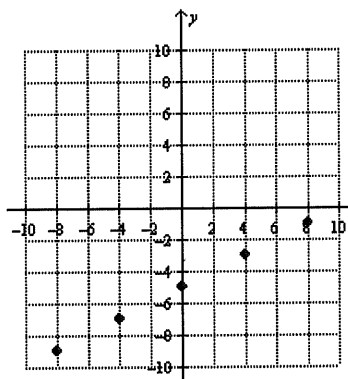
D)

x	-1	0	1	2
y	9	3	-3	-9

D ↙
 ↘ R

Write a linear function that relates y to x.

E)



$y = \frac{1}{2}x - 5$

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

x	-4	-2	0	2
y	8	7	6	5

↘
 ↙
 -1

(17)

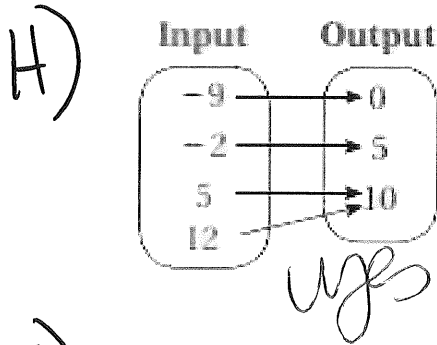
G)

$y = 3x - 5$

x	-5	0	5	10
y	15	0	-15	-30

↘
 ↙
 -15

Is the relation a function?



I)

Input	Output
2	2.6
4	5.2
6	7.8

yes

J)

$(-5, 0), (0, 0), (5, 0)$
 $(5, 10), (10, 10)$

no

K)

$(-2, 2), (-1, 2), (0, 2), (1, 0), (2, 0)$

yes

Is the domain discrete or continuous?

L)

Input Hats, x	Output Cost, y (dollars)
0	0
1	8.45
2	16.9

Discrete

M)

Input Bags, x	Output Marbles, y
2	20
4	40
6	60

Discrete

N)

Input Years, x	Output Height of a Tree, y (feet)
0	3
1	6
2	9

continuous

O)

Input Width, x (inches)	Output Volume, y (cubic inches)
5	50
10	100
15	150

continuous

Evaluate the function when $x = -4, 0,$ and $2.$

1. $f(x) = x - 2$

$f(-4) = -6$ $f(2) = 0$
 $f(0) = -2$

2. $g(x) = 7x + 3$

$g(-4) = -25$ $g(2) = 17$
 $g(0) = 3$

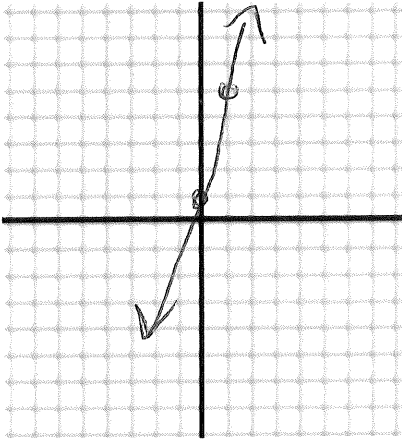
3. $h(x) = -\frac{1}{4}x + 5$

$h(-4) = 6$ $h(2) = 4\frac{1}{2}$
 $h(0) = 5$

Graph the function. Compare the graph to the graph of $f(x) = 4x.$

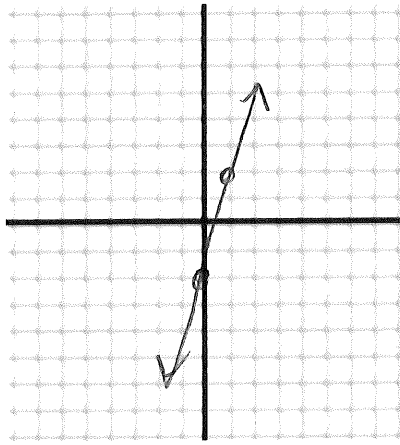
4. $g(x) = 4x + 1$

↑ 1 unit



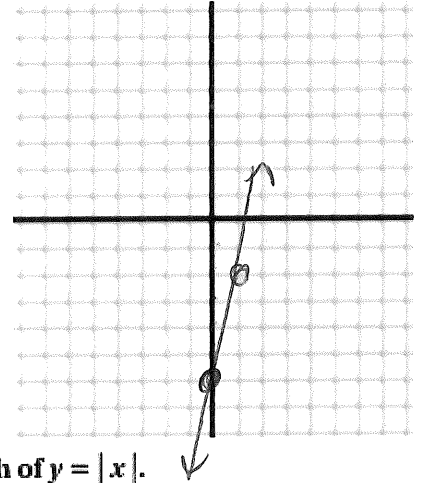
5. $h(x) = 4x - 2$

↓ 2 units



6. $n(x) = 4x - 6$

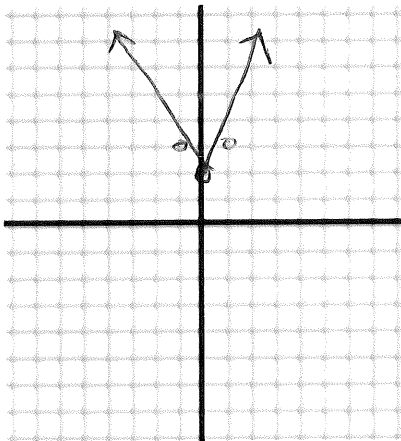
↓ 6 units



Graph the function. Compare the graph to the graph of $y = |x|.$

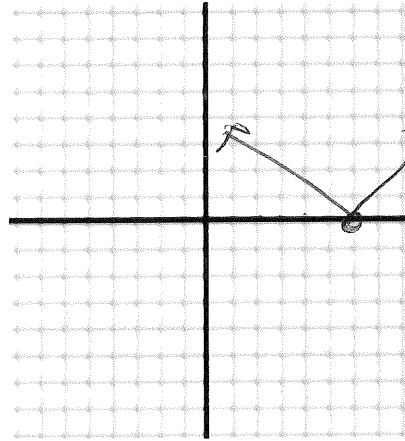
7. $y = |x| + 2$

↑ 2 units



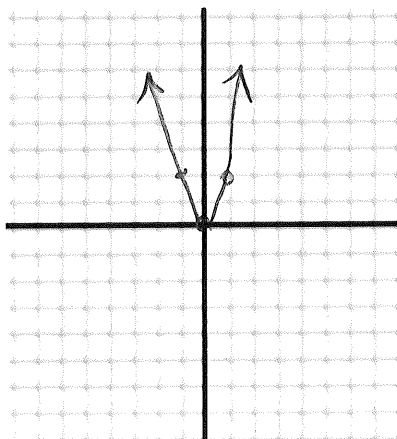
8. $y = |x - 6|$

→ 6 units



9. $y = 2|x|$

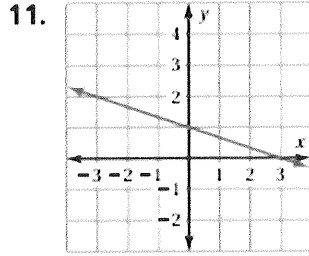
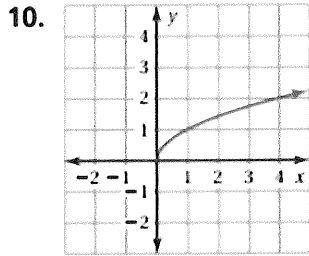
Thinner



Does the table or graph represent a *linear* or *nonlinear* function? Explain.

(Section 5.5)

non



12.

x	y
0	3
3	0
6	3
9	6

Linear

13.

HIGH-SPEED RAIL A high-speed passenger train travels at 110 miles per hour. The function $d(x) = 1375 - 110x$ represents the distance (in miles) the train is from its destination after x hours. How far is the train from its destination after 8 hours? (Section 5.4)

$x = 8$

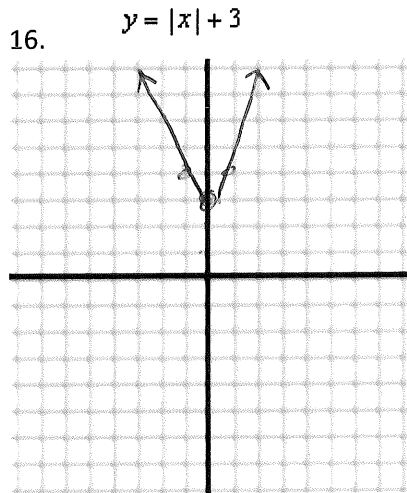
495 miles

14.

CHICKEN SALAD The equation $y = 7.9x$ represents the cost y (in dollars) of buying x pounds of chicken salad. Does this equation represent a linear or nonlinear function? Explain. (Section 5.5)

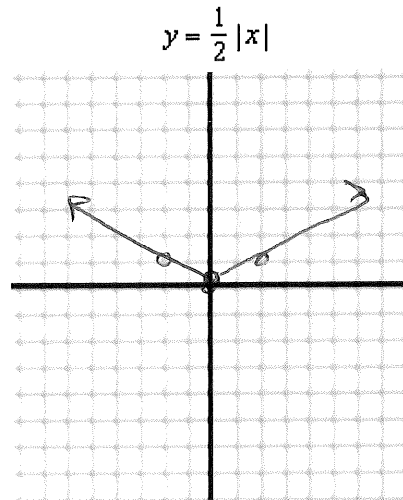
Linear, can be in $y = mx + b$

Graph the function. Compare the graph to the graph of $y = |x|$.



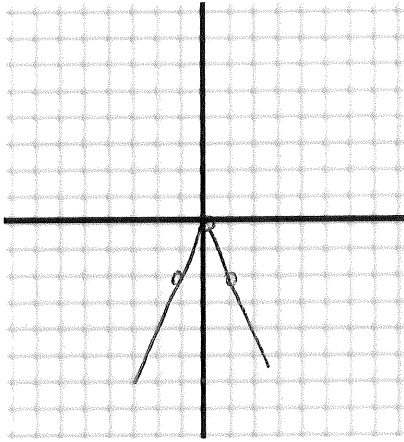
↑ 3 units

17.



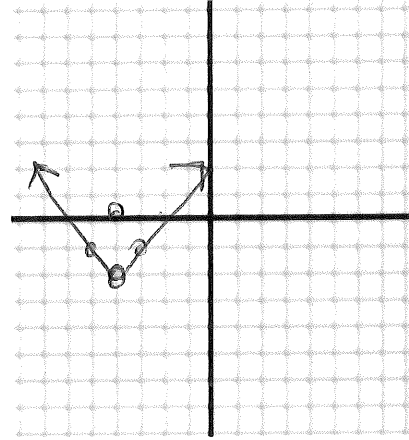
wider

18. $y = -2|x|$



wider
upside-
down

19. $y = |x+4| - 2$



← 4
↓ 2
units

20.

Find the value of x so that the function has the given value.

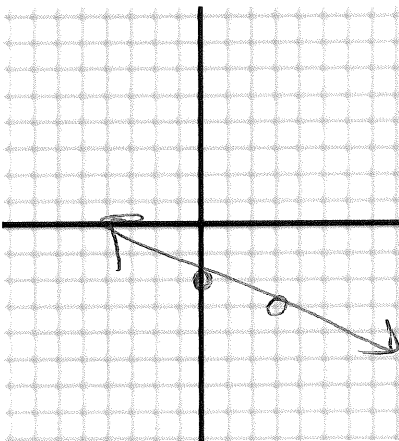
$n(x) = 4x + 10; \quad n(x) = 14$

- | | | | |
|----|-----|----|----|
| a. | -66 | c. | -1 |
| b. | 66 | d. | 1 |

21.

Graph the linear function.

$g(x) = -\frac{1}{3}x - 2$



Sequence Assessment Review

Name _____

Determine whether the sequence is arithmetic. If so, find the common difference.

1. 13, 26, 39, 52, ...

yes, $d = 13$

2. 5, 9, 14, 20, ...

no

Write an equation for the n th term of the arithmetic sequence. Then find the 12th term.

3. 10, 11, 12, 13, ...

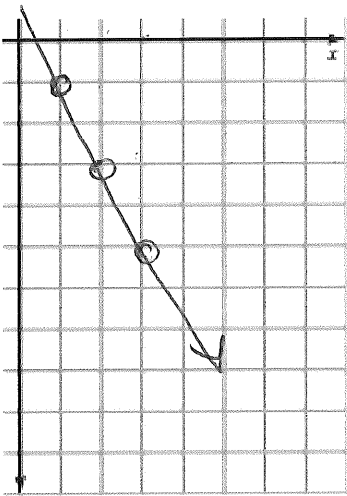
~~$a_n = n + 9$~~
 $a_n = n + 9$
 $a_{12} = 21$

4. $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2, ...

$a_n = \frac{1}{2}n$
 $a_{12} = 6$

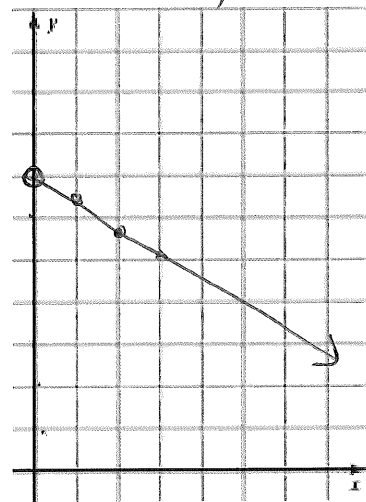
Write the next three terms of the arithmetic sequence, then graph the sequence.

5. -1, -3, -5, -7, ... -9, -11, -13



6. 7, 6.4, 5.8, 5.2, ...

4.6, 4, 3.4



7. Firewood is stacked in a pile. The bottom row has 20 logs and the top row has 14 logs. Each row has one more log than the row above it. How many logs are in the pile?

119 logs

8. The first row of a dominoes display has 10 dominoes. Each row after the first has two more dominoes than the row before it. Write the first five terms of the sequence that represents the number of dominoes in each row.

10, 12, ~~14~~, 16, 18

Write the next three terms of the geometric sequence.

9. 3, -12, 48, -192, ...

768, -3072, 12288

10. 0.1, 0.9, 8.1, 72.9, ...

656.1, 5904.9, 53144.1

Write the next three terms of the geometric sequence, then find the 9th term.

11. 1, -5, 25, -125, ...

625, -3125, 15625

12. 2, 8, 32, 128, ...

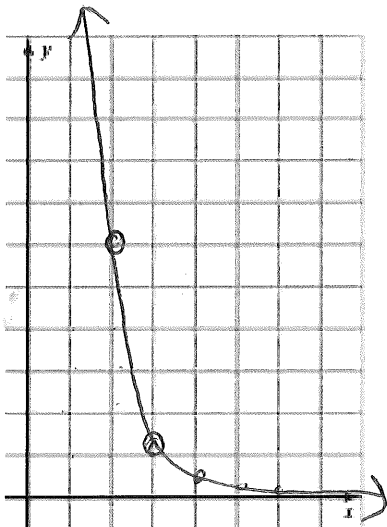
512, 2048, 8192

$a_9 = 390,625$

$a_9 = 131,072$

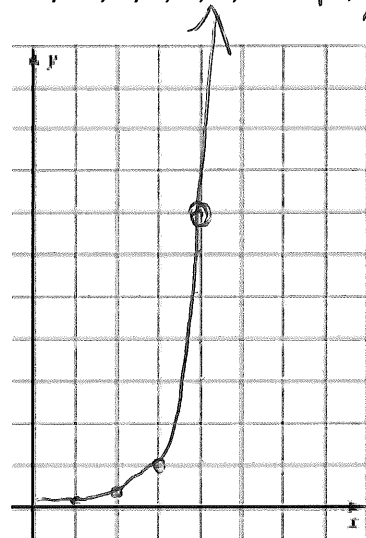
Write the next three terms of the geometric sequence, then graph the sequence.

13. 36, 6, 1, 1/6, ...



$\frac{1}{36}, \frac{1}{216}, \frac{1}{1296}$

14. 1/49, 1/7, 1, 7, ... 49, 343, 2401



Tell whether the sequence is *geometric* or *arithmetic*.

15. -8, 0, 8, 16, ...

arith

16. -1, 3, -5, 7, ...

none

Simplifying Radicals Worksheet 1

Simplify.

1) $\frac{\sqrt{75}}{5\sqrt{3}}$

2) $\frac{\sqrt{16}}{4}$

3) $\frac{\sqrt{36}}{6}$

4) $\frac{\sqrt{64}}{8}$

5) $\frac{\sqrt{80}}{4\sqrt{5}}$

6) $\frac{\sqrt{30}}{\sqrt{30}}$

7) $\frac{\sqrt{8}}{2\sqrt{2}}$

8) $\frac{\sqrt{18}}{3\sqrt{2}}$

9) $\frac{\sqrt{32}}{4\sqrt{2}}$

10) $\frac{\sqrt{12}}{2\sqrt{3}}$

11) $\frac{\sqrt{8}}{2\sqrt{2}}$

12) $\frac{\sqrt{108}}{6\sqrt{3}}$

13) $\frac{\sqrt{125}}{5\sqrt{5}}$

14) $\frac{\sqrt{50}}{5\sqrt{2}}$

15) $\frac{\sqrt{175}}{5\sqrt{7}}$

16) $\frac{\sqrt{28}}{2\sqrt{7}}$

17) $\frac{\sqrt{45}}{3\sqrt{5}}$

18) $\frac{\sqrt{72}}{6\sqrt{2}}$

19) $\frac{\sqrt{20}}{2\sqrt{5}}$

20) $\frac{\sqrt{150}}{5\sqrt{6}}$

Properties of Exponents

Simplify. Your answer should contain only positive exponents.

1) $2m^2 \cdot 2m^3$
 $4m^5$

2) $m^4 \cdot 2m^{-3}$
 $2m$

3) $4r^{-3} \cdot 2r^2$
 $\frac{8}{r}$

4) $4n^4 \cdot 2n^{-3}$
 $8n$

5) $2k^4 \cdot 4k$
 $8k^5$

6) $2x^3y^{-3} \cdot 2x^{-1}y^3$
 $4x^2$

7) $2y^2 \cdot 3x$
 $6y^2x$

8) $4v^3 \cdot vu^2$
 $4v^4u^2$

9) $4a^3b^2 \cdot 3a^{-4}b^{-3}$
 $\frac{12}{ab}$

10) $x^2y^{-4} \cdot x^3y^2$
 $\frac{x^5}{y^2}$

11) $(x^2)^0$
 1

12) $(2x^2)^{-4}$
 $\frac{1}{16x^8}$

13) $(4r^0)^4$
 256

14) $(4a^3)^2$
 $16a^6$

15) $(3k^4)^4$
 $81k^{16}$

16) $(4xy)^{-1}$
 $\frac{1}{4xy}$

$$17) (2b^4)^{-1}$$

$$\frac{1}{2b^4}$$

$$18) (x^2y^{-1})^2$$

$$\frac{x^4}{y^2}$$

$$19) (2x^4y^{-3})^{-1}$$

$$\frac{y^3}{2x^4}$$

$$20) (3m)^{-2}$$

$$\frac{1}{9m^2}$$

$$21) \frac{r^2}{2r^3}$$

$$\frac{1}{2r}$$

$$22) \frac{x^{-1}}{4x^4}$$

$$\frac{1}{4x^5}$$

$$23) \frac{3n^4}{3n^3}$$

$$n$$

$$24) \frac{m^4}{2m^4}$$

$$\frac{1}{2}$$

$$25) \frac{3m^{-4}}{m^3}$$

$$\frac{3}{m^7}$$

$$26) \frac{2x^4y^{-4}z^{-3}}{3x^2y^{-3}z^4}$$

$$\frac{2x^2}{3yz^7}$$

$$27) \frac{4x^0y^{-2}z^3}{4x}$$

$$\frac{z^3}{y^2x}$$

$$28) \frac{2h^3j^{-3}k^4}{3jk}$$

$$\frac{2h^3k^3}{3j^4}$$

$$29) \frac{4m^4n^3p^3}{3m^2n^2p^4}$$

$$\frac{4m^2n}{3p}$$

$$30) \frac{3x^3y^{-1}z^{-1}}{x^{-4}y^0z^0}$$

$$\frac{3x^7}{yz}$$