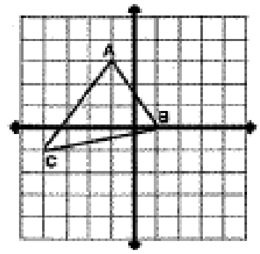
High School Math Summer Packet 2022

This packet provides practice on pre-requisite skills needed for Algebra 1 concepts, as well as a preview for Units 1 and 2 of Algebra 1.

Math 8 Review

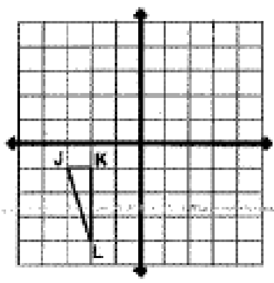
Name______________________________ **Date**____________

1. a. Draw and label the transformed image of ΔABC after it is translated <u>4 units right</u> and <u>2 units up</u>.



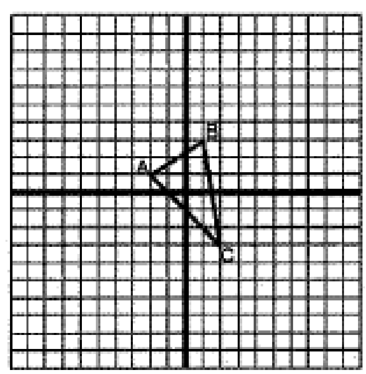
   b. What are the coordinates of B'? __________

2. Rotate ΔJKL 180° about the origin on the graph below and label your new image. Write the original and new coordinates.



Pre-Image Coordinates	Image Coordinates
J __________	J' __________
K __________	K' __________
L __________	L' __________

3. Graph and label the dilated image of ΔABC using a scale factor of 3, using the origin as the center of dilation.



Pre-Image Coordinates	Image Coordinates
A __________	A' __________
B __________	B' __________
C __________	C' __________

Find the coordinates of the vertices of each figure after the given transformation:

4. Rotate $JKLM$ 180° around the origin.

   $J(2,3)$, $K(3,-6)$, $L(-1,-5)$, M(-1,4)

   ____

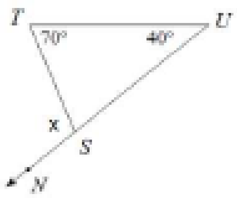
5. Dilate ΔABC using a scale factor of $\frac{1}{2}$ with the origin as the center of dilation.

   $A(6, 10)$, $B(-4, 8)$, $C(0, -2)$

   ____

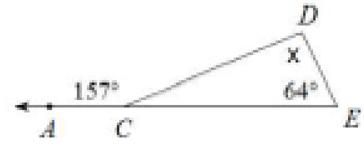
Find the missing angle measures.

6.



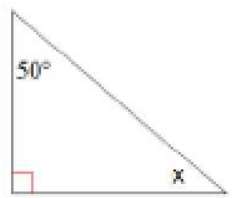
$x =$ ____________

7.



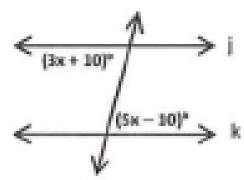
$x =$ ______________

8.

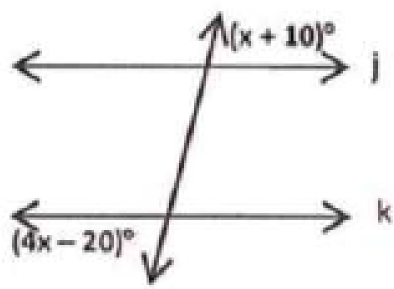


$x =$ ____________

9.

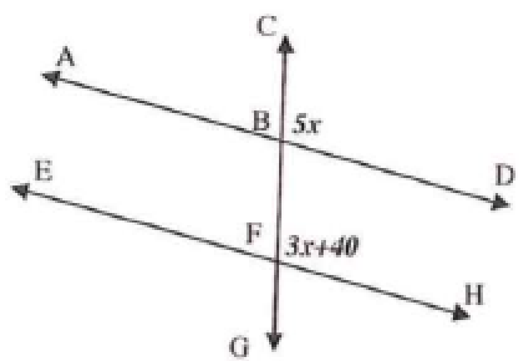


10.



x = ______

11.



x = ______

12. What value of x makes the expression $\sqrt{25 - x}$ irrational?

A. -11 B. 9 C. -75 D. 5

13. A square board has an area of 256 square feet. What is the length of one side of the board?

A. 64 ft. B. 16 ft. C. 128 ft. D. 14 ft.

14. Evaluate $a^{-2}b^3$ for $a = 2$ and $b = 3$.

A. $\frac{3}{2}$ B. $-\frac{27}{4}$ C. $\frac{9}{4}$ D. $\frac{27}{4}$

15. There are 4×10^{22} atoms in 1 gram of oxygen. How many atoms are there in 4000 grams of oxygen?

A. 16×10^{25} B. 1.6×10^{25} C. 1.6×10^{22} D. 1.6×10^{26}

16. The approximations for the radius of Jupiter and the radius of one of its moons are listed below. Approximately how many times larger is Jupiter than its moon?

- Radius of Jupiter: 9×10^7 meters
- Radius of Jupiter's moon: 3×10^4 meters

17. Estimate the following square root to the nearest tenth. $\sqrt{92}$ Show your work, and circle your answer.

18. List the following numbers in order from least to greatest: 3.5×10^3, 3.5×10^{-2}, 6.8×10^{-5}, 5.3×10^3

________________, ________________, ________________, ________________

19. Multiply or divide. Write your answers in scientific notation.

A. $(4.9 \times 10^{-6})(6 \times 10^{14})$ B. $\frac{3\times10^{-7}}{5\times10^{-2}}$

20. Add or subtract. Write your answers in scientific notation.

A. $(3.8 \times 10^4) + (1.2 \times 10^4)$ B. $(4.2 \times 10^6) - (5.2 \times 10^5)$

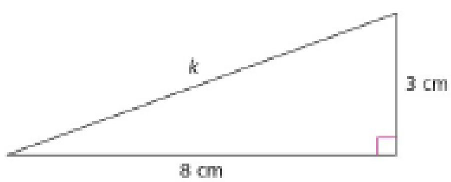
21. Simplify each expression. Leave no negative or zero exponents. Circle your answers.

A. $\left(\frac{2}{3}\right)^{-3}$ B. $\dfrac{-6x^{-6}y}{18x^{4}y^{-4}}$ C. $\left(\dfrac{5^{-2}m^{-5}n^{9}}{6^{-3}m^{-28}n^{-16}}\right)^{0}$

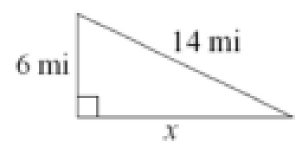
D. $(4v^{5}w^{-1})(-v^{4}w^{3})$ E. $(6m^{-4}p^{6})^{-2}$ F. $\dfrac{7^{5}\cdot 3^{5}}{7^{7}\cdot 3^{2}}$

Find the exact length of the missing side of each right triangle.

22. ___________



23. ___________



24.___________

$a = 4in$

$b = ?$

$c = 9in$

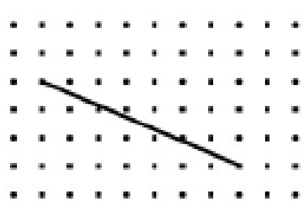
25. ___________

$a = 7\,ft$

$b = 8\,ft$

$c = ?$

26. Using the Pythagorean Theorem, find the exact distance between the given points.



Volume

Formulas:	Cylinder: $V = \pi r^2 \cdot h$	Cone: $V = \frac{1}{3} \pi r^2 \cdot h$	Sphere: $V = \frac{4}{3} \pi r^3$

27. A cylindrical pipe has a radius of 3inches and a height of 6 inches. Find the volume rounded to the nearest tenth, if necessary.

28. An ice cream cone is 4 inches tall and has a radius of 1 inch. Find how much ice cream the ice cream cone can hold. Leave your answer in terms of pi.

29. A snow globe has a radius of 2 inches. Find the volume of the snow globe to the nearest tenth, if necessary.

Equations – Solve.

30. $4m - 3 = 2m + 2m + 2$

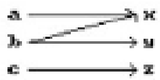
31. $6n - 3n + 5 = 3n + 1 + 4$

32. $6(1 + 2k) = 6k + 13$

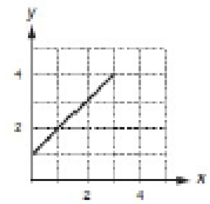
33. $12y = 2y + 40$

Functions- decide if each is a function.

34.



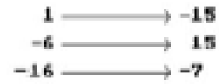
35.



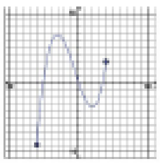
36.

y= 2x - 5

37.



38.



39.

x	2	4	6	8	10
y	1	3	5	7	9

40.

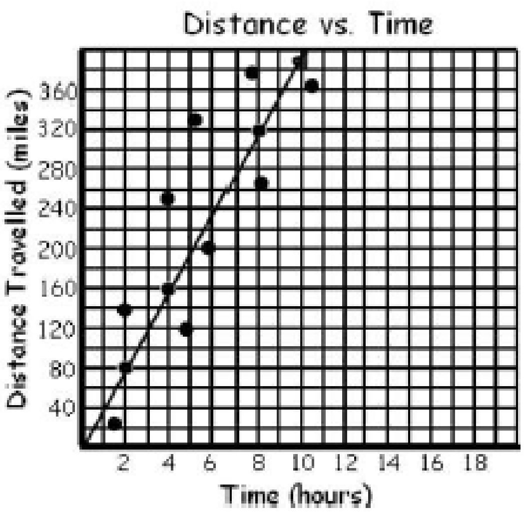
x	1	2	3	4	5
y	-5	-5	5	5	15

41.

y= $x^2 + 1$

Linear Functions

42.



a. Write the equation for the linear function in the graph.

b. What does the slope represent in the situation?

c. What does the y-intercept represent in the situation?

d. How many miles can you expect to be traveled in 14 hours?

e. How many hours can you expect to be travelling after 680 miles?

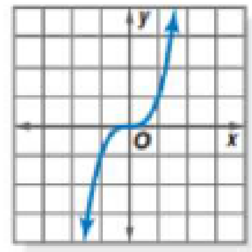
43. Write an equation for the line that goes through each pair of coordinates.

(2, 2) and (-5, 4)

(5, 5) and (4, 2)

(5, 7) and (2, 7)

Linear Models

44. Write an equation from the table below.	45. Write an equation from the table below.	46. Linear or non-linear?
(table below)	(table below)	

44.

x	3	6	9	12
y	12	10	8	6

45.

x	2	4	6	8
Y	-4	-8	-12	-16

2 Way Tables 56 students were asked if they watched tennis yesterday. 20 of the students are boys and 13 of them did not watch tennis. 17 of the girls did watched tennis yesterday. Use this information to copy & complete the two way table.

	Boys	**Girls**	**Total**
Watched tennis			
Did not watch tennis			
Total			

47. a. One of these students is to be chosen at random. What is the relative frequency that the student chosen is a boy?

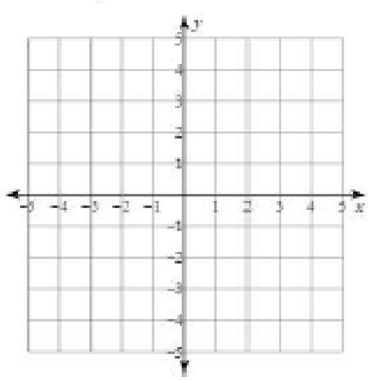
b. Given that the student chosen is a girl, what is the probability that she did not watch tennis yesterday?

Systems of Equations

Solve by graphing.

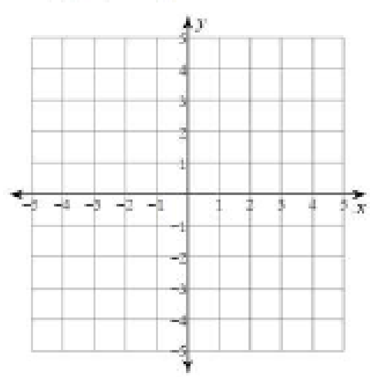
48) $y = -\frac{3}{2}x + 3$

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



49) $2x - y = -1$

$2x - y = -4$



50. Solve by substitution

$y=2x-15$ $\qquad$ $-3x - 3y = 3$

$y=5x$ $\qquad$ $y=-5x-17$

51. Solve by elimination

$-4x - 2y = -12$ $\qquad$ $3x + 6y = 6$

$4x + 8y = -24$ $\qquad$ $-6x + 3y = -12$

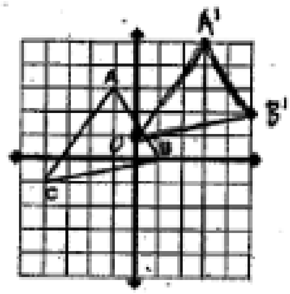
52. A used book store also started selling used CDs and videos. In the first week, the store sold a combination of 40 CDs and videos. They charged \$4 per CD and \$6 per video and the total sales were \$180. Determine the total number of CDs and videos sold.

53. Determine if (3, 5) is a solution to the following system: $y = 2x - 1$

$-5x + 4y = 5$

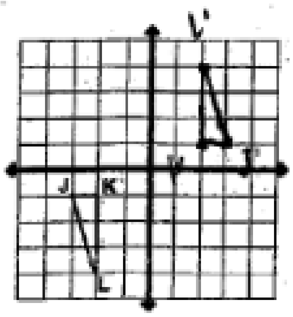
ANSWER KEY

1. a. Draw and label the transformed image of Δ ABC after it is translated 4 units right and 2 units up.



b. What are the coordinates of B'? (5,2)

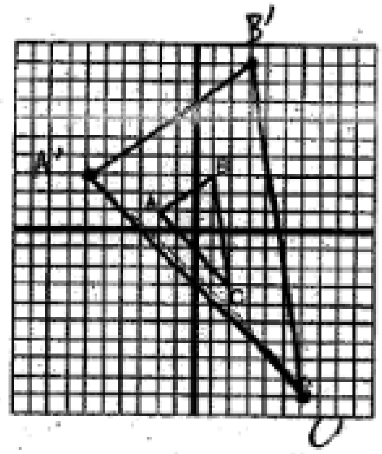
2. Rotate Δ JKL 180° about the origin on the graph below and label your new image. Write the original and new coordinates.



Pre-Image Coordinates		Image Coordinates	
J	(-3,-1)	J'	(3,1)
K	(-2,-1)	K'	(2,1)
L	(-2,-4)	L'	(2,4)

3. Graph and label the dilated image of ΔABC using a scale factor of 3, using the origin as the center of dilation.

Pre-Image Coordinates			Image Coordinates	
A	(-2,1)		A'	(-6,3)
B	(1,3)	x3	B'	(3,9)
C	(2,-3)		C'	(6,-9)



Find the coordinates of the vertices of each figure after the given transformation:

4. Rotate $JKLM$ 180° around the origin.

$J(2,3)$, $K(3,-6)$, $L(-1,-5)$, $M(-1,4)$

J'(-2,-3) K'(-3,6) L'(1,5) M'(1,-4)

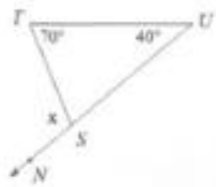
5. Dilate ΔABC using a scale factor of $\frac{1}{2}$ with the origin as the center of dilation.

$A(6, 10)$, $B(-4, 8)$, $C(0, -2)$

A'(3,5) B'(-2,4) C'(0,-1)

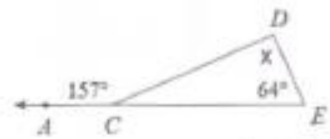
Find the missing angle measures.

6.



$x =$ 110°

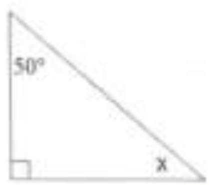
7.



$x + 64 = 157$
$-64 \quad -64$
$x = 93$

$x =$ 93°

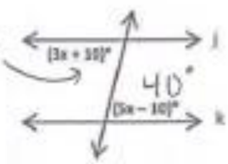
8.



$x =$ 40°

9.

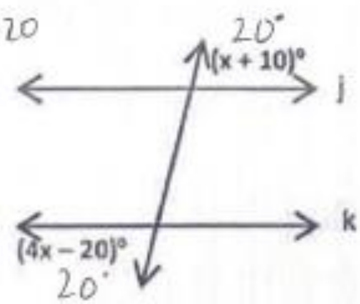
40°



$3x + 10 = 5x - 10$
$-3x \quad -3x$
$10 = 2x - 10$
$+10 \quad +10$
$\frac{20}{2} = \frac{2x}{2}$
$10 = x$ so $\boxed{40°}$

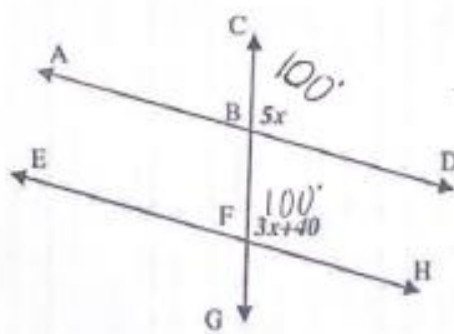
10.

$x + 10 = 4x - 20$
$-4x \quad -4x$
$-3x + 10 = -20$
$-10 \quad -10$
$\frac{-3x}{-3} = \frac{-30}{-3}$
$x = 10$



x = 10

11.



$5x = 3x + 40$
$-3x \quad -3x$
$\frac{2x}{2} = \frac{40}{2}$
$x = 20$

x = 20

12. What value of x makes the expression $\sqrt{25 - x}$ irrational?

A. -11 $\sqrt{25 - -11}$ $\sqrt{36} = 6$

B. 9 $\sqrt{25 - 9}$ $\sqrt{16} = 4$

C. -75 $\sqrt{25 - -75}$ $\sqrt{100} = 10$

D. 5 $\sqrt{25 - 5} = \sqrt{20}$

13. A square board has an area of 256 square feet. What is the length of one side of the board?

A. 64 ft.

B. 16 ft.

C. 128 ft.

D. 14 ft.

$\boxed{256 ft^2}$ $\sqrt{256} = 16$

14. Evaluate $a^{-2}b^3$ for $a=2$ and $b=3$. $2^{-2}3^3 = \frac{3^3}{2^2} = \frac{27}{4}$

A. $\frac{3}{2}$ B. $-\frac{27}{4}$ C. $\frac{9}{4}$ D. $\frac{27}{4}$

15. There are 4×10^{22} atoms in 1 gram of oxygen. How many atoms are there in 4000 grams of oxygen? 4×10^3

A. 16×10^{25} B. 16×10^{25} C. 1.6×10^{22} D. 1.6×10^{26}

$4\times10^{22} \cdot 4 \times 10^3$

16×10^{25} LARS $= 1.6\times10^{25}$

16. The approximations for the radius of Jupiter and the radius of one of its moons are listed below. Approximately how many times larger is Jupiter than its moon?

- Radius of Jupiter: 9×10^7 meters
- Radius of Jupiter's moon: 3×10^4 meters

$\frac{9\times10^7}{3\times10^4} = \boxed{3\times10^3}$

17. Estimate the following square root to the nearest tenth. $\sqrt{92}$ Show your work, and circle your answer.

$\boxed{9.6}$

$\sqrt{81}$ $\sqrt{92}$ $\sqrt{100}$

$9\frac{11}{19}$ 10

18. List the following numbers in order from least to greatest: 3.5×10^3, 3.5×10^{-2}, 6.8×10^{-5}, 5.3×10^3

6.8×10^{-5}, 3.5×10^{-2}, 3.5×10^3, 5.3×10^3

19. Multiply or divide. Write your answers in scientific notation. LARS

A. $(4.9 \times 10^{-6})(6 \times 10^{14})$

29.4×10^8

$\boxed{2.94\times10^9}$

B. $\frac{3\times10^{-7}}{5\times10^{-2}} = 0.6\times10^{-5}$

$\boxed{6\times10^{-6}}$

20. Add or subtract. Write your answers in scientific notation.

A. $(3.8 \times 10^4) + (1.2 \times 10^4)$

$3.8 + 1.2 = 5.0$

$\boxed{5\times10^4}$

B. $(4.2 \times 10^6) - (5.2 \times 10^5)$ +1

$4.2\times10^6 - 0.52\times10^6$

$\boxed{3.68\times10^6}$

1. Simplify each expression. Leave no negative or zero exponents. Circle your answers.

A. $\left(\frac{2}{3}\right)^{-3}$

$\left(\frac{3}{2}\right)^3 = \frac{3^3}{2^3} = \boxed{\frac{27}{8}}$

B. $\frac{-6x^{-6}y^{1}}{18x^{4}y^{-4}}$

$= \frac{-1x^{-10}y^5}{3} = \boxed{\frac{-1y^5}{3x^{10}}}$

C. $\left(\frac{5^{-4}m^{-5}n^{9}}{6^{-3}m^{-20}n^{-16}}\right)^{0}$

$= \boxed{1}$

D. $(4v^8w^{-1})(-v^6w^3)$

$\boxed{-4v^9w^2}$

E. $(6m^{-4}p^{6})^{-2}$

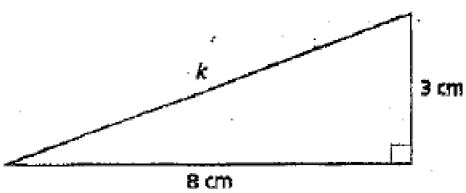
$6^{-2}m^8p^{-12} = \boxed{\frac{m^8}{36p^{12}}}$

F. $\frac{7^5\cdot 3^5}{7^7\cdot 3^2}$

$= 7^{-2}\cdot 3^3 = \frac{3^3}{7^2} = \boxed{\frac{27}{49}}$

Find the <u>exact</u> length of the missing side of each right triangle. $a^2+b^2=c^2$

18. $k = \sqrt{73}$ cm

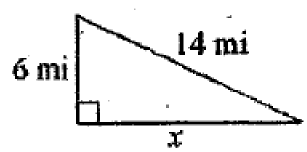


$9+64=k^2$

$73=k^2$

$\sqrt{73}=k$

19. $\sqrt{160}$ mi



$x^2+36=196$

$\sqrt{x^2}=\sqrt{160}$

$x=\sqrt{160}$

20. $\sqrt{65}$ in

$a = 4in$

$b = ?$

$c = 9in$

$16+b^2=81$

$b^2=65$

$b=\sqrt{65}$

21. $\sqrt{113}$ ft

$a = 7ft$

$b = 8ft$

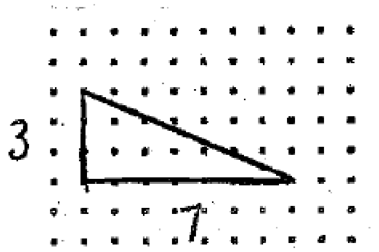
$c = ?$

$49+64=c^2$

$113=c^2$

$c=\sqrt{113}$

22. Using the Pythagorean Theorem, find the <u>exact</u> distance between the given points.



$3^2+7^2=c^2$

$9+49=c^2$

$\sqrt{58}=\sqrt{c^2}$

$\boxed{c=\sqrt{58}}$

Volume

Formulas:	Cylinder: $V = \pi r^2 \cdot h$	Cone: $V = \frac{1}{3}\pi r^2 \cdot h$	Sphere: $V = \frac{4}{3}\pi r^3$

$\pi = 3.14$

27. A cylindrical pipe has a radius of 3inches and a height of 6 inches. Find the volume rounded to the nearest tenth, if necessary.

$V = \pi r^2 h$

$V = 3.14(3)^2(6)$

$\boxed{V = 169.6 \text{ in}^3}$

28. An ice cream cone is 4 inches tall and has a radius of 1 inch. Find how much ice cream the ice cream cone can hold. Leave your answer in terms of pi.

$V = \frac{1}{3}\pi r^2 h$

$= \frac{1}{3}\pi(1)^2(4)$

$\boxed{V = \frac{4}{3}\pi \text{ in}^3}$ or $\boxed{\frac{4\pi}{3} \text{ in}^3}$

29. A snow globe has a radius of 2 inches. Find the volume of the snow globe to the nearest tenth, if necessary.

$\pi = 3.14$

$V: \frac{4\pi r^3}{3} \rightarrow V = \frac{4(3.14)(2)^3}{3}$

$\boxed{V = 33.5 \text{ in}^3}$

<u>Equations –</u> Solve.

30. $4m - 3 = \underline{2m + 2m} + 2$

$4m - 3 = 4m + 2$

$-4m \quad -4m$

$-3 \neq 2$

$\boxed{\text{No Solution}}$

31. $\underline{6n - 3n} + 5 = 3n + \underline{1 + 4}$

$3n + 5 = 3n + 5$

$-3n \quad -3n$

$5 = 5$

$\boxed{\text{All real \#'s} \quad \mathbb{R} \quad \text{infinite solutions}}$

32. $6(1 + 2k) = 6k + 13$

$6 + 12k = 6k + 13$

$-6k \quad -6k$

$6 + 6k = 13$

$-6 \quad -6$

$\frac{6k}{6} = \frac{7}{6}$

$\boxed{k = \frac{7}{6}}$

33. $12y = 2y + 40$

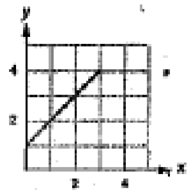
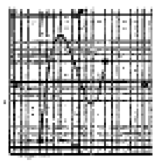
$-2y \quad -2y$

$\frac{10y}{10} = \frac{40}{10}$

$\boxed{y = 4}$

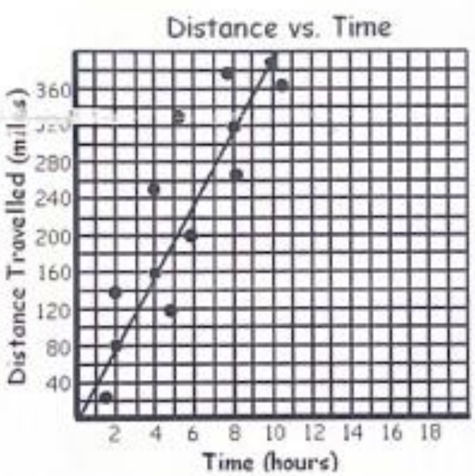
Functions- decide if each is a function.

<table>
<tr><td>30.

NO</td><td>31.

yes</td><td>32.
y= 2x - 5
yes</td><td>33.
$1 \to -15$
$-6 \to 15$
$-16 \to -7$
yes</td></tr>
<tr><td>34.

yes</td><td>35.
x: 2, 4, 6, 8, 10
y: 1, 3, 5, 7, 9
yes</td><td>36.
x: 1, 2, 3, 4, 5
y: −5, −5, 5, 5, 15
yes</td><td>37.
$y = x^2 + 1$
yes</td></tr>
</table>

Linear Functions

42.



a. Write the equation for the linear function in the graph. $y = 40x$

b. What does the slope represent in the situation? 1 additional hour for every 40 miles traveled

c. What does the y-intercept represent in the situation? Distance traveled at 0 hours

d. How many miles can you expect to be traveled in 14 hours?

$y = 40(14)$ 560 miles

e. How many hours can you expect to be travelling after 680 miles? $\frac{680}{40} = \frac{40x}{40}$

17 hours = x

31. Write an equation for the line that goes through each pair of coordinates.

(2, 2) and (-5, 4) $\frac{\Delta y}{\Delta x}$	(5, 5) and (4, 2)	(5, 7) and (2, 7)
$\frac{4-2}{-5-2} = \frac{2}{-7} = m$	$\frac{2-5}{4-5} = \frac{-3}{-1} = 3 = m$	$\frac{7-7}{2-5} = \frac{0}{-3} = 0 = m$
$2 = -\frac{2}{7}\left(\frac{2}{1}\right) + b$	$2 = 3(4) + b$	$\boxed{y = 7}$ Hoy!
$2 = -\frac{4}{7} + b$	$2 = 12 + b$	
$2\frac{4}{7} = b$ $\boxed{y = -\frac{2}{7}x + 2\frac{4}{7}}$	$-10 = b$ $\boxed{y = 3x - 10}$	

Linear Models

40. Write an equation from the table below.

+3

0 [redacted]	3	6	9	12
14 [redacted]	12	10	8	6

-2

$m = \frac{-2}{3}$

$\boxed{y = -\frac{2}{3}x + 14}$

41. Write an equation from the table below.

+2

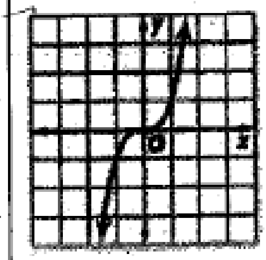
x 0	2	4	6	8
Y 0	-4	-8	-12	-16

-4

$m = \frac{-4}{2} = -2$

$\boxed{y = -2x}$

42. Linear or non-linear?



non-linear

2 Way Tables

56 students were asked if they watched tennis yesterday. 20 of the students are boys and 13 of them did not watch tennis. 17 of the girls did watched tennis yesterday. Use this information to copy & complete the two way table.

	Boys	Girls	Total
Watched tennis	7	17	24
Did not watch tennis	13	19	32
Total	20	36	56

43. One of these students is to be chosen at random. What is the probability that the student chosen is a boy?

$20/56 = .357 = \boxed{36\%}$

44. Given that the student chosen is a girl, what is the probability that she did not watch tennis yesterday?

$19/36 = .527 = \boxed{53\%}$

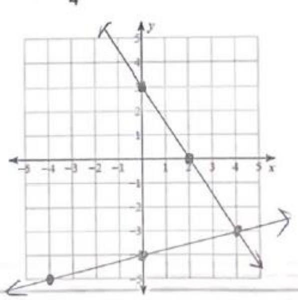
Systems of Equations

Solve by graphing.

48) $y = -\frac{3}{2}x + 3$

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

$\boxed{(4, -3)}$



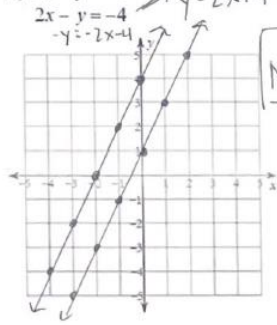
49) $2x - y = -1$ → $y = 2x + 1$

$2x - y = -4$ → $y = 2x + 4$

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

$-y = -2x - 4$

No Solution



Systems of Equations

45. Solve by substitution

$y=2x-15$ $y=5x$ $2x-15=5x$ $-15=3x$ $-5=x$ $y=5(-5)$ $y=-25$ $\boxed{(-5,-25)}$	$-3x-3y=3$ $y=-5x-17$ $-3x-3(-5x-17)=3$ $-3x+15x+51=3$ $12x=-48$ $x=-4$ $y=-5(-4)-17$ $y=20-17$ $y=3$ $\boxed{(-4,3)}$

46. Solve by elimination

$-4x-2y=-12$ $4x+8y=-24$ $6y=-36$ $y=-6$ $-4x+12=-12$ $-4x=-24$ $x=6$ $\boxed{(6,-6)}$	$2(3x+6y=6)$ $-6x+3y=-12$ $6x+12y=12$ $15y=0$ $y=0$ $3x+0=6$ $3x=6$ $x=2$ $\boxed{(2,0)}$

47. A used book store also started selling used CDs and videos. In the first week, the store sold a combination of 40 CDs and videos. They charged \$4 per CD and \$6 per video and the total sales were \$180. Determine the total number of CDs and videos sold.

$-4(\cancel{x+y=40})$

$4x+6y=180$

$-4x-4y=-160$

$2y=20$

$y=10$

$x+10=40$

$x=30$

$\boxed{\text{30 CDs, 10 videos}}$

x = CDs

y = videos

53. Determine if (3, 5) is a solution to the following system: $y=2x-1$
$-5x+4y=5$

$y=2x-1$ $5=2(3)-1$ $5=6-1$ $5=5$ ✓	$-5x+4y=5$ $-5(3)+4(5)=5$ $-15+20=5$ $5=5$ ✓

$\boxed{\text{Yes}}$

Algebra 1
Unit 1: Relationships Between Quantities & Expression

Volume 1 Issue 1

References

HMH Georgia Coordinate Algebra Text:

Unit 1: Modules 1-2

Check with you

teacher for online

and print access:

Online website:

my.hrw.com

Web Resources

- Rational & irrational https://www.illustrativemathematics.org/content-standards/tasks/608
- Simplifying radicals http://cms.gavirtualschool.org/Shared/Math/GSEAlgI16/GSEAlgI_RelationshipsandExp_Shared/GSEAlgI_RelationshipsandExp_Shared8.html#headingtaglink_1
- Unit conversions https://www.khanacademy.org/math/pre-algebra/rates-and-ratios/metric-system-

Dear Parents

Below you will find a list of concepts that your child will use and understand while completing Unit 1: Relationships Between Quantities & Expressions. Also included are references, vocabulary and examples that will help you assist your child at home.

Concepts Students will Use and Understand

- The structure of expressions and the meaning of their parts in context.
- Appropriateness of units of measure within context.
- Similarities between the system of polynomials and the system of integers.
- Addition, Subtraction, and Multiplication of polynomials is closed.
- Properties of rational and irrational numbers.
- Simplify and/or use the operations of addition, subtraction, and multiplication, with radicals within expressions limited to square roots.
- Visual representation of radicals.

Vocabulary

- **Binomial Expression:** An algebraic expression with two unlike terms.
- **Capacity:** The greatest volume that a container can hold.
- **Coefficient:** A number multiplied by a variable.
- **Constant Term:** A quantity that does not change its value.
- **Factor:** When two or more integers are multiplied, each integer is a factor of the product. "To factor" means to write the number or term as a product of its factors.
- **Irrational Number:** A number whose decimal form is nonterminating and nonrepeating. Irrational numbers cannot be written in the form a/b, where a and b are integers (b cannot be zero). So all numbers that are not rational are irrational.
- **Monomial Expression:** An algebraic expression with one term.
- **Polynomial function:** A ***polynomial function*** is defined as a function,

  $f(x)= a_o x^n + a_1 x^{n-1} + a_2 x^{n-2} + \ldots + a_{n-2} x^2 + a_{n-1} x^1 + a_n$, where the coefficients are real numbers.

Pythagorean Theorem: It is a theorem that states a relationship that exists in any right triangle. If the lengths of the legs in the right triangle are *a* and *b* and the length of the hypotenuse is *c*, we can write the theorem as the following equation: $a^2 + b^2 = c^2$

- **Radical:** The symbol, $\sqrt[b]{a}$, which is read "the bth root of a," is called a radical.
- **Radicand:** The number underneath the root symbol. So, in $\sqrt[b]{a}$, the *a* is called the radicand.

tutorial/v/unit-conversion

- Polynomials http://mathbitsnotebook.com/Algebra1/Polynomials/POoutline.html
- Polynomials http://www.brightstorm.com/search/?k=polynomials

- **Rational Number:** A number expressible in the form *a*/*b* or – *a*/*b* for some fraction *a*/*b*. The rational numbers include the integers.
- **Standard Form of a Polynomial**: To express a polynomial by putting the terms in descending exponent order.
- **Term:** A number, a variable, or a product of numbers and variables.
- **Trinomial**: An algebraic expression with three unlike terms.

Algebra 1 Unit 1 Practice Problems

Formulas

Perimeter:

all sides added together

Area:

Length x width

Example 1

A rectangle is 5m longer than it is wide. The perimeter is 38m. Find the length & width.

Example 2

Determine if $4+\sqrt{7}=\frac{a}{b}$ is rational or irrational.

Example 3

What is the simplified form of $\sqrt{98}$?

Example 4

Find the difference. Write the answer in standard form.

$$(-6x^3+5x-3)-(2x^3+4x^2-3x+1)$$

Example 5

A rectangle has a width of $(x+2)$ and a height of $(2x+1)$. Find an expression that represents the area as a whole.

Answer Key

Example 1

2(w) + 2(w+5)=4w + 10; 4w + 10=38; w=7; the width is 7 and the length is 12

Example 2

Irrational

Example 3

$7\sqrt{2}$

Example 4

$-8x^3 - 4x^2 + 8x - 4$

Example 5

$2x^2 + 5x + 2$

Unit 1 Relationships between Quantities

Standard Code	Mastery	Standard
N.RN.2		Rewrite expression involving radicals using operations.
N.RN.3		Explain properties of rational numbers under algebraic operations.
N.Q.1		Interpret units in the context of the problem.
		When solving a multi-step problem, use units to evaluate the appropriateness of the solution.
		Choose the appropriate units for a specific formula and interpret the meaning of the unit in that context.
		Choose and interpret both the scale and the origin in graphs and data displays.
N.Q.2		Determine and interpret appropriate quantities when using descriptive modeling.
N.Q.3		Determine the accuracy of values based on their limitations in the context of the situation.
A.SSE.1.a		Identify the different parts of the expression and explain their meaning within the context of a problem.
A.SSE.1.b		Decompose expressions and make sense of the multiple factors and terms by explaining the meaning of the individual parts.
A.APR.1		Add, subtract, and multiply polynomials.
		Explain properties of polynomial expressions under algebraic operations.

For each algebraic expression, identify the number of terms. Then list the coefficient(s), constant(s), and factor(s).

Expression	6a + 3	8b -4c +3	2x-y +8z	9n
Number of terms				
Coefficient(s)				
Constant(s)				
Factor(s)				

Identify the number of terms, the coefficients, the constants, and the factors in the expressions below.

1. 7p-6pc + 3c – 2

Number of terms: _______ **Coefficients:** ______________________

Constants: ____________________ **Factors:** ______________________

(separate factors with a comma in between)

2. 4ab + 8 – 5b

Number of terms: ________ **Coefficients:** ______________________

Constants: _________________ **Factors:** ________________________

(separate factors with a comma in between)

3. $6x^2 - 7xy + 3xz - 2$

Number of terms: _________ **Coefficients:** _______________

(separate factors with a comma in between)

Constants: _________ **Factors:** _________________

Algebra 1 Name________________________________ ID: 1

Unit 1: Combining Polynomials

Date________________ Period____

Simplify each expression.

1) $(5k^2 + 6) - (-5 - 3k^4)$

2) $(4 + 7v) - (-3v - 3)$

3) $(-4 - 5x) - (x - 5x^3)$

4) $(-5x^4 - 4x) - (-6x^4 + x)$

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

6) $(-6x^4 + x^2 + 8x) + (-4x^2 - 5x^4)$

7) $(5n + 2n^2 - 5n^4) - (6n^4 - 3n^2)$

8) $(-n^3 + 7n^4 - 6n^2) + (8n^4 + n^3)$

9) $(7x - 8x^4 - 5x^3) + (-4x^4 - 6x^3)$

10) $(2x + 2x^2 + 5x^3) + (4x^2 - 3x)$

11) $(2x^2 + 7x) - (-8 - 5x^2 - 8x)$

12) $(6p^3 - 5p^2) - (3p^4 + 2p^2 + p^3)$

13) $(6 + 5x) + (8x - 5x^3 - 1)$

14) $(-6r^4 + 4r^2) + (-3r^4 - 7r^3 - 3r^2)$

15) $(5x^4 - 5x) - (5x^3 + 2x^4 + 3x)$

16) $(5k + 5k^3) - (3k^2 + 2k) - (7k^2 - 4k)$

17) $(4 - 6m^2) + (3m^2 + m^4) - (4m^4 - 2m^2)$

18) $(3b^4 + 7 - 7b^2) - (5b^3 - 6b^2 + 1)$

19) $(5n^3 - 8n + 5n^2) + (6n^3 + 6n^2 + 4n)$

20) $(3x^2 - 1 - 8x^4) - (5x^4 + 4x^3 + 2) + (x^4 - 3x^3)$

Algebra 1 Name________________________________ ID: 1

Unit 1: Multiplying Polynomials

Date________________ Period____

Find each product.

1) $5(4b+2)$

2) $2x^4(4x+3)$

3) $3n(2n-4)$

4) $6(x+5)$

5) $6x(5x+4)$

6) $(2n-8)(3n+3)$

7) $(4k+4)(2k-6)$

8) $(3p-1)(8p+5)$

9) $(8x-8)(5x+7)$

10) $(8v+2)(8v-6)$

11) $(4k-8)(7k+6)$

12) $(8x-6)(3x-4)$

13) $(8x-2)(3x+2)$

14) $(7n-2)(n-8)$

15) $(3x+2)(8x+4)$

16) $(2n-4)(6n-5)$

17) $(2n+7)(3n+1)$

18) $(2x-5)(2x+7)$

19) $(4x-8)(6x+8)$

20) $(3a-4)(4a+8)$

21) $(8m-3)(2m^2-4m-4)$

22) $(4n+4)(2n^2-n+2)$

23) $(x+8)(6x^2+4x+6)$

24) $(8m-7n)(2m-n)$

25) $(4m-4n)(7m-n)$

Unit 1 Mixed Review

1. Simplify the radical: $-8\sqrt{726}$

2. Simplify the expression: $2\sqrt{8}\cdot\sqrt{20}$

3. What sum is rational? A. $\pi+18$ B. $\sqrt{25}+1.75$ C. $\sqrt{3}+5.5$ D. $\pi+\sqrt{2}$

4. What product is irrational? A. $\sqrt{2}\cdot\sqrt{50}$ B. $\sqrt{64}\cdot\sqrt{4}$ C. $\sqrt{9}\cdot\sqrt{49}$ D. $\sqrt{10}\cdot\sqrt{8}$

5. A rectangle has a length of 12 meters and a width of 400 centimeters. What is the perimeter, in cm, of the rectangle?

6. Jill swam 200 meters in 2 minutes 42 seconds. If each lap is 50 meters long, what is a good estimate for her time, in second, per lap?

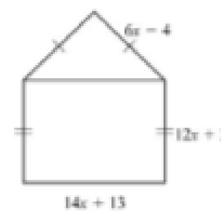
7. In which expression is the coefficient of term "n" -1?

A. $3n^2+4n-1$ B. $-n^2+5n+4$ C. $-2n^2-n+5$ D. $4n^2+n-5$

8. The expression s^2 is used to calculate the area of a square, where s is the side length of the square. What does the expression $(8x)^2$ represent?

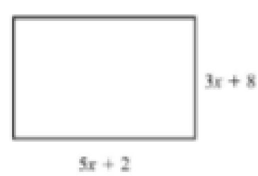
9. What is the product of $7x - 4$ and $8x + 5$?

10. A model of a house is shown. What is the perimeter, in units, of the model?



11. Find the expression that has the same value as the expression: $(8x^2 + 2x - 6) - (5x^2 - 3x + 2)$

12. The dimensions of a patio, in feet, are shown to the right.
What is the area, in square feet, of the patio?



1. 261 g $\rightarrow$ kg
2. 3 days $\rightarrow$ seconds
3. 9,474 mm $\rightarrow$ cm
4. 0.73 kL $\rightarrow$ L
5. 5.93 $cm^3 \rightarrow m^3$
6. 498.82 cg $\rightarrow$ mg
7. 1 $ft^3 \rightarrow m^3$
   (Note: 3.28 ft = 1 m)
8. 1 year $\rightarrow$ minutes
9. 175 lbs $\rightarrow$ kg
   (Note: 2.2 lb = 1 kg)
10. 4.65 km $\rightarrow$ m
11. 22.4 kg/L to kg/mL
12. 0.74 Kcal/min to cal/sec
13. 1.42 g/cm^2 to mg/mm^2
14. 10095 m/s to miles/s
15. 9.81 m/s^2 to ft/s^2
16. 8.41 g/mL to Kg/L
17. 3.8 Km/sec to miles/year
18. 7.68 cal/sec to Kcal/min
19. 8.24 g/cm^2 to mg/mm^2
20. 25 m/s to miles/hr

Algebra I Unit 2
Reasoning with Linear Equations & Inequalities

Volume 1 Issue 2

References

HMH Georgia Coordinate Algebra Text:

Unit 1: Modules 1; Unit 2 Modules 3-5, 9-10, 12-13; Unit 3 Modules 8-9

Check with you teacher for online access: my.hrw.com

Web Resources

- http://mathbitsnotebook.com/Algebra1/LinearEquations/LEGraphiLines.html
- http://mathbitsnotebook.com/Algebra1/LinearEquations/LEConstraintsLinearPractice.html
- http://mathbitsnotebook.com/Algebra1/Inequalities/IQgraphinglinear2.html
- http://mathbitsnotebook.com/Algebra1/Inequalities/IQGraphingPractice.html
- http://mathbitsnotebook.com/Algebra1/Systems/SYlinearinequalities.html
- http://mathbitsnotebook.com/Algebra1/Systems/SYGraphIneqPractice.html
- http://mathbitsnotebook.com/Algebra1/Functions/FNNotationEvaluation.html

Dear Parents

Below you will find a list of concepts that your child will use and understand while completing Unit 2: Reasoning with Linear Equations & Inequalities. Also included are references, vocabulary and examples that will help you assist your child at home.

Concepts Students will Use and Understand

- Create Equations that Describe Numbers or Relationships
- Solve Equations & Inequalities
- Build a Function that Models a Relationship Between Two Quantities
- Understand the Concept of Function & Use Function Notation
- Interpret Functions that Arise in Applications in Terms of Context
- Analyze Functions using Different Representations

Vocabulary

- **Arithmetic Sequence.** A sequence of numbers in which the difference between any two consecutive terms is the same.
- **Average Rate of Change.** The change in the value of a quantity by the elapsed time. For a function, this is the change in the *y*-value divided by the change in the *x*-value for two distinct points on the graph.
- **Constant Rate of Change.** With respect to the variable *x* of a linear function $y = f(x)$, the constant rate of change is the slope of its graph.
- **Continuous.** Describes a connected set of numbers, such as an interval.
- **Discrete.** A set with elements that are disconnected.
- **Domain.** The set of *x*-coordinates of the set of points on a graph; the set of *x*-coordinates of a given set of ordered pairs. The value that is the input in a function or relation.
- **End Behaviors.** The appearance of a graph as it is followed farther and farther in either direction.
- **Explicit Formula.** A formula that allows direct computation of any term for a sequence $a1, a2, a3, \ldots, an, \ldots$
- **Factor.** For any number *x*, the numbers that can be evenly divided into *x* are called factors of *x*. For example, the number 20 has the factors 1, 2, 4, 5, 10, and 20.
- **Interval Notation.** A notation representing an interval as a pair of numbers. The numbers are the endpoints of the interval. Parentheses and/or brackets are used to show whether the endpoints are excluded or included.
- **Linear Function.** A function with a constant rate of change and a straight line graph.

- http://www.math-play.com/slope-intercept-game.html
- http://www.webmath.com/equline1.html
- http://www.mathplanet.com/education/algebra-1/systems-of-linear-equations-and-inequalities/systems-of-linear-inequalities
- https://www.quia.com/rr/79715.html?AP_rand=1474276100
- http://www.purplemath.com/modules/fcnops.htm

- **Linear Model.** A linear function representing real-world phenomena. The model also represents patterns found in graphs and/or data.
- **Parameter.** The independent variable or variables in a system of equations with more than one dependent variable.
- **Range.** The set of all possible outputs of a function.
- **Recursive Formula.** A formula that requires the computation of all previous terms to find the value of *an*.
- **Slope.** The ratio of the vertical and horizontal changes between two points on a surface or a line.
- **X-intercept.** The point where a line meets or crosses the *x*-axis
- **Y-intercept.** The point where a line meets or crosses the *y*-axis

Algebra 1 Unit 2 Practice Problems

Formulas

Slope-Intercept:

$y = mx + b$

Arithmetic Sequence:

$A_n = a_1 + (n-1)d$

Example 1

The sum of two consecutive integers is less than 83. Find the pair of integers with the greatest sum.

Example 2

Pablo and his family are driving to California for vacation. The trip is 1,505 miles and they drive at an average speed of 59 mph. Which equation would give the number of miles remaining until they reach their destination, M, in terms of h, the number of hours they have driven?

A. M = 59 + 1,505h

B. M = 1,505 - 59h

C. M = 1,505 + 59h

D. M = 59 - 1,505h

Example 3

Britany is leaving for an 800 mile road trip. Her plan is not to make any stops until she has 590 miles, or less, left of the drive. She is averaging 70 miles per hour. If *x* represents the number of hours driving, which of the following inequalities symbolizes this situation?

A. 590 - 70x > 800

B. 800 - 70x < 590

C. 590 - 70x < 800

D. 800 - 70x > 590

Example 4

What is the next term in this sequence? 4, 10, 16, …

Example 5

Generate ordered pairs for the function y = x + 3 for x = -2, -1, 0, 1, and state the domain and range.

Answer Key

Example 1

Define a Variable: x = the first consecutive number, so x +1 = the second consecutive number

Equation: x + x + 1 < 83

2x < 82

x < 41

The numbers are 40 and 41

Check: 40 + 41 < 83 81 < 83

Example 2

B. M = 1,505 - 59h

Example 3

B. 800 - 70x < 590

Example 4

22

Example 5

(-2,1), (-1,2), (0,3), (1,4), (2,5) Domain: {-2,-1,0,1,2} Range: {1,2,3,4,5)

Unit 2 Reasoning with Linear Equations & Inequalities

Standard Code	Mastery	Standard
A.CED.1		☐ Create linear and exponential equations and inequalities in one variable and use them in a contextual situation to solve problems.
A.CED.2		☐ Create equations in two or more variables to represent relationships between quantities. ☐ Graph equations in two variables on a coordinate plane and label the axes and scales.
A.CED.3		☐ Represent & Interpret constraints by linear equations & inequalities.
A.CED.4		☐ Solve multi-variable formulas or literal equations, for a specific variable.
A.REI.1		☐ Assuming an equation has a solution, construct a convincing argument that justifies each step in the solution process.
A.REI.3		☐ Solve linear equations in one variable, including coefficients represented by letters. ☐ Solve linear inequalities in one variable, including coefficients represented by letters.
A.REI.5		☐ Solve systems of equations using the elimination method (sometimes called linear combinations). ☐ Solve a system of equations by substitution (solving for one variable in the first equation and substituting it into the second equation).
A.REI.6		☐ Solve systems of equations using graphs.
A.REI.10		☐ Solve systems of linear equations exactly and approximately.
A.REI.11		☐ Understand the set of all solutions plotted on the coordinate plane.
A.REI.12		☐ Graph the solutions to a linear inequality in two variables as a half-plane, excluding the boundary for non-inclusive inequalities. ☐ Graph the solution set to a system of linear inequalities in two variables as the intersection of their corresponding half-planes.
F.BF.1		☐ Write a function that describes a relationship between two quantities.
F.BF.1a		☐ Determine an explicit expression and the recursive process (steps for calculation) from context.
F.BF.2		☐ Write arithmetic recursively and explicitly, use them to model situations, and translate between the two forms. Connect arithmetic sequences to linear functions.

F.IF.1		☐ Understand that a function from one set (the input, called the domain) to another set (the output, called the range) assigns to each element of the domain exactly one element of the range.
F.IF.2		☐ Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
F.IF.3		☐ Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.
F.IF.4		☐ Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. ☐ Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior.
F.IF.5		☐ Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
F.IF.6		☐ Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
F.IF.7		☐ Graph functions expressed algebraically and show key features of the graph both by hand and by using technology.
F.IF.7a		☐ Graph linear functions to show intercepts, maxima, and minima (as determined by the function or by context).
F.IF.9		☐ Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one function and an algebraic expression for another, say which has the larger maximum.

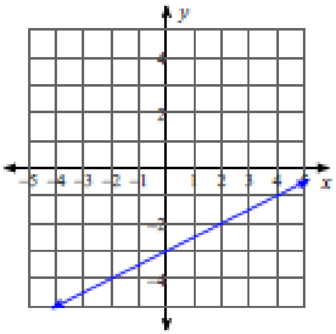
Algebra 1 Name________________________________ ID: 1

Unit 2 Review

Date________________ Period____

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

1)



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

2) through: $(-5, -5)$, slope = undefined

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

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

4) through: $(3, -5)$ and $(1, 0)$

5) through: $(5, 2)$ and $(0, 1)$

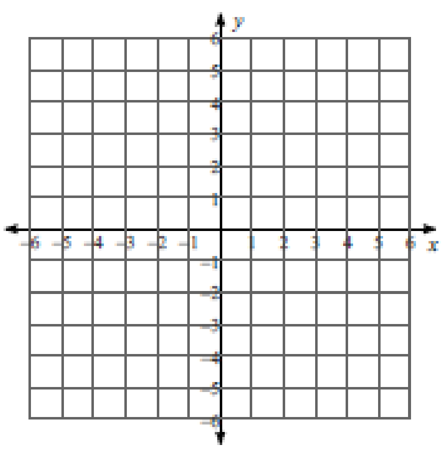
Write the slope-intercept form of the equation of the line described.

6) through: $(-1, 5)$, parallel to $y = -5$

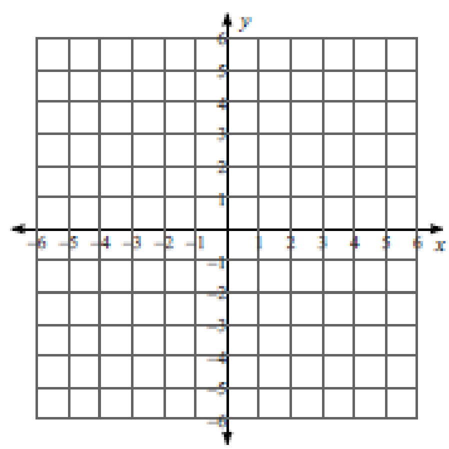
7) through: $(4, 0)$, perp. to $y = -4x + 3$

Sketch the graph of each linear inequality.

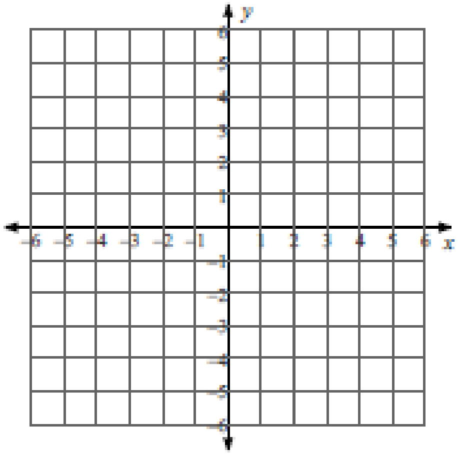
8) $y \le -3x + 2$



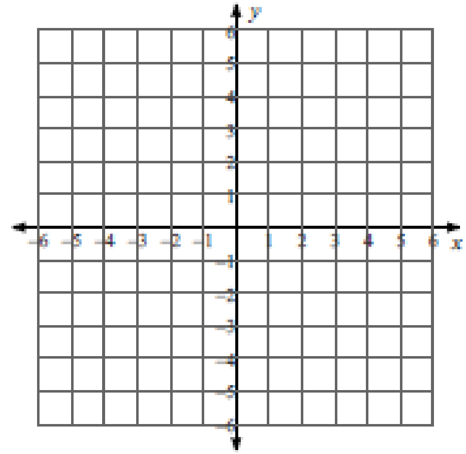
9) $y > 3x + 3$



10) $8x + 3y > 15$

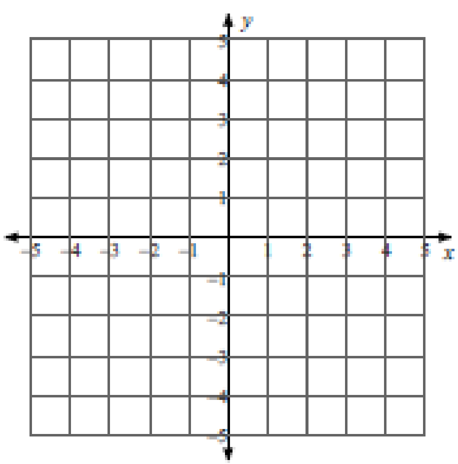


11) $2x + 5y > 20$

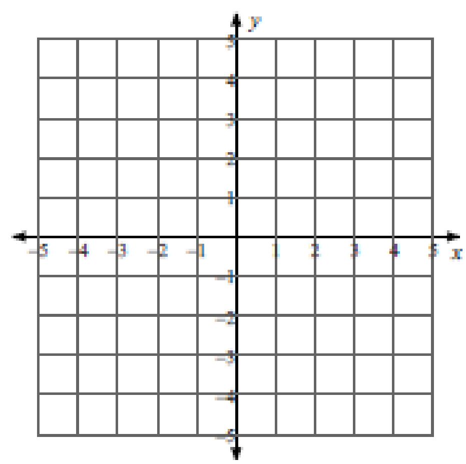


Solve each system by graphing.

12) $y = 2x - 2$
$y = \frac{2}{3}x + 2$



13) $y = -x + 3$
$y = x - 1$



Solve each system by substitution.

14) $-2x + 2y = 6$
$y = -4x + 8$

15) $x + 7y = -24$
$-4x + 2y = -24$

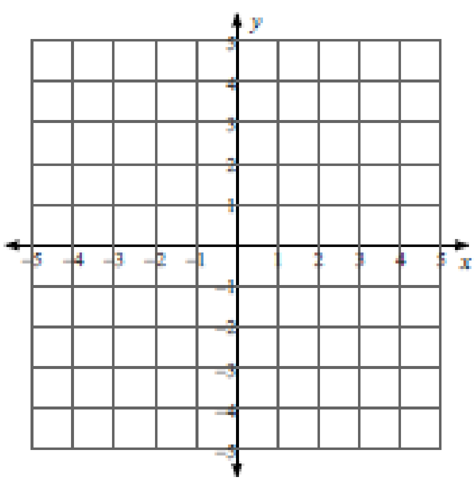
Solve each system by elimination.

16) $7x + 10y = -16$
$7x + 6y = -4$

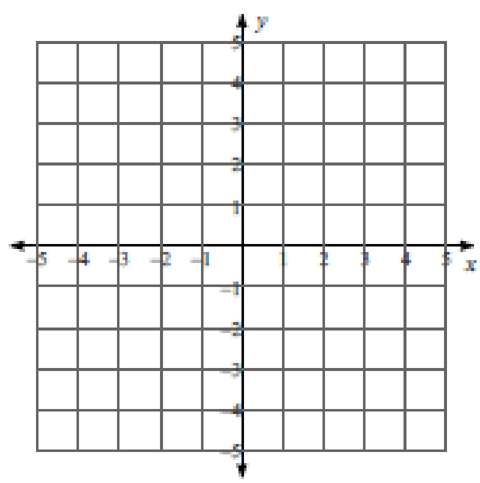
17) $6x + 5y = -15$
$8x + 10y = -30$

Sketch the solution to each system of inequalities.

18) $y < -2x + 3$
$y \le 2x - 1$



19) $y < \frac{5}{2}x + 3$
$y > -\frac{1}{2}x - 3$



Evaluate each function.

20) $g(t) = -3t^3 - 1 + 2t$; Find $g(4)$

21) $h(x) = x^3 - 3x$; Find $h(-5)$

22) $p(t) = 3t - 5$; Find $p(-1)$

23) $p(n) = 3n^3 - 4$; Find $p(-1)$

24) $f(x) = 4x - 5$; Find $f(-5)$

25) $g(x) = x^2 - 3x$; Find $g\left(\frac{x}{4}\right)$

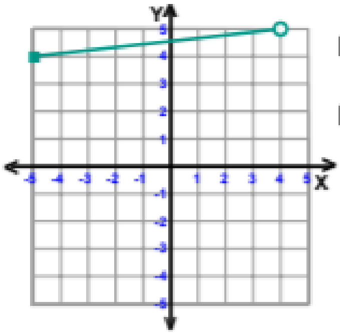
26) $g(a) = 2a + 3$; Find $g(-4a)$

27) $h(n) = n^3 + 2n^2$; Find $h(1 - n)$

28) $h(x) = 3x^2 + 4x$; Find $h(-2x)$

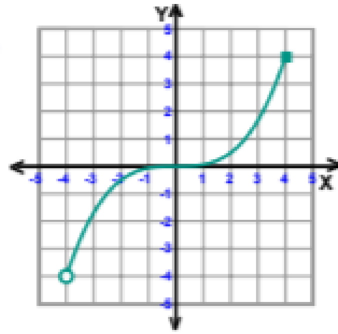
29) $p(t) = t^3 + 5$; Find $p(2 - t)$

Domain and Range of Graphs

1)


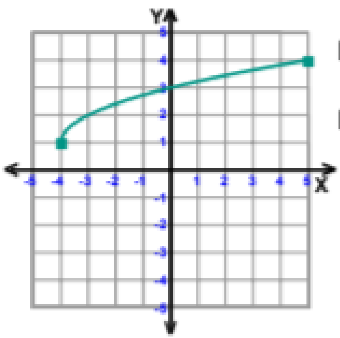
Domain: ________

Range: ________

2)


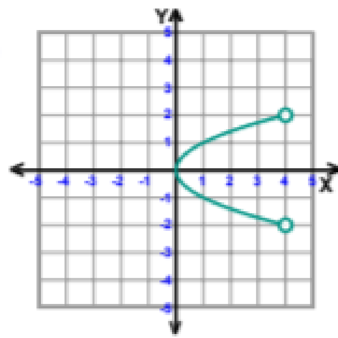
Domain: ________

Range: ________

3)


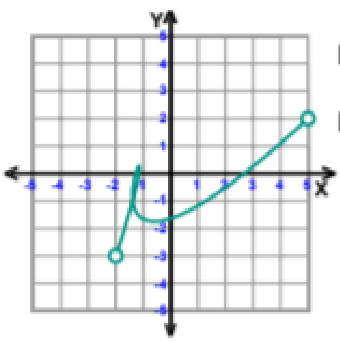
Domain: ________

Range: ________

4)


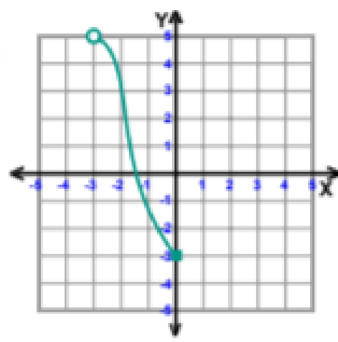
Domain: ________

Range: ________

5)


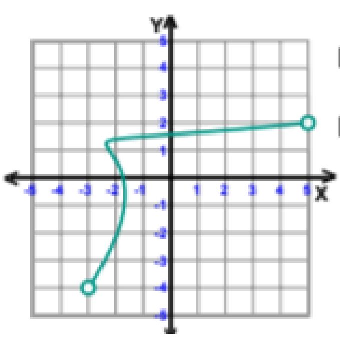
Domain: ________

Range: ________

6)


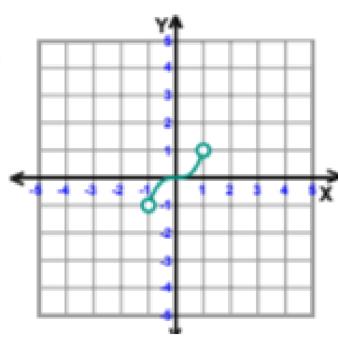
Domain: ________

Range: ________

7)


Domain: ________

Range: ________

8)


Domain: ________

Range: ________

Perform the indicated operation.

1) $f(x) = x^3 - 5x^2$
$g(x) = 3x - 5$
Find $f(x) - g(x)$

2) $g(x) = 3x - 1$
$h(x) = 3x - 2$
Find $g(x) + h(x)$

3) $g(x) = x^3 + x$
$h(x) = -4x - 1$
Find $g(x) + h(x)$

4) $f(x) = -3x^3 + 5x^2$
$g(x) = -4x + 2$
Find $f(4) + g(4)$

5) $f(t) = t^2 - t$
$g(t) = t + 3$
Find $f(-2) \cdot g(-2)$

6) $f(x) = 2x + 4$
$g(x) = x^2 - 4 - 2x$
Find $f(-4) \cdot g(-4)$

7) $g(x) = x^2 + 1$
$f(x) = x - 5$
Find $g(2) + f(2)$

8) $f(x) = 2x + 5$
$g(x) = x^2 - 4$
Find $f(x - 3) + g(x - 3)$

9) $f(a) = a^3 + 5a^2$
$g(a) = 4a - 4$
Find $f(a^2) + g(a^2)$

10) $g(n) = 2n^3 - 3n^2$
$f(n) = 4n - 1$
Find $g\left(\frac{n}{2}\right) \cdot f\left(\frac{n}{2}\right)$

11) $g(n) = 4n + 3$
$h(n) = n - 1$
Find $(g \circ h)(n)$

12) $f(x) = -4x + 5$
Find $(f \circ f)(x)$

13) $h(x) = x + 3$
$g(x) = 4x - 5$
Find $(h \circ g)(6)$

14) $h(t) = t^3 + 3t^2$
$g(t) = t + 3$
Find $(h \circ g)(-5)$

15) $f(n) = n - 4$
$g(n) = -4n + 1$
Find $(f \circ g)(-3 - x)$

Find the three terms in the sequence after the last one given.

1) $-34,\ -64,\ -94,\ -124, \ldots$

Find the explicit formula.

2) $16,\ 13,\ 10,\ 7, \ldots$

Given the first term and the common difference of an arithmetic sequence find the explicit formula.

3) $a_1 = -15,\ d = -9$

Given a term in an arithmetic sequence and the common difference find the explicit formula.

4) $a_{31} = 2996,\ d = 100$

Given two terms in an arithmetic sequence find the explicit formula.

5) $a_{16} = 477$ and $a_{34} = 1017$

Key

For each algebraic expression, identify the number of terms. Then list the coefficient(s), constant(s), and factor(s).

Expression	6a + 3	8b -4c +3	2x-y +8z	9n
Number of terms	2	3	3	1
Coefficient(s)	6	8 -4	2, -1, 8	9
Constant(s)	3	3	none	none
Factor(s)	6, a	8, b, -4, c	2, x 8, z	9, n

Identify the number of terms, the coefficients, the constants, and the factors in the expressions below.

1. 7p-6pc + 3c - 2

Number of terms: 4 Coefficients: 7, -6, 3

Constants: -2 Factors: 7, p -6, p, c, 3, c

(separate factors with a comma in between)

2. 4ab + 8 - 5b

Number of terms: 3 Coefficients: 4, -5

Constants: 8 Factors: 4, a, b, -5, b

(separate factors with a comma in between)

3. $6x^2 - 7xy + 3xz - 2$

Number of terms: 4 Coefficients: 6, -7, 3

(separate factors with a comma in between)

Constants: -2 Factors: 6, x, x, -7, x, y, 3, x, z

KEY TO P. 7

Answers to Unit 1: Combining Polynomials (ID: 1)

1) $3k^4+5k^2+11$
2) $10v+7$
3) $5x^3-6x-4$
4) x^4-5x
5) $-6x$
6) $-11x^4-3x^2+8x$
7) $-11n^4+5n^2+5n$
8) $15n^4-6n^2$
9) $-12x^4-11x^3+7x$
10) $5x^3+6x^2-x$
11) $7x^2+15x+8$
12) $-3p^4+5p^3-7p^2$
13) $-5x^3+13x+5$
14) $-9r^4-7r^3+r^2$
15) $3x^4-5x^3-8x$
16) $5k^3-10k^2+7k$
17) $-3m^4-m^2+4$
18) $3b^4-5b^3-b^2+6$
19) $11n^3+11n^2-4n$
20) $-12x^4-7x^3+3x^2-3$

KEY TO P. 8-9

Answers to Unit 1: Multiplying Polynomials (ID: 1)

1) $20b+10$
2) $8x^5+6x^4$
3) $6n^2-12n$
4) $6x+30$
5) $30x^2+24x$
6) $6n^2-18n-24$
7) $8k^2-16k-24$
8) $24p^2+7p-5$
9) $40x^2+16x-56$
10) $64v^2-32v-12$
11) $28k^2-32k-48$
12) $24x^2-50x+24$
13) $24x^2+10x-4$
14) $7n^2-58n+16$
15) $24x^2+28x+8$
16) $12n^2-34n+20$
17) $6n^2+23n+7$
18) $4x^2+4x-35$
19) $24x^2-16x-64$
20) $12a^2+8a-32$
21) $16m^3-38m^2-20m+12$
22) $8n^3+4n^2+4n+8$
23) $6x^3+52x^2+38x+48$
24) $16m^2-22mn+7n^2$
25) $28m^2-32mn+4n^2$

KEY TO P. 10

1. Simplify the radical: $-8\sqrt{726}$

A

$-8\sqrt{6\cdot 121}$
$-8\cdot\sqrt{121}\cdot\sqrt{6}$
$-8\cdot 11\sqrt{6}$
$\boxed{-88\sqrt{6}}$

726
2 363
3 121

2. Simplify the expression: $2\sqrt{8}\cdot\sqrt{20}$

D

$2\sqrt{8\cdot 20}$
$2\sqrt{160}$
$2\sqrt{16\cdot 10}$
$2\sqrt{16}\cdot\sqrt{10}$
$2\cdot 4\sqrt{10}$
$8\sqrt{10}$

3. What sum is rational? A. $\pi+18$ B. $\sqrt{25}+1.75$ C. $\sqrt{3}+5.5$ D. $\pi+\sqrt{2}$

F

A. I + R, I
B. 5 + 1.75, 6.75, R
C. I + R, I
D. I + I, I

4. What product is irrational? A. $\sqrt{2}\cdot\sqrt{50}$ B. $\sqrt{64}\cdot\sqrt{4}$ C. $\sqrt{9}\cdot\sqrt{49}$ D. $\sqrt{10}\cdot\sqrt{8}$

B

A. $\sqrt{100}$, 10, R
B. $8\cdot 2$, 16, R
C. $3\cdot 7$, 21, R
D. $\sqrt{80}$, I

5. A rectangle has a length of 12 meters and a width of 400 centimeters. What is the perimeter, in cm, of the rectangle?

L

K H D M D C M

400 cm
12 m

12 m → 1200 cm

$P = 2l + 2w$
$P = 2(1200) + 2(400)$
$P = 2400 + 800$
$\boxed{P = 3200 \text{ cm}}$

6. Jill swam 200 meters in 2 minutes 42 seconds. If each lap is 50 meters long, what is a good estimate for her time, in second, per lap?

C

$\frac{200 \text{ meters}}{50 \text{ meters}} = 4$ laps

$\frac{162 \text{ seconds}}{4 \text{ laps}} = \boxed{40.5 \text{ seconds/lap}}$

7. In which expression is the coefficient of term "n" -1?

A. $3n^2+4n-1$ B. $-n^2+5n+4$ C. $\boxed{-2n^2-n+5}$ D. $4n^2+n-5$

H

KEY TO P. 11

8. The expression s^2 is used to calculate the area of a square, where s is the side length of the square. What does the expression $(8x)^2$ represent?

J The area of a square with a side length of 8x.

9. What is the product of $7x-4$ and $8x+5$?

E $(7x-4)(8x+5)$

$56x^2+35x-32x-20$

$56x^2+3x-20$

10. A model of a house is shown. What is the perimeter, in units, of the model?

G $(6x-4)+(6x-4)+(12x+3)+(12x+3)+(14x+13)$

OR

$2(6x-4)+2(12x+3)+(14x+13)$

$\boxed{12x}-8\boxed{+24x}+6\boxed{+14x}+13$

$50x+11$ units

11. Find the expression that has the same value as the expression: $(8x^2+2x-6)-(5x^2-3x+2)$

K $\underline{8x^2}\boxed{+2x}-6-\underline{5x^2}\boxed{+3x}-2$

$\boxed{3x^2+5x-8}$

12. The dimensions of a patio, in feet, are shown to the right. What is the area, in square feet, of the patio?

I $(5x+2)(3x+8)$

$15x^2+40x+6x+16$

$\boxed{15x^2+46x+16 \text{ ft}^2}$

KEY TO P. 12

1. 261 g → kg
   0.261 kg

2. 3 days → seconds
   3×10^5s

3. 9,474 mm → cm
   947.4 cm

4. 0.73 kL → L
   730 L

5. 5.93 cm^3 → m^3
   5.93×10^{-6} m^3

6. 498.82 cg → mg
   4988.2 mg

7. 1 ft^3 → m^3
   (Note: 3.28 ft = 1 m)
   0.028m3

8. 1 year → minutes
   525600

9. 175 lbs → kg
   (Note: 2.2 lb = 1 kg)
   79.5kg

10. 4.65 km → m
    4650m

11. 22.4 kg/L to kg/mL
    0.0224kg/mL

12. 0.74 Kcal/min to cal/sec
    12 cal/sec

13. 1.42 g/cm^2 to mg/mm^2
    14.2mg/mm^2

14. 10095 m/s to miles/s
    6.3094 miles/s

15. 9.81 m/s^2 to ft/s^2
    32.2 ft/s^2

16. 8.41 g/mL to Kg/L
    8.41 Kg/L

17. 3.8 Km/sec to miles/year
    7.5×10^7 miles/year

18. 7.68 cal/sec to Kcal/min
    0.461 Kcal/min

19. 8.24 g/cm^2 to mg/mm^2
    82.4 mg/mm^2

20. 25 m/s to miles/hr
    =56 miles/hr

KEY TO P. 18-22

Answers to Unit 2 Review (ID: 1)

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

2) $x = -5$

3) $x = -2$

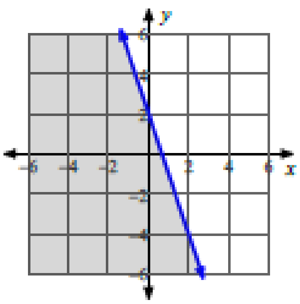
4) $y = -\frac{5}{2}x + \frac{5}{2}$

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

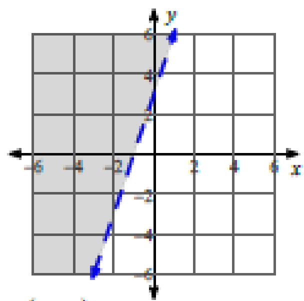
6) $y = 5$

7) $y = \frac{1}{4}x - 1$

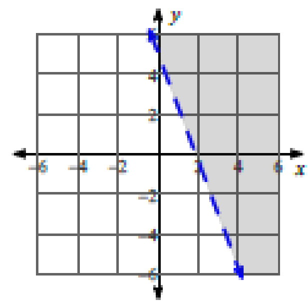
8)



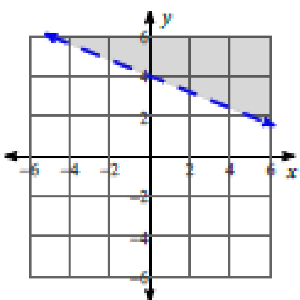
9)



10)



11)



12) $(3, 4)$

13) $(2, 1)$

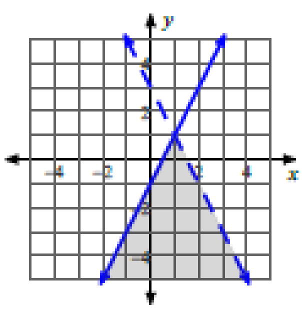
14) $(1, 4)$

15) $(4, -4)$

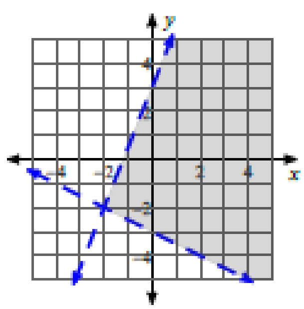
16) $(2, -3)$

17) $(0, -3)$

18)



19)



20) -185

21) -110

22) -8

23) -7

24) -25

25) $\frac{1}{16}x^2 - \frac{3}{4}x$

26) $-8a + 3$

27) $3 - 7n + 5n^2 - n^3$

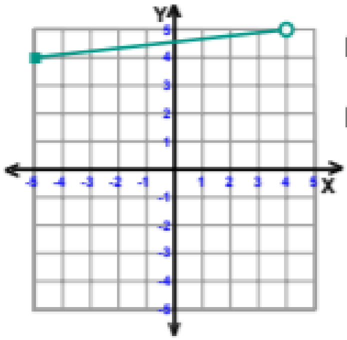
28) $12x^2 - 8x$

29) $13 - 12t + 6t^2 - t^3$

KEY TO P. 23

Domain and Range of Graphs

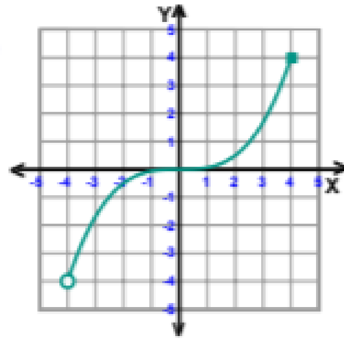
1)



Domain: [-5,4)

Range: [4,5)

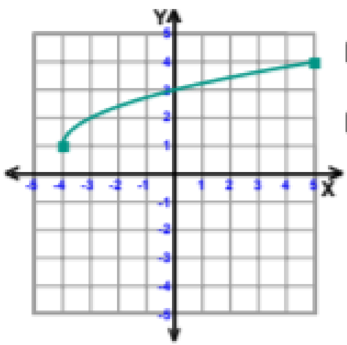
2)



Domain: (-4,4]

Range: (-4,4]

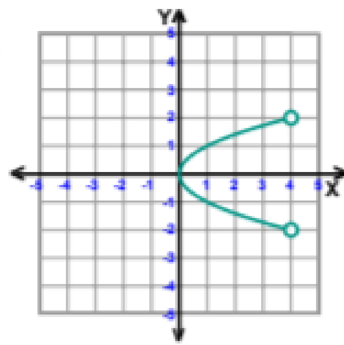
3)



Domain: [-4,5]

Range: [1,4]

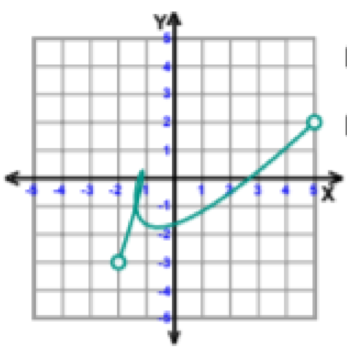
4)



Domain: [0,4)

Range: (-2,2)

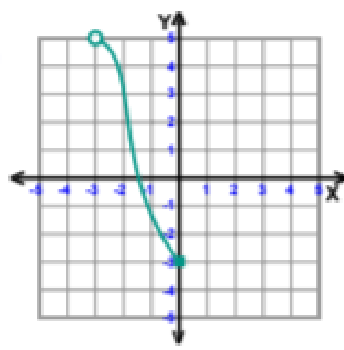
5)



Domain: (-2,5)

Range: (-3,2)

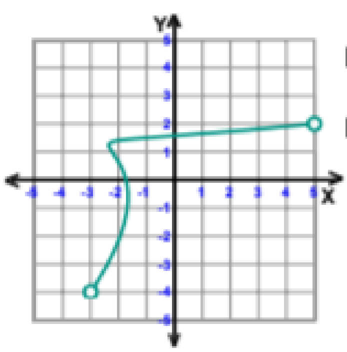
6)



Domain: (-3,0]

Range: [-3,5)

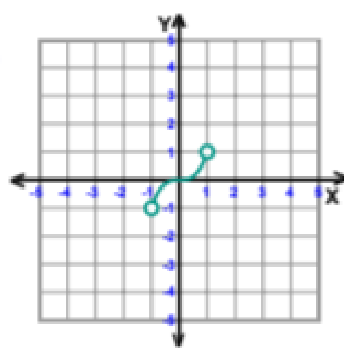
7)



Domain: (-3,5)

Range: (-4,2)

8)



Domain: (-1,1)

Range: (-1,1)

KEY TO P. 24

1) $x^3 - 5x^2 - 3x + 5$
2) $6x - 3$
3) $x^3 - 3x - 1$
4) -126
5) 6
6) -80
7) 2
8) $x^2 - 4x + 4$
9) $a^6 + 5a^4 + 4a^2 - 4$
10) $\dfrac{2n^4 - 7n^3 + 3n^2}{4}$
11) $4n - 1$
12) $16x - 15$
13) 22
14) 4
15) $4x + 9$

KEY TO P. 25

1) $-154, \; -184, \; -214$
2) $a_n = 16 + (n - 1) \cdot -3$
3) $a_n = -15 + (n - 1) \cdot -9$
4) $a_n = -4 + (n - 1) \cdot 100$
5) $a_n = 27 + (n - 1) \cdot 30$