

1. What is the value of the expression $2\sqrt[3]{a} - c\sqrt{b} - 8$ when $a = 64$, $b = 49$, and $c = -5$?

$$2\sqrt[3]{64} - (-5)\sqrt{49} - 8$$

$$2(4) - (-5)(7) - 8$$

$$8 - (-35) - 8 = 8 + 35 - 8 = 43 - 8 = 35$$

2. Write an algebraic expression for "3 less than 8 times the cube root of b to the fourth power"?

$$8\sqrt[3]{b^4} - 3$$

3. What is the value of T if $f = 35$, $r = 25$, and $h = 3$ hours in the equation $T = f + rh$?

$$T = f + rh$$

$$T = 35 + 25(3)$$

$$T = 35 + 75$$

$$T = 110$$

- 4 a. What property justifies how the statement $3a + 5a + (2a - 4)$ is related to $5a + 3a + (2a - 4)$?

Commutative for addition

- 4 b. What property justifies how the statement $3a + 5a + 4(2a - 4)$ is related to $3a + 5a + 8a - 16$?

Distributive Property

5. Write an expression equivalent to $(3x^2)(9x^4)$.

$$3 \cdot 9 \cdot x^2 \cdot x^4$$

$$27x^6$$

6. Simplify $\frac{(6x^2)^4}{9x^3} = \frac{6^4(x^2)^4}{9x^3} = \frac{1296x^8}{9x^3} = 144x^5$

power to power \rightarrow multiply exponents $(x^2)^4 = x^8$

dividing powers \rightarrow subtract exponents

7. Write an expression which is equivalent to $(3x^{-3})^4 (4x^{-3})$

$$3^4(x^{-3})^4(4x^{-3})$$

$$81x^{-12}(4x^{-3})$$

$$324x^{-15}$$

$$\frac{324}{x^{15}}$$

(no negative exponents)

8. A pump removes water from a swimming pool.

- It takes 90 minutes to empty the pool at a rate of 1,200 L/min. $90(1200) = 108,000$
- It takes 60 minutes to empty the pool at a rate of 1,800 L/min. $60(1800) = 108,000$

Is this a direct variation, inverse variation, or neither? inverse variation

Write an equation to represent the relationship. $xy = 108,000$ OR $y = \frac{108,000}{x}$

Direct Variation: $k = \frac{y_1}{x_1}$ OR $y = kx$

Inverse Variation: $x \cdot y = k$ OR $y = \frac{k}{x}$

9. A triangle has a height of $2x$ and a base of $5x + 1$. What is the area of the triangle?

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(2x)(5x+1)$$

$$A = x(5x+1)$$

$$A = 5x^2 + x$$

10. Write an expression which is equivalent to $(3x - 8y)(5x + 6)$. [HINT: Use FOIL]

	$5x$	6
$3x$	$15x^2$	$18x$
-8	$-40x$	-48

$$15x^2 - 22x - 48$$

11. Simplify $(x + 3)(2x^2 - 3x + 5)$

	$2x^2$	$-3x$	5
x	$2x^3$	$-3x^2$	$5x$
3	$6x^2$	$-9x$	15

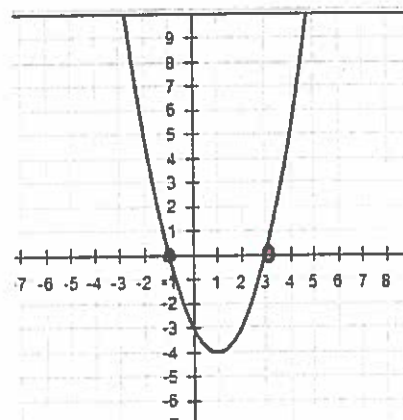
$$2x^3 + 3x^2 - 4x + 15$$

12. The graph at the right represents $x^2 - 2x - 3$.

Find the following:

x - intercept(s) $(-1, 0); (3, 0)$

y - intercepts $(0, -3)$



13. Write an equation to represent the pattern in this set of data? [HINT: Use calculator] *Stat Edit L1 → x L2 → y Stat → Calc → #4 ↓ calculate enter*
 $\{(1, 0), (8, 1), (15, 2), (22, 3)\}$
 $a = m \quad b = b$
 $y = mx + b$

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

13. The ordered pairs in the sets shown below are of the form (x, y) . In which set of ordered pairs is y a function of x ?

- A $\{(1, 2), (2, 2), (3, 2), (4, 2)\}$

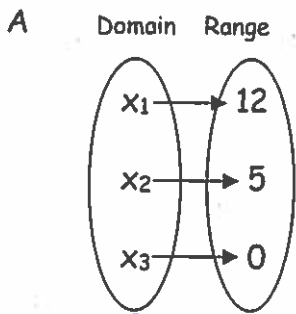
function

Every x-value has a unique y-value (no x's repeat)

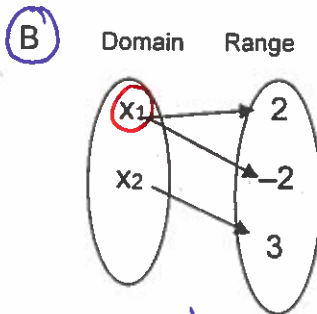
- B $\{(1, 2), (2, 3), (3, 4), (1, 4)\}$

not a function ("1" repeats)

15. Which of the following is NOT a function?



function



not a function

- C $\{(4, 5), (6, 8), (9, 10), (-4, 8)\}$

function

- D $\{(5, 2), (5, 3), (4, 2), (0, 3)\}$

not a function

16. Simplify $(5x + 3)(2x^2 + 4x - 6)$

	$2x^2$	$4x$	-6
$5x$	$10x^3$	$20x^2$	$-30x$
3	$6x^2$	$12x$	-18

$$10x^3 + 26x^2 - 18x - 18$$

17. Simplify $(5x^2 + 3x - 9) + (3x^2 - 5x - 10)$

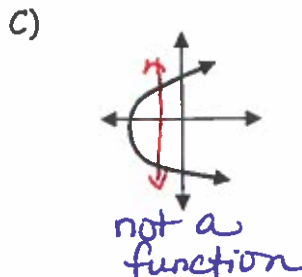
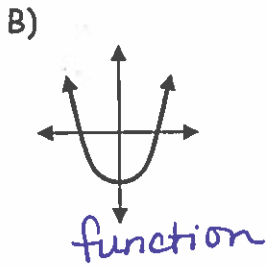
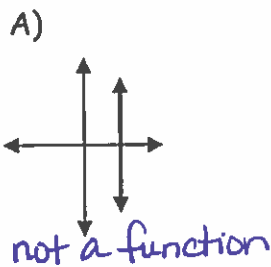
$$5x^2 + 3x - 9$$

$$3x^2 - 5x - 10$$

$$8x^2 - 2x - 19$$

Line up "like" terms. Follow addition rules

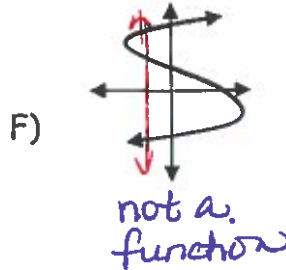
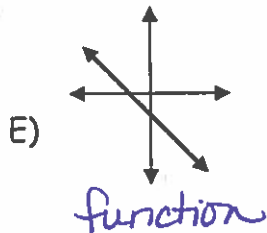
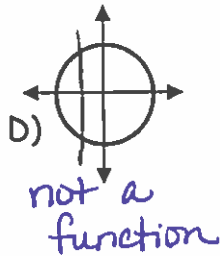
18. Determine if each example is a function.



D)

x	y
-3	5
4	6
8	6
9	12

function



G)

x	y
-1	5
-4	6
-1	10
9	12

not a function

19. Given a domain of $\{-1, 0, 2, 3\}$ what is the range for the function below?

$$f(x) = -3x^3 + 3x^2 + 1$$

$\boxed{Y=}$ enter equation $(-3x^3 + 3x^2 + 1)$ $\boxed{2nd}$ \boxed{GRAPH}
OR work it once for every x-value.

$$f(-1) = (-3)(-1)^3 + 3(-1)^2 + 1 = -3(-1) + 3 + 1 = 3 + 3 + 1 = 7$$

$$f(0) = -3(0)^3 + 3(0)^2 + 1 = 1$$

$$f(2) = -3(2)^3 + 3(2)^2 + 1 = -3(8) + 3(4) + 1 = -24 + 12 + 1 = -11$$

$$f(3) = -3(3)^3 + 3(3)^2 + 1 = -81 + 27 + 1 = -53$$

20. The following equation defines a function of x:

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

If $(4, g)$ is an element of the function, what is the value of g ?

$$f(4) = 5(4) - 3 = 20 - 3 = 17$$

$\{7, 1, -11, -53\}$

21. A direct variation passes through the point $(3, -6)$. Name two other points that the direct variation could pass through.

$$y = \frac{y_1}{x_1} x$$

$$y = \frac{-6}{3} x$$

$$y = -2x$$

EQUATION

Points:

- $(0, 0)$
- $(1, -2)$
- $(2, -4)$
- $(3, -6)$
- $(4, -8)$
- $(-4, 8)$
- $(-3, 6)$
- $(-2, 4)$
- $(-1, 2)$

22. The force needed to lift an object varies directly with the object's weight. A force of 0.123 lb. is needed to lift a weight of 18-lb. How much force would be needed to lift a weight of 100 lbs.?

$$\frac{\text{force}}{\text{weight}} = \frac{0.123}{18} = \frac{f}{100}$$

$$\frac{18f}{18} = \frac{12.3}{18} \rightarrow f = 0.68\bar{3}$$

23. What are the zeros of a function defined by the following equation?

Solutions
X-intercepts
Zeros
Roots

$$f(x) = x(x - 6)(x + 4)$$

SET EACH FACTOR EQUAL TO ZERO AND SOLVE

$$x = 0 \text{ OR } \begin{array}{r} x - 6 = 0 \\ +6 \quad +6 \\ \hline x = 6 \end{array} \text{ OR } \begin{array}{r} x + 4 = 0 \\ -4 \quad -4 \\ \hline x = -4 \end{array}$$

{ 0, 6, -4 }

24. What is the value of x if $4(x + 2) = 3(x - 4)$?

$$\begin{array}{r} 4x + 8 = 3x - 12 \\ -3x \quad -3x \\ \hline x + 8 = -12 \\ -8 \quad -8 \\ \hline x = -20 \end{array}$$

25. $C = 3A + 4B$ Solve for B

$$\frac{C - 3A - 3A}{4} = \frac{4B}{4}$$

$$\frac{C - 3A}{4} = B$$

26. If $-2\left(\frac{1}{4}x + 2\right) > \frac{17}{6}$, then -

$$\begin{array}{r} -\frac{1}{2}x - 4 > \frac{17}{6} \\ +\frac{24}{6} \quad +\frac{24}{6} \\ \hline -\frac{1}{2}x > \frac{41}{6} \\ -2\left(-\frac{1}{2}x\right) < \left(\frac{41}{6}\right)(-2) \\ x < -\frac{41}{3} \end{array}$$

• Distributive Property
• Add 4 to $17 \div 6$
• Enter
• Multiply by reciprocal (-2)

27. The table at the right shows the relationship between the depth and the temperature. Using the data, write an equation that could be used to predict the temperature at any given depth.

Depth	Temperature
1	55
2	90
3	125
4	160
5	195
6	230

stat
edit
stat
calc
#4

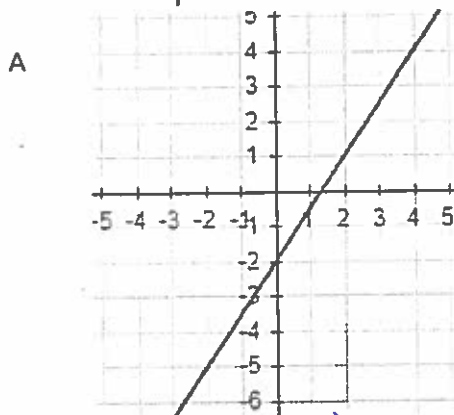
$Y = 35x + 20$
OR
 $T = 35d + 20$

calculate enter

27. Name the property for each example below:

- A $3 + 2m = 2m + 3$ commutative (addition)
- B If $y + 4 < x$ and $x < 40$, then $y + 4 < 20$ transitive for inequalities
- C $2 + 3m = 2 + (1 + 2)m$ substitution
- D If $-4y < 20$, then $y > -5$ division property of inequalities

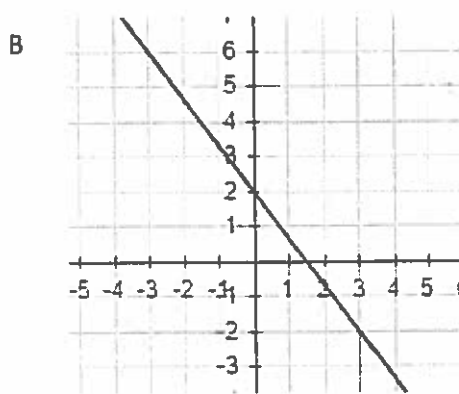
28 Find the equation of each graph. Write your answer in standard form and slope-intercept form.



$m = 3/2$ (rise/run)
 $b = -2$

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

$-2(-\frac{3}{2}x + y) = (-2)(-2)$
 $3x - 2y = 4$



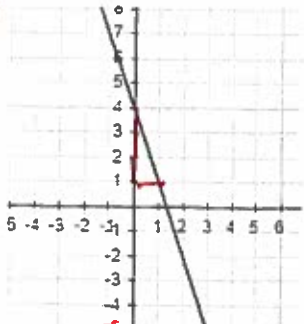
$m = \frac{\text{rise}}{\text{run}} = -\frac{4}{3}$

$b = 2$

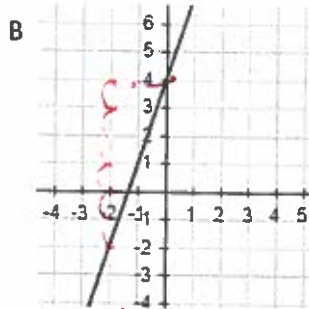
$Y = -\frac{4}{3}x + 2$ (slope-int. form)

$3[\frac{4}{3}x + y] = [2]3$
 $4x + 3y = 6$ (standard form)

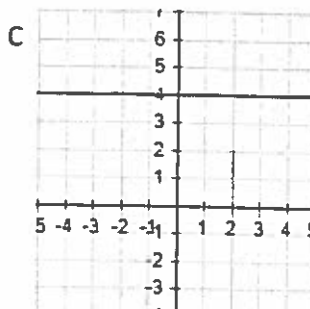
29. Write the equation for each of the lines graphed below. (NOT MULTIPLE CHOICE)



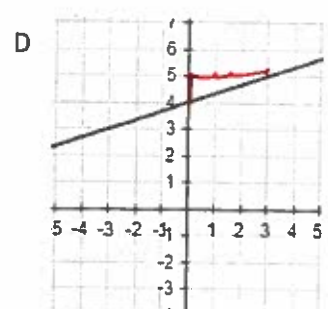
$m = -\frac{3}{1}$ $b = 4$
 $y = -3x + 4$



$m = \frac{6}{2} = 3$ $b = 4$
 $y = 3x + 4$

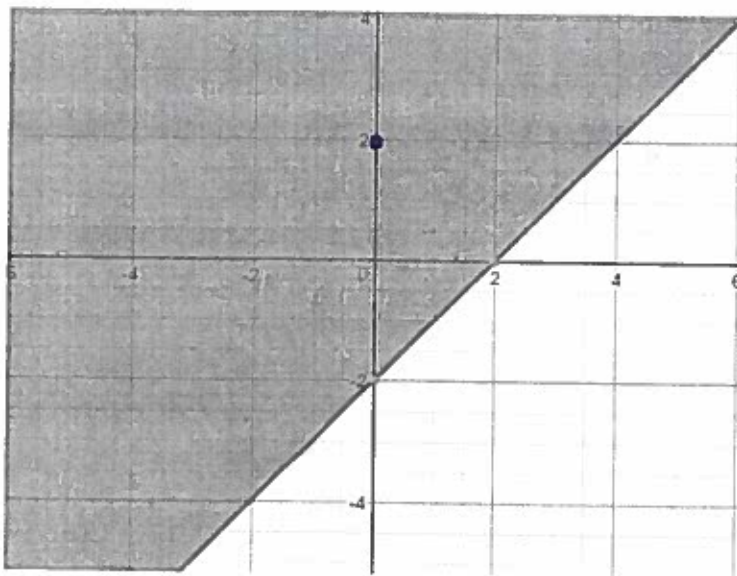


HOY
 $y = 4$



$m = \frac{1}{3}$ $b = 4$
 $m = \frac{1}{3}x + 4$

30. Which of the following best represents the graphed linear inequality?



A $y > x - 2$

B $y \geq x - 2$

C $y \leq x - 2$

D $y < x - 2$

• Solid Line (eliminate A & D)

• Pick a test point to discover sign

OR

• Try Inequality

(0, 2) is in the shaded area

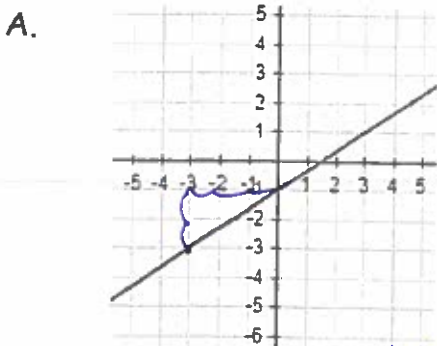
$y \square x - 2$
 $2 \square 0 - 2$
 $2 \square > -2$

31. What is the slope of the line? $3x - 2y = 5$ SOLVE FOR Y. NUMBER IN FRONT OF X IS THE SLOPE

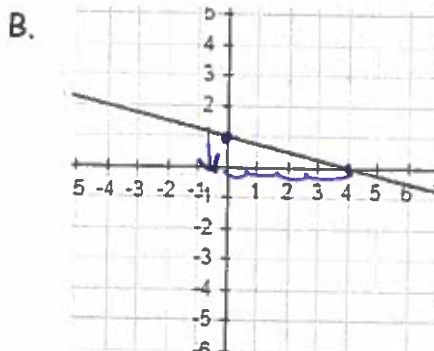
$3x - 2y = 5$
 $-3x \quad -3x$
 $-2y = -3x + 5$
 $y = \frac{3}{2}x - \frac{5}{2}$

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

32. What is the slope of each graph?



$m = \frac{\text{rise}}{\text{run}} = \frac{2}{3}$



$m = \frac{\text{rise}}{\text{run}} = -\frac{1}{4}$

33. What is the slope of the line that passes through the points (-4, -5) and (-9, 1)?

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - (-5)}{-9 - (-4)} = \frac{6}{-5}$$

34. What is the equation of the line with an x-intercept of 5 and having a slope of $\frac{3}{4}$?

(Write your equation in slope-intercept form.)

$$y = mx + b$$

$$0 = \frac{3}{4}(5) + b$$

$$0 = \frac{15}{4} + b$$

$$0 = \frac{15}{4} + b$$

$$-\frac{15}{4} = b$$

$$y = \frac{3}{4}x - \frac{15}{4}$$

35. What is the equation of the line through (3, -2) and (6, 4)?

$$m = \frac{4 - (-2)}{6 - 3} = \frac{6}{3} = 2$$

$$y - y_1 = m(x - x_1)$$

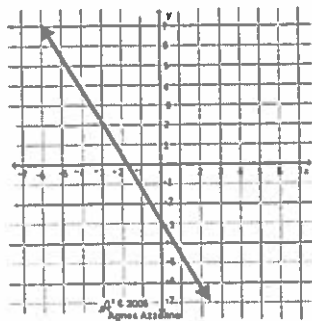
$$y - 4 = 2(x - 6)$$

$$y - 4 = 2x - 12$$

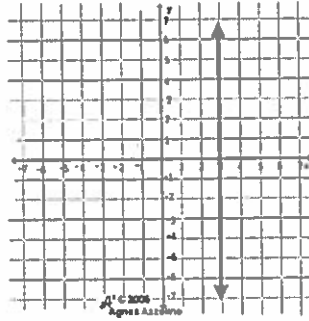
$$\begin{array}{r} +4 \\ \hline y = 2x - 8 \end{array}$$

OR solve for "b" using $y = mx + b$ like in #34.

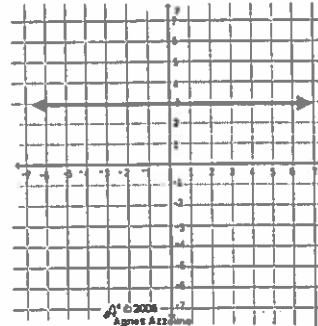
36. Describe each of the following slopes:



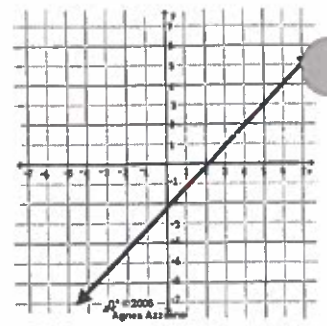
negative



undefined



zero



positive

37. A gym offers a trial membership for 3 months. It discounts the regular monthly fee, f , by \$15. Maverick would like to sign up if the total price of the trial membership is less than \$75. Write an inequality that would help Maverick determine if he would like to sign up.

$$3(f - 15) < 75$$

38. Find the solution to the system below:

$$\begin{cases} x = 5 + 2y \\ 3x - 2y = 9 \end{cases}$$

$$\begin{array}{r} x = 5 + 2y \\ -2y \quad -2y \\ \hline x - 2y = 5 \end{array}$$

$$\begin{bmatrix} 1 & -2 & 5 \\ 3 & -2 & 9 \end{bmatrix}$$

$$(2, -3/2)$$

APPS → PLYSMLT → #2 SIMULTANEOUS EQUATION SOLVER

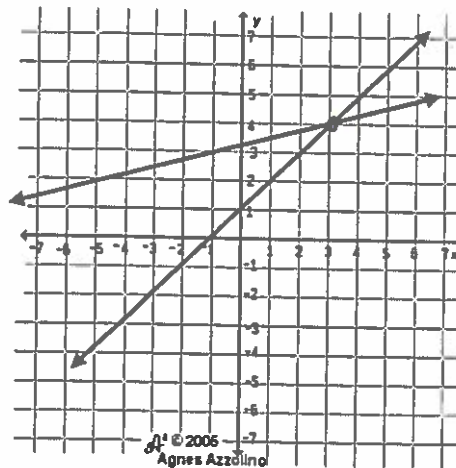
MUST BE $Ax + By = C$!

39. Bob bought 10 hockey tickets for \$64. Adult tickets were \$8 each and a child's ticket was \$4 each. How many adult tickets did he buy? (Use a system of equations)

one equation for # of tickets $x + y = 10$
 equation for cost $8x + 4y = 64$

$$\begin{bmatrix} 1 & 1 & 10 \\ 8 & 4 & 64 \end{bmatrix}$$

6 adult tickets
4 child tickets

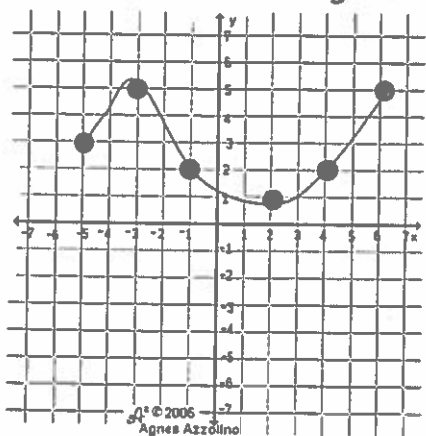


40. What is the solution to the system of equations shown? (intersection)
 $(3, 4)$

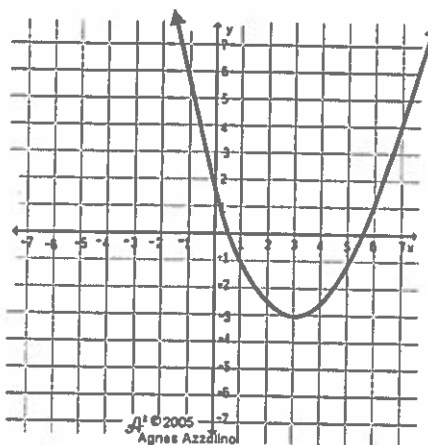
41. Which is a factor of $c^2 - 64$? difference of squares
 A. $c + 2$ B. $c + 32$ C. $c + 8$ D. $c + 64$

$(c + 8)(c - 8)$ $-8 \cdot 8 = -64$
 $-8 + 8 = 0$ $(c^2 + 0c - 64)$

42. What is the ^{y-value} range of the graphs shown?

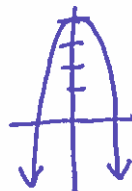


$1 \leq y \leq 5$



$y \geq -3$

$y \leq 4$



43. Which is the complete factorization of the trinomial $5a^2 - 17a + 14$?

- A. $(5a + 7)(a + 2)$
- B. $(5a - 2)(a - 7)$
- C. $(5a - 7)(a - 2)$
- D. $(3a - 7)(a - 2)$

$$5a^2 - 17a + 14$$

$$a^2 - 17a + 14$$

$$(a-7)(a-10)$$

$$(5a-7)(a-2)$$

*70	(+)
-1, -70	-71
-2, -35	-37
-5, -14	-19
-7, -10	-17*

44. Which is a factor of $c^2 - 7c + 12$?

- A. $c - 4$
- B. $c + 4$
- C. $c + 3$
- D. $c - 7$

$$c^2 - 7c + 12$$

$$(c-3)(c-4)$$

mult. of 12	add
-1, -12	-13
-2, -6	-8
-3, -4	-7

45. Which is a factored form of the following expression?

$$6a^2 - 10a$$

- A. $2(3a^2 - 5)$
- ⓑ. $2a(3a - 5)$
- C. $6a^2(1 - 4a)$
- D. $(3a + 2)(2a - 6)$

Look for a common factor
 $2a$ is a factor of both
 $6a^2$ and $10a$

$$2a(3a - 5)$$

Think $\frac{6a^2}{2a}$ Think $\frac{10a}{2a}$

46. Simplify $\sqrt[3]{162}$

$$\sqrt[3]{2 \cdot 3 \cdot 3 \cdot 3 \cdot 3}$$

$$3 \sqrt[3]{6}$$

$$\sqrt[3]{162} = x^3$$

$$\frac{x}{3} \mid \frac{Y}{6}$$

47. Simplify $\sqrt{128a^8b^7c^6}$

$$\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot a^8 \cdot b^6 \cdot b \cdot c^6}$$

$$2 \cdot 2 \cdot 2 \cdot a^4 \cdot b^3 \cdot c^3 \sqrt{2b} = 8a^4b^3c^3\sqrt{2b}$$

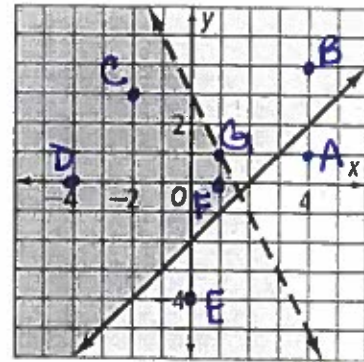
48. Simplify $\left(\frac{3m^3n^{-2}}{m^{-2}}\right)^3$

Everything is cubed!

$$\frac{3^3(m^3)^3(n^{-2})^3}{(m^{-2})^3} = \frac{27m^9n^{-6}}{m^{-6}}$$

$$= \frac{27m^9m^6}{n^6} = \frac{27m^{15}}{n^6}$$

49. Which are solutions for the following systems of inequalities graphed? *Point must be in the intersection*



A (4, 1) NO B (4, 4) NO

C (-2, 3) YES **D (-4, 0) YES**

E (0, -4) NO **F (1, 0) YES**

G (1, 1) NO (on the dashed line)

50. Name all of the solutions to the following quadratic equation: *Factor and then set each factor equal to 0.*

$$3(x^2 - 2x - 15) = 0$$

$$3x^2 - 6x - 45$$

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

$$\begin{matrix} x - 5 = 0 & x + 3 = 0 \\ x = 5 & x = -3 \end{matrix} \quad \{5, -3\}$$

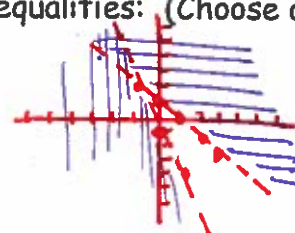
OR
Graph (Y=) and find the x-intercepts

51. Which are solutions for the following system of inequalities: (Choose all)

Graph + look for points in intersection. (USE INEQUALITY)

$$\begin{cases} y > -x + 1 \\ y < -3x - 1 \end{cases}$$

TRY PTS. IN THE INEQUALITIES.



A (-1, 0) NO **B (-3, 5) YES** C (-2, -2) NO D (-3, 4) NO (ON THE LINE) **E (-4, 6) YES**

52. What is the product of $2x^2(5x^4 - 8x^2 + 5)$? *DISTRIBUTE PROPERTY*

$$10x^6 - 12x^4 + 10x^2$$

53. The equation for the line $y = -\frac{2}{3}x + 2$ is shown to the right.

(A) Write an equation of a line that would be perpendicular to the line graphed.

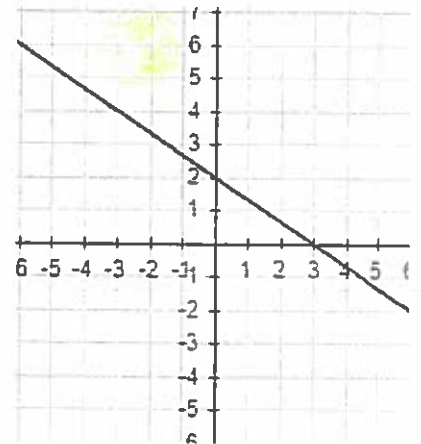
Product of slopes is -1 (negative reciprocal)

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

(B) Write an equation for a line that would be parallel to the line graphed

same slope (different y-intercept)

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



Directions: Click on the boxes containing the terms of the solution.

54. Simplify the expression below. *Line Up Like Terms. Change all signs of second polynomial. Follow addition rules.*

$$\begin{array}{r} 4x^3 + 0x^2 + 3x - 10 \\ -2x^3 + 5x^2 + 0x - 8 \\ \hline 2x^3 + 5x^2 + 3x - 18 \end{array}$$

$$(4x^3 + 3x - 10) + (2x^3 + 5x^2 + 8)$$

$6x^3$	$2x^3$	$8x^2$	$-2x^2$	$5x^2$	$3x$	-2	-18
--------	--------	--------	---------	--------	------	------	-------

Directions: Select one box from each column to represent your answer.

55. When $x > 0$, $y > 0$, and $z > 0$, which expression is equivalent to $\sqrt{250x^{12}y^7z^5}$ in simplest form?

5	$x^6y^3z^2$	$\sqrt{10yz}$
3	$x^6y^3z^2$	$\sqrt{10yz}$
4	$x^6y^4z^4$	$\sqrt{3xyz}$
5	xyz	$\sqrt{12xz}$
12	x^5z^3	$\sqrt{2yz}$

$$\sqrt{2 \cdot 5 \cdot 5 \cdot x^{12} \cdot y^7 \cdot z^5}$$

$$5x^6y^3z^2 \sqrt{10yz}$$

OR

$$y = 250 \div x^2$$

x	y
1	250
$\rightarrow 5$	10

Directions: Click on the box to choose each function you want to select. You must select all correct functions.

56. Identify each function that has exactly one zero.

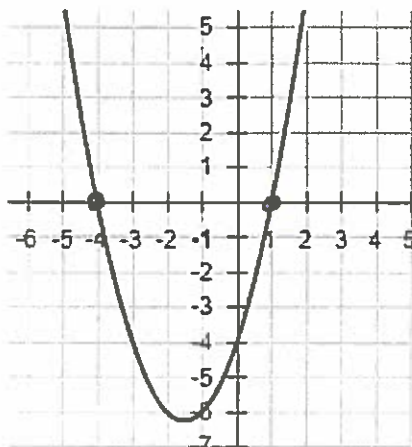
GRAPH. COUNT NUMBER OF TIMES LINE CROSSES OR TOUCHES X-AXIS

$e(x) = x^2 + 8x + 16$ 1	$h(x) = x^2 + 5x - 9$ 2
$f(x) = -3(x - 4)(x + 1)$ 2	$j(x) = -4(x+9)$ 1
$g(x) = 16x^2 - 25$ 2	$k(x) = x^2 + 5x + 9$ 0

OR TOUCHES X-AXIS

Directions: Select all solutions for the quadratic function shown.

57. What are the solutions to the quadratic equation graphed below?



4	1	-1	-2	-4
---	---	----	----	----

x-intercepts are the solutions

S
X
I
N
G
Z
E
R

Directions: Select one box from each column to represent your answer.

58. Solve the system of equations: $\begin{cases} 4x + 5y = 11 \\ y = 3x - 13 \end{cases}$ rewrite

APPS
PLYSMLT
#2

$-3x \quad -3x$
 $\hline -3x + y = -13$

$$\begin{bmatrix} 4 & 5 & 11 \\ -3 & 1 & -13 \end{bmatrix}$$

(4, -1)

Be sure to shade the correct one!

x	y
-4	-4
-1	-1
1	1
4	4



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