Algebra 1 End-of-Course Exam Practice Test with Solutions

For Multiple Choice Items, circle the correct response. For Fill-in Response Items, write your answer in the box provided, placing one digit in each box and no spaces between digits.

MA.912.A.2.3, MA.912.A.2.13

1. Anton joined a golf club two years ago. He pays an annual membership fee of $895 and a greens fee of $30 each time he plays a game of golf. The function below can be used to calculate the total yearly golfing fee, $f(g)$, in dollars.

$f(g) = 895 + 30g,$

where g represents the number of times he played golf during the year.
Last year he paid $2,065 as a total golfing fee. For how many games did he pay a greens fee?

Given that the golfing fee, f(g) for Anton was $2,065 we substitute $2,065 for f(g) in the equation.
2065 = 895 + 30g   Subtract 895 from both sides of the equation
1170=30g   Divide both sides of the equation by 30
39=g
Answer: 39

					3	9

MA.912.A.2.3

2. For the function $f(x) = 3x + 2,$ find x such that $f(x) = 14$.

Given that f(x) = 14, we substitute 14 in to the equation in place of f(x)

14 = 3x + 2   Subtract two from both sides of the equation
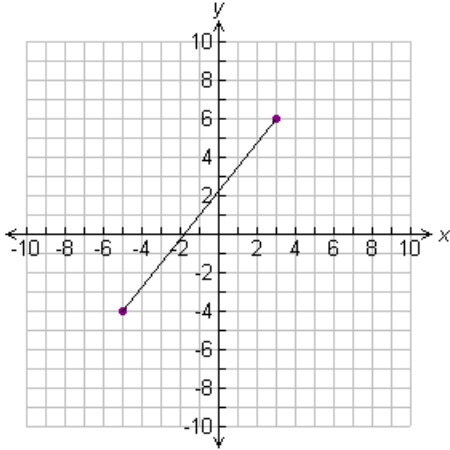12 = 3x   Divide both sides of the equation by three.
4 = x
Answer: 4

					4	

MA.912.A.2.4

3. Find the domain of the function represented in the graph.

A. The domain consists of input values from -5 to 3.*
B. The domain consists of input values from -4 to 6.
C. The domain consists of input values from -5 to 6.
D. The domain consists of input values from -4 to 3.

The domain is the set of x (or input) values that will satisfy the function. In this graph, we have a line segment from the point (-5, -4) to (3, 6) therefore the x (or input values) range from -5 to 3.

Answer Choice A

MA.912.A.2.13

4. Gregory teaches martial arts. He charges a one-time processing fee of $5.00 and the cost of the classes is shown below. Let x represent the number of classes and y represent the cost of classes. Based on this information, what will it cost to take 10 classes?

Cost of classes (not including processing fee)

Number of Classes, x	1	2	3	4
Cost of Classes, y	$15.00	$27.00	$39.00	$51.00

A. $123.00
B. $125.00
C. $128.00*
D. $130.00

Use two points from the chart. For this explanation the points (1, 15) and (2, 27) will be used.
First find the slope.

$$m = \frac{27-15}{2-1} = \frac{12}{1} = 12$$

Use point-slope formula to find the equation for the cost of classes y and the number of classes, x.

$y - y_1 = m(x-x_1)$ Write the formula
$y - 15 = 12(x-1)$ Distribute the 12 to both the x and the -1
$y - 15 = 12x-12$ Add 15 to both sides of the equation
$y = 12x + 3$

We want to know how much it will cost to take ten classes (x is the number of classes taken).

$y = 12(10) + 3$
$y = 120+3$
$y = 123$

Therefore it will cost $123 for the 10 classes plus the $5.00 registration fee which is a total of $128.00

Answer Choice C

MA.912.A.3.1

5. Solve the equation. $-4(x + 10) - 6 = -3(x - 2)$

$-4(x + 10) - 6 = -3(x - 2)$

$\quad -4x - 40 - 6 = -3x + 6$ Distribute

$\quad\quad -4x - 46 = -3x + 6$ Combine Like Terms

$\quad\quad +4x \quad\quad\quad +4x$ Collect Variables

$\quad\quad\quad\quad -46 = x + 6$ Isolate variable

$\quad\quad\quad\quad\quad -6 \quad\quad -6$

$\quad\quad\quad\quad -52 = x$

Answer: -52

				$-$	5	2

MA.912.A.3.1

6. A bookstore sold 18,000 paperbacks one month. This was 10% less than the number of paperbacks the store sold the previous month. The following equation represents this situation, where x represents the number of paperbacks sold the previous month.

$x - 0.1x = 18,000$

How many paperbacks did the store sell in both the months combined?

    A. 20,000

    B. 35,990

    C. 38,000*

    D. 180,000

To determine the total number of paperbacks sold, we must first determine how many paperbacks were sold the previous month, x.

$x - 0.1x = 18000$ combine like terms

$0.9x = 18000$ Divide both sides of the equation by 0.9

$x = 20,000$ paperbacks.

Therefore, the total number of paperbacks sold in both months combined is 20,000+18,000 = 38,000 paperbacks.

Answer Choice C

MA.912.A.3.1

7. Shades R Us charges $20 per day to rent a lounge chair and $15 per day to rent an umbrella. Dan and Lisa paid a total of $245 to rent a lounge chair and an umbrella each during their vacation. Lisa rented the chair and umbrella for 1 day less than Dan. The following equation represents this situation, where x represents the number of days Dan rented the lounge chair and umbrella.

$20x + 15x + 20(x - 1) + 15(x - 1) = 245$

What is the total amount Dan paid to rent the lounge chair and umbrella during his vacation?

A. $80

B. $105

C. $140*

D. $17

We must first determine x, the number of days Dan rented the lounge chair and umbrella.

$20x + 15x + 20(x-1) + 15(x-1) = 245$ Distribute the 20 and the 15

$20x + 15x + 20x – 20 + 15x – 15 = 245$ Combine Like terms

$20x + 15x + 20x + 15x – 20 – 15 = 245$

$70x – 35 = 245$ Add 35 to both sides of the equation

$70x = 280$ Divide both sides by 70

$x = 4$

This means Dan rented the lounge chair and umbrella for four days.

Now, we know that it costs 20 dollars a day to rent a lounge chair and 15 dollars a day to rent an umbrella

Therefore, Dan paid 20(4) + 15(4) total dollars, or 80+60 = 140 dollars.

Answer Choice C

MA.912.A.3.2

8. Which property would be used first to simplify the expression $2(x+5y+1)-4(3x-y-2)$?

A. Distributive*
B. Identity
C. Inverse
D. Commutative

The distributive property should be used so that like terms may be combined.

Answer Choice A

MA.912.A.3.2

9. Your daily workout plan involves a total of 40 minutes of running and swimming. You burn 20 calories per minute running and 10 calories per minute swimming. Let r be the number of minutes you run. How many calories will you burn in your 40 minute workout if you run for 20 minutes?

$$C = 20r + 10(40 - r)$$
$$C = 20r + 400 - 10r$$
$$C = 10r + 400$$
$$C = 10(20) + 400$$
$$C = 200 + 400$$
$$C = 600$$

You burn 600 calories during your 40 minute workout.
Answer: 600

			6	0	0

MA.912.A.3.3

10. Which mathematical sentence represents the solution for *d* in the equation $6e = ef + 3d$?

A. $d = \dfrac{6e - ef}{3}$ *

B. $d = \dfrac{6e + ef}{3}$

C. $d = \dfrac{2e - ef}{3}$

D. $d = \dfrac{2e + ef}{3}$

$6e = ef + 3d$

$6e - ef = 3d$

$\dfrac{6e - ef}{3} = d$

Answer Choice A

MA.912.A.3.3

11. The formula for the perimeter *P* of a rectangle with length *l* and width *w* is $P = 2l + 2w$. Which of the following is a formula for the length of a rectangle in terms of the perimeter and width?

A. $l = \dfrac{P - w}{2}$

B. $l = \dfrac{P + w}{2}$

C. $l = \dfrac{P - 2w}{2}$ *

D. $l = \dfrac{P + 2w}{2}$

$P = 2l + 2w$

$P - 2w = 2l$

$\dfrac{P - 2w}{2} = l$

Answer Choice C

MA.912.A.3.4

12. Which of the following is the solution for $4x - 4 > 12$?

A. $x \geq 4$
B. $x \leq 4$
C. $x > 4$*
D. $x < 4$

$4x - 4 > 12$

$4x > 16$

$x > 4$

Answer Choice C

MA.912.A.3.4

13. Which graph represents the solution set for the compound inequality $-3 \le -2x+1 < 11$?
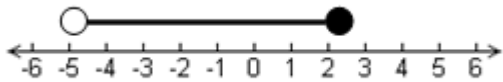
A.
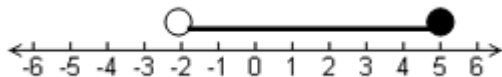
B.
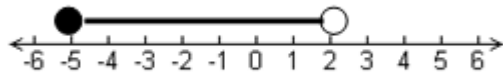
C.
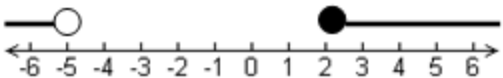
D.

$-3 \le -2x+1 < 11$

$-3 \le -2x+1$ and $-2x+1 < 11$

$-4 \le -2x$ and $-2x < 10$

$2 \ge x$ and $x > -5$

$2 \ge x > -5$

$-5 < x \le 2$

Remember, if you multiply or divide by a negative number when solving an inequality, you must reverse the inequality sign.

Answer Choice A

MA.912.A.3.5

14. Trini's car breaks down on a highway. Trini estimates that she is 20 to 30 miles from the nearest car repair shop. She calls a towing company that charges a fee of $80 plus $3 per mile to tow a car. If Trini uses this towing company, which is the best estimate for the amount of money, *m*, she will pay for the company to tow her car?

A. $103 \leq m \leq 113$
B. $140 \leq m \leq 150$
C. $140 \leq m \leq 170$*
D. $160 \leq m \leq 170$

She will travel between 20 and 30 miles
$80 + 3(20) = 80+60 = 140$
$80 + 3(30) = 80+90= 170$
Therefore, *m*, the amount of money she will pay for the company to tow her car is between 140 and 170 dollars.

Answer choice C

MA.912.A.3.5

15. Mia is a sales associate at an art gallery. Each week she earns $300 plus a 4% commission of all her sales. This week she earned $327. How much were Mia's art sales this week?

Solution: Let x = the number of dollars Mia sold.
$$.04x + 300 = 327$$
$$.04x = 27$$
$$x = 675$$

Mia sold 675 dollars worth of art this week.

Answer: 675

			6	7	5

MA.912.A.3.7

16. Which of the following represents the linear equation $3x = 12 - 2y$ in standard form?

A. $y = -\dfrac{3}{2}x + 6$

B. $y = \dfrac{3}{2}x - 6$

C. $3x - 2y = 12$

D. $3x + 2y = 12$ *

Standard form is Ax + By = C.

$3x = 12 - 2y$
$3x + 2y = 12$

Answer Choice D

MA.912.A.3.7

17. Which of the following represents the linear equation $2x = y + 3$ in slope-intercept form?

A. $2x + y = 3$
B. $2x - y = 3$
C. $y = 2x - 3$ *
D. $y = 2x + 3$

Slope-intercept form is y = mx + b.

$2x = y + 3$
$2x - 3 = y$

Answer choice C

MA.912.A.3.8

18. The travel path of a ferry heading from a mainland harbor toward an island jetty is graphed on a coordinate grid. The graph is a straight line with a slope of – ¼. If the mainland harbor is located at point (2, 1), which graph represents the travel path of the ferry?
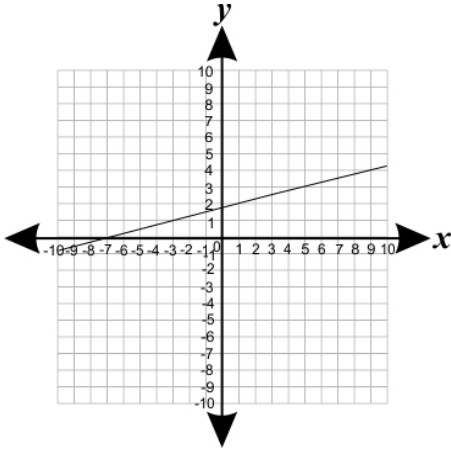
A.
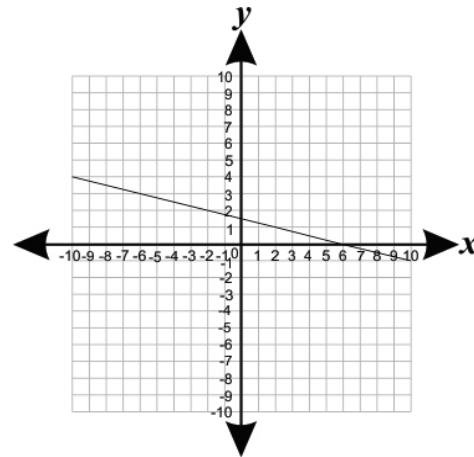
C*.
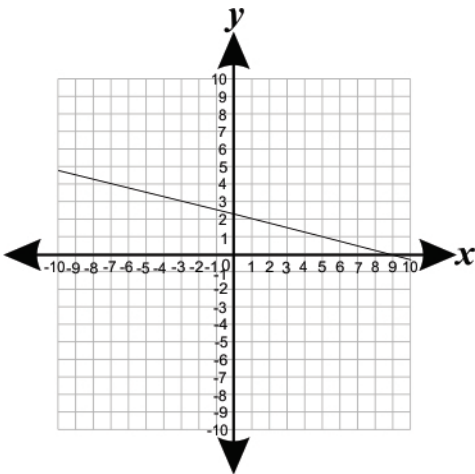
B.

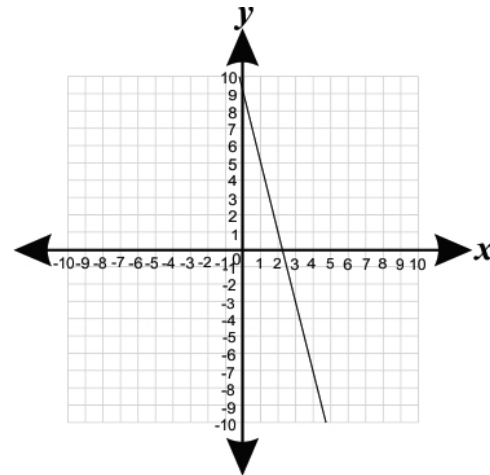D.

Locate the point (2, 1) on each graph and look for the change.
The slope is -1/4 meaning that the line we are looking for goes down from left to right at a rate of one down to four to the right. This matches to graph C.

Answer Choice C

MA.912.A.3.8

19. For a science experiment Corrine is adding hydrochloric acid to distilled water. The relationship between the amount of hydrochloric acid, *x*, and the amount of distilled water, *y*, is graphed below.
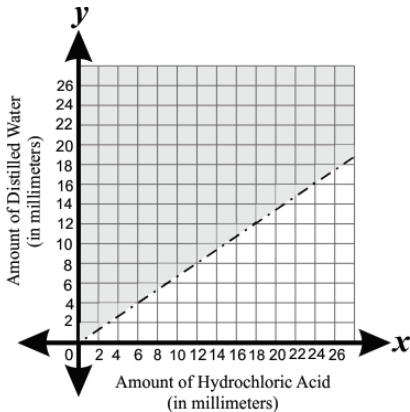
Which inequality best represents this graph?

A. $2y - 3x < 0$

B. $3y - 2x < 0$

C. $2y - 3x > 0$

D. $3y - 2x > 0$ *

The easiest way to find this is to write the line in slope intercept form and then change to standard form. Using the graph, we see that the y intercept is 0 and the slope is 4/6 or 2/3. The line is dotted and shaded above the line meaning that the inequality is greater than… y > 2/3 x +0 or y> 2/3 x.
To write this in standard form, we start by multiplying both sides of the inequality by 3
3y > 2x
3y – 2x >0

Answer choice D

MA.912.A.3.9

20. What is the y-coordinate of the *y*-intercept of the line that passes through the points (–4, –4) and (4, 8)?

$$\frac{8-(-4)}{4-(-4)}=\frac{3}{2} \qquad y=\frac{3}{2}x+b \qquad 8=\frac{3}{2}(4)+b \qquad 8=6+b \qquad 2=b$$

The y-intercept is (0, 2), so therefore the y-coordinate is 2.

Answer: 2

						2

MA.912.A.3.10

21. Which equation represents the line passing through the points (3, 2) and (–9, 6)?

A. $x - 3y = 9$
B. $x + 3y = 9$*
C. $3x - y = -9$
D. $3x + y = 9$

1. Start by finding the slope.
2. Next you can use y = mx + b to find the b, or y intercept.
3. Finally you will put your equation into standard form.

$$m = \frac{6-2}{-9-3} = \frac{4}{-12} = -\frac{1}{3}$$

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

$$2 = -\frac{1}{3}(3) + b$$

$$2 = -1 + b$$

$$3 = b$$

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

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

$$3y = -x + 9$$

$$3y + x = 9$$

$$x + 3y = 9$$

Answer Choice B

MA.912.A.3.10

22. Which equation represents the line passing through the point (4, −16) and is perpendicular to the line $y = -\frac{2}{3}x + 8$?

A. $y = \frac{2}{3}x - 22$

B. $y = -\frac{2}{3}x - 22$

C. $y = -\frac{3}{2}x - 22$

D. $y = \frac{3}{2}x - 22$ *

Perpendicular lines have opposite slopes. Therefore, the line perpendicular to our line (slope -2/3) has a slope of 3/2.
m = 3/2 passes through the point (4, -16)
Plug your information into y = mx + b.
y=3/2 x + b
-16=3/2 (4) + b
-16=6 + b
-22= b
y=3/2 x -22

Answer Choice D

23. A company builds computers. It costs $6,700 to build 10 computers and $12,200 to build 20 computers. Which equation models the cost, C(x), as a linear function of the number of computers built, *x*?

A. C(x) = 550x -1200
B. C(x) = 550x + 1200*
C. C(x) = 1200x - 550
D. C(x) = 1200x + 550

1. Write two ordered pairs from the problem.
2. Find the slope.
3. Use y = mx + b to find the y intercept.
4. Write the equation, replacing y with C(x).

(10, 67,000), (20, 12,200)
$$m = \frac{12200 - 6700}{20 - 10} = \frac{5500}{10} = 550$$
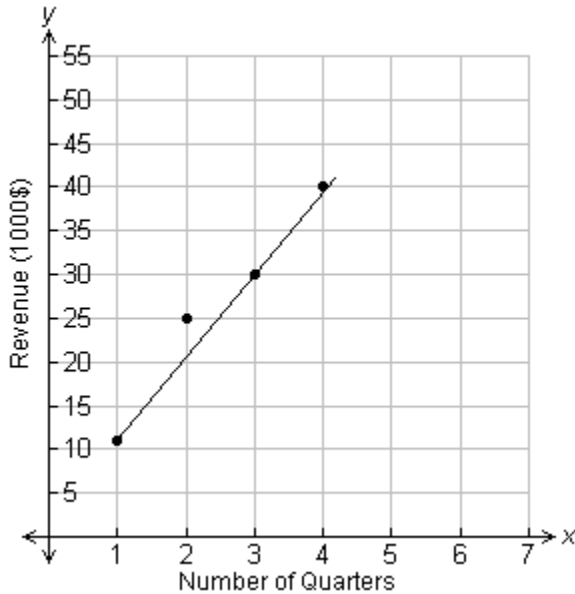$$C(x) = 550x + b$$
$$6700 = 550(10) + b$$
$$6700 = 5500 + b$$
$$1200 = b$$
$$C(x) = 550x + 1200$$

Answer Choice B

MA.912.A.3.11

24. The graph below shows the revenue earned by a company in its first 4 quarters of operation. A line of best fit has been drawn on the graph.

Based on the linear model, how much revenue, in thousands of dollars, should the company earn in its 5th quarter of operation?

Solution: Use two points that the line of best fit passes through to find the slope.

$$m = \frac{y_1 - y_2}{x_1 - x_2}$$

Use points (3, 30) and (4, 40).

$$m = \frac{40 - 30}{4 - 3}$$

$$m = 10$$

Since the question asks for the earnings by the 5th quarter, use (5, y) and (3, 30).

$$10 = \frac{30 - y}{3 - 5}$$

$$10 = \frac{30 - y}{-2}$$

$$-20 = 30 - y$$

$$-50 = -y$$

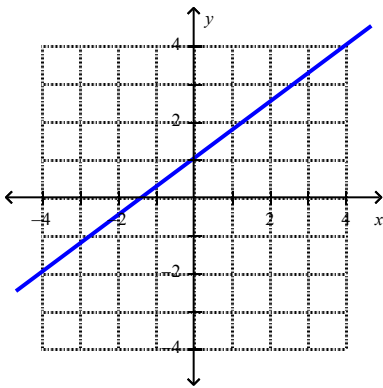$$50 = y$$

Answer: 50. Because the question asks for the amount of revenue in thousands of dollars, the answer only needs to be 50, not 50,000.

5 0

MA.912.A.3.12

25. Which equation represents the graph of the line shown below?

A. $y = -\dfrac{3}{4}x + 1$

B. $y = \dfrac{3}{4}x + 1$ *

C. $y = \dfrac{3}{4}x - 1$

D. $y = -\dfrac{3}{4}x - 1$

The graph has a positive slope (rises from left to right) and has a y intercept of positive one, therefore, B is the only plausible answer choice.

Answer Choice B

MA.912.A.3.13

26. Determine the number of solutions based on the graph for the following system of equations.

2x + 5y = 7
10y = −4x + 14

A. Exactly one solution

B. No solutions

C. Infinitely many solutions *

D. Exactly two solutions

The graphs of these two equations show that they are the same line and therefore, have infinitely many solutions

Answer Choice C

MA.912.A.3.13

27. Which point lies in the solution set for the following system of inequalities?

x − y > 3
x + 2y < 6
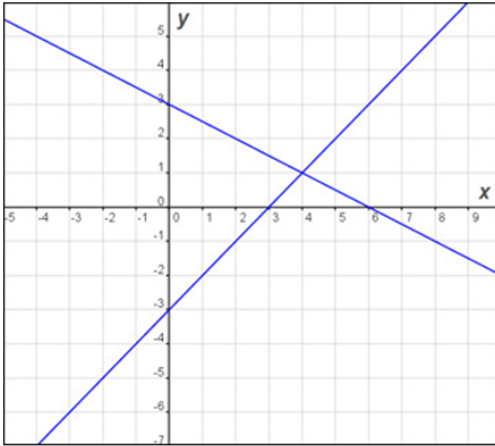
A. (7, 1)

B. (3, 4)

C. (-2, 2)

D. (4, -2) *

When you plug the points in for the x and y, only Answer choice D satisfies both inequalities.

Answer Choice D

M.A.912.A.3.14

28. Which system of equations is represented by the following graph?

A. $x - 2y = 6$
 $x + y = 3$

B. $y = x + 3$
 $y = -\frac{1}{2}x + 3$

C. $y = x - 3$
 $y = \frac{1}{2}x + 3$

D. $x + 2y = 6$ *
 $x - y = 3$

This question may be solved through either using the graph to determine the equation of each line or using the solution to the system of equations, (4,1).

Answer Choice D

M.A.912.A.3.14

29. Determine the value of y for the system of equations.

$x - 3y = 4$
$2x + y = 8$ | 4 |

x-3y=4 Solve the first equation for x by adding 3y to both sides.
x= 3y+4

2(3y+4) +y=8 Substitute (3y + 4) into the other equation for the x value.
6y+8+y=8
7y+8=8
7y=0
y=0

| | | | | | | 0 |

30. An auditorium earned $25,000 in sold-out concert ticket sales. Front section tickets cost $75 per seat and back section tickets cost $50 per seat. The number of front section seats is twice the number of back section seats. How many seats are in the front section?

25000= 75x +50y
Where *x* is the number of front section seats and *y* is the number of back section seats.
x=2y

25000=75(2y) + 50y
25000= 150y+50y
25000=200y
125=y

25000=75x+50(125)
25000=75x + 6250
18750= 75x
250=x

x is the number of front section seats and *x* = 250, therefore there are 250 front section seats.

Answer: 250

				2	5	0

MA.912.A.3.14, MA.912.A.3.15:

31. Sam has a total of 58 DVD's and CD's. If the number of CD's is two more than three times the number of DVD's, how many CD's does he have?

A. 42
B. 14
C. 44 *
D. 12

Let x = the number of CDs and y = the number of DVDs
We know that
x + y = 58
and
x=3y + 2

x+y = 58
(3y+2) + y = 58   Substitute 3y + 2 in for the x.
4y+2 = 58   Combine like terms.
4y = 56   Solve for y.
y = 14

x+14 = 58   Substitute 14 in for the y value.
x= 44   Solve for y.

Sam has 44 CDs.

 Answer Choice C

MA.912.A.4.1

32. The length of each side of a square wooden box, in inches, is represented by the expression $8m^2$. The volume of the box, in cubic inches, is $(8m^2)^3$.

Which simplified expression represents the volume of the box?

A. $8m^6$

B. $24m^5$

C. $512m^5$

D. $512m^6$ *

$(8m^2)^3 = 8^3 m^{2*3} = 8^3 m^6 = 512m^6$

Answer Choice D.

MA.912.A.4.1; MA.912.A.4.2:

33. Easton simplified the following expression:

$(x^2y^6z^5)(x^4y^5z^3)$

If he writes his answer in the form of $x^a y^b z^c$, what is the value of b, the exponent on y?

When multiplying monomials, you need to add their exponents.

$x^{2+4} y^{6+5} z^{5+3}$
$x^6 y^{11} z^8$

The exponent on the y, or b, is 11.

Answer: 11

						1	1

MA.912.A.4.1

34. A film set designer is using white and colored tiles in a pattern to create paths of different lengths. If x is the length of the path in feet, the number of colored tiles needed to make it is calculated using the rule $(3xy)(7xy^2)$, where y represents the number of white tiles.

Which simplified expression represents the number of colored tiles used for a path of length x feet?

A. $21xy^2$

B. $21xy^3$

C. $21x^2y^2$

D. $21x^2y^3$ *

$(3xy)(7xy^2)$

$3*7*x*x*y*y^2$

$21x^2y^3$

Answer Choice D

MA.912.A.4.2

35. A concert hall is in the shape of a rectangle. Its floor has a length of (x + 6) meters and a width of ($2x$ - 3) meters. The expression below represents the area of the floor of the hall in square meters.

(x + 6)($2x$ - 3)

Which of the following simplified expressions represents the area of the floor of the concert hall, in square meters?

A. $2x^2$ + 9x - 18 *

B. $2x^2$ + 15x - 18
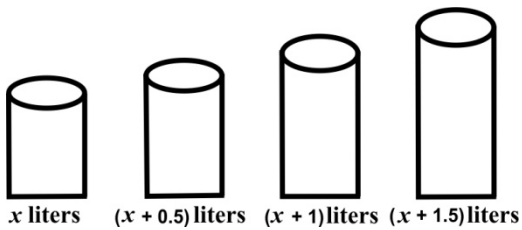
C. x^2 + 15x - 18

D. x^2 + 9x + 18

$(x+6)(2x-3)$
$2x^2 - 3x + 12x - 18$
$2x^2 + 9x - 18$

Answer Choice A

MA.912.A.4.2

36. In a kitchen there are four containers that can hold different quantities of water, as shown in the figure below.

x liters $(x + 0.5)$ liters $(x + 1)$ liters $(x + 1.5)$ liters

How many liters of water can the four containers hold in all?

A. 3

B. $x + 3$

C. $4x + 3$ *

D. $x^4 + 3$

$x + (x+0.5) + (x+1) + (x+1.5)$
$x+x+x+x+0.5+1+1.5$
$4x+3$

Answer Choice C

MA.912.A.4.2

37. A greenhouse that specializes in growing bell peppers is divided into sections. The number of plants in each section depends on the number of sprinklers in that section.

In a section with x sprinklers, there are $3x(x + 3)$ Red bell pepper plants and $(x + 4)^2$ Yellow bell pepper plants.

Which simplified expression represents the total number of Red and Yellow bell pepper plants in a section with x sprinklers?

A. $3x^2 + 17x + 16$

B. $4x^2 + 17x + 16$ *

C. $3x^4 + 17x^2 + 16$

D. $4x^4 + 17x^2 + 16$

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

$3x^2 + 9x + (x + 4)(x + 4)$

$3x^2 + 9x + x^2 + 8x + 16$

$4x^2 + 17x + 16$

Answer Choice B

MA.912.A.4.3

38. Which of the following is equivalent to $16a^2 - 49$?

A. $(4a - 7)(4a - 7)$
B. $(4a + 7)(4a - 7)$ *
C. $(7 - 4a)(7 - 4a)$
D. $(7 + 4a)(7 - 4a)$

$16a^2 - 49$

$(4a)^2 - 7^2$

$(4a + 7)(4a - 7)$

Difference of two squares

Answer Choice B

MA.912.A.4.3

39. Which of the following is equivalent to $48xy^2 + 24xy^4 - 12x^2y^4$?

A. $12xy^2(4 + 2y^2 - xy^2)$ *
B. $12xy^2(4 - 2y^2 + xy^2)$
C. $12xy^2(3 + 2y^2 - xy^2)$
D. $12xy^2(4 - 3y^2 - xy^2)$

The greatest common factor in this expression is $12xy^2$.

Answer choice A

MA.912.A.4.4

40. Assuming $x \neq 0$ and $y \neq 0$, what is the quotient of $\dfrac{12x^6y^2 + 8x^4y^3 + 4x^2y^4}{4x^2y}$?

A. $3x^{12}y^2 + 2x^8y^3 + x^4y^4$
B. $3x^8y^3 + 2x^6y^4 + x^4y^5$
C. $3x^4y + 2x^2y^2 + y^3$ *
D. $3x^3y^2 + 2x^2y^3 + xy^4$

$\dfrac{12x^6y^2}{4x^2y} + \dfrac{8x^4y^3}{4x^2y} + \dfrac{4x^2y^4}{4x^2y}$

$3x^4y + 2x^2y^2 + y^3$

Remember to subtract exponents when dividing.

Answer Choice C

MA.912.A.4.4

41. A wooden garden tray with a base area of *xy* square inches is filled with soil up to a certain height. The tray contains $(x^2y + 10xy^2 + 12xy)$ cubic inches of soil. The height of the tray is represented by the expression

$$\frac{x^2y + 10xy^2 + 12xy}{xy}$$

Which expression below is the correct simplified form of the height of the tray?

A. $11xy + 12$

B. $x + 10y + 12$ *

C. $x + 10xy^2 + 12xy$

D. $x^2y + 10xy^2 + 12$

$$\frac{x^2y}{xy} + \frac{10xy^2}{xy} + \frac{12xy}{xy}$$
$$x + 10y + 12$$

Answer Choice B

MA.912.A.4.3, MA.912.A.5.1

42. If $x \neq 3$, which of the following represents $\dfrac{x^2 - 9}{x^2 - 3x}$ in simplified form?

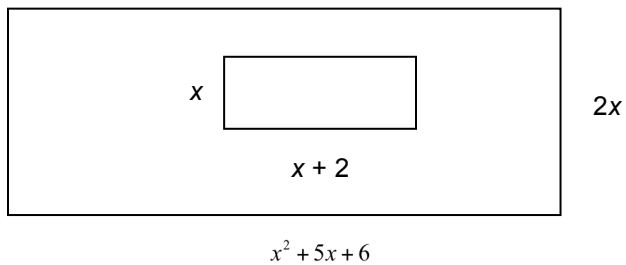A. $1 - \dfrac{3}{x}$

B. $1 + 3x$

C. $\dfrac{x - 3}{x}$

D. $\dfrac{x + 3}{x}$ *

$$\frac{x^2 - 9}{x^2 - 3x} = \frac{(x+3)(x-3)}{x(x-3)} = \frac{x+3}{x}$$

Answer Choice D

MA.912.A.4.3, MA.912.A.5.1

43. Which ratio represents the area of the smaller rectangle compared to the area of the larger rectangle? (Figure not drawn to scale).

x (inner rectangle) $2x$

$x + 2$

$x^2 + 5x + 6$

A. $\dfrac{x}{x+3}$

B. $\dfrac{1}{2(x+3)}$ *

C. $\dfrac{x+2}{x^2+5x+6}$

D. $2x(x+3)$

To find the area, we multiply the length by the width.
We need to set it up in a ratio of small rectangle/large rectangle.

$$\frac{x(x+2)}{2x(x^2+5x+6)} = \frac{x(x+2)}{2x(x+3)(x+2)} = \frac{1}{2(x+3)}$$

Answer Choice B

MA.912.A.5.4

44. What is the value for x in the proportion $\dfrac{x+8}{5x-2}=\dfrac{3}{8}$?

Cross multiply, then solve for x.

$8x + 64 = 15x - 6$
$70 = 7x$
$10 = x$

Answer: 10

MA.912.A.5.4

45. For what value(s) of x is $\dfrac{2x+3}{5x+3}=\dfrac{2}{5}$?

A. $x = 1$
B. $x = 3$
C. no real numbers *
D. all real numbers

First cross multiply, then solve for x.

$\dfrac{2x+3}{5x+3}=\dfrac{2}{5}$
$5(2x+3) = 2(5x+3)$
$10x + 15 = 10x + 6$
$0x + 15 = 6$
$0x = -9$
$0 = -9$

No real solutions.

Answer Choice C

MA.912.A.6.1, MA.912.A.6.2

46. Assuming $x > 0$, which of these expressions is equivalent to $11\sqrt{245x^3} + 9\sqrt{45x^3}$?

A. $5x\sqrt{104x}$

B. $20\sqrt{290x^6}$

C. $20x\sqrt{290x}$

D. $104x\sqrt{5x}$ *

$11\sqrt{245x^3} + 9\sqrt{45x^3}$

$11\sqrt{49*5x^2*x} + 9\sqrt{9*5*x^2*x}$

$11*7*x\sqrt{5x} + 9*3*x\sqrt{5x}$

$77x\sqrt{5x} + 27x\sqrt{5x}$

$104x\sqrt{5x}$

Answer Choice D

MA.912.A.6.2

47. Assuming $x > 0$, what is the simplified fraction form for $\dfrac{5x\sqrt{3}}{\sqrt{48x^2}}$?
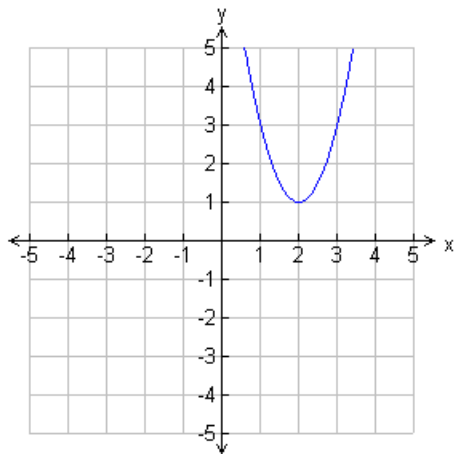
Solution:

$\dfrac{5x\sqrt{3}}{\sqrt{48x^2}}$

$\dfrac{5x\sqrt{3}}{\sqrt{16\cdot3\cdot x\cdot x}}$

$\dfrac{5x\sqrt{3}}{4x\sqrt{3}}$

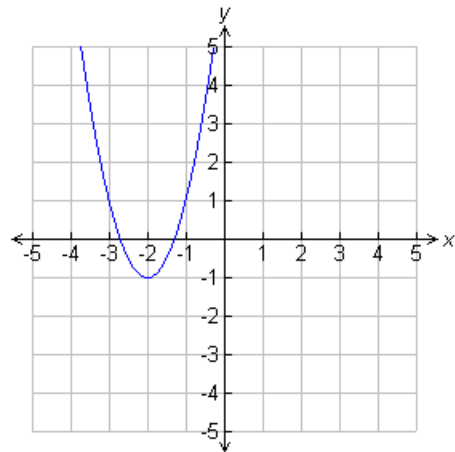$\dfrac{5}{4}$

Answer: 5/4

MA.912.A.7.1

48. Which of these graphs show the quadratic function $y = 2x^2 + 8x + 7$?
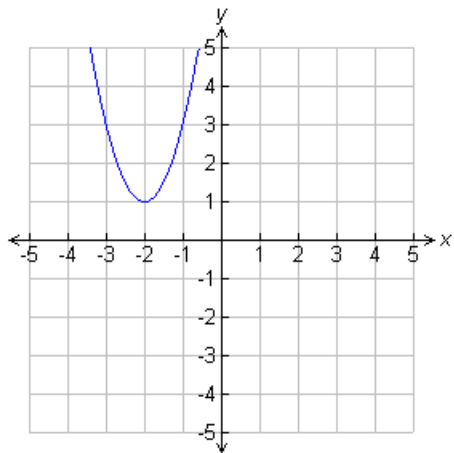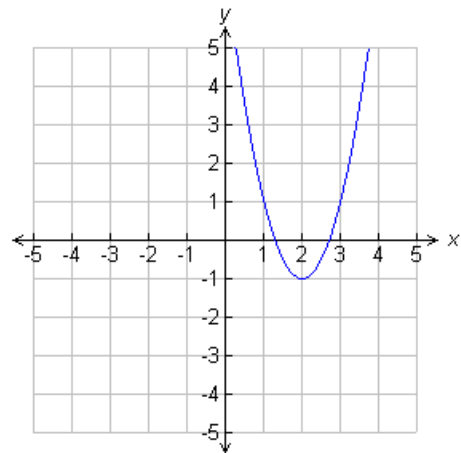
A.

C. *

B.

D.

This equation is a parabola with a vertex at (-2, -1). If solved with the quadratic formula, its solutions are approximately equal to -1.3 and -2.7. These are the x intercepts. The y-intercept is (0, 7) and can be found by substituting 0 in for x. This corresponds to answer choice C.

MA.912.A.7.1

49. Based on the graph of $y = x^2 - 2x - 3$, what is the positive x-intercept?

$0 = x^2 - 2x - 3$
$0 = (x - 3)(x + 1)$
$x - 3 = 0 \quad$ or $\quad x + 1 = 0$
$x = 3 \quad$ or $\quad x = -1$
Answer: 3

						3

MA.912.A.7.2

50. One solution of the equation $3x^2 - 16x + 5 = 0$ is $\dfrac{1}{3}$. What is the other solution?

$3x^2 - 16x + 5 = 0$
$(3x - 1)(x - 5) = 0$
$3x - 1 = 0$
$3x = 1$
$x = \dfrac{1}{3}$
$x - 5 = 0$
$x = 5$

Answer: 5

						5

MA.912.A.1.8, MA.912.A.7.2

51. What are the solutions to $6x^2 = 18x$?

A. $x = 6$, $x = 3$

B. $x = 6$, $x = -3$

C. $x = 0$, $x = -3$

D. $x = 0$, $x = 3$*

$6x^2 = 18x$

$x^2 = 3x$

$x^2 - 3x = 0$

$x(x - 3) = 0$

$x = 0$ or   x-3=0

$x = 0$ or   x = 3

Answer choice D

MA.912.A.7.8

52. The height in meters of a projectile can be modeled by $h = -4.9t^2 + vt + s$ where t is the time (in seconds) the object has been in the air, v is the initial velocity (in meters per seconds) and s is the initial height (in meters). A soccer ball is kicked upward from the ground and flies through the air with an initial vertical velocity of 4.9 meters per second. Approximately, after how many seconds does it land?

$h = -4.9t^2 + vt + s$

$0 = -4.9t^2 + 4.9t + 0$ $0 = t(-4.9t + 4.9)$

$0 = t$ or $0 = -4.9t + 4.9$

$-4.9 = -4.9t$

$t = 1.00\,\text{sec}$

Answer: 1

						1

MA.912.A.7.8

53. A batter hits a baseball upward with an initial speed of 96 feet per second. After how many seconds does the ball hit the ground? Use the formula $h = rt - 16t^2$ where h represents height in feet and r represents the rate in feet per second.

Solution:
$h = rt - 16t^2$
$h = 96t - 16t^2$
$0 = 16t(6 - t)$
$0 = 6 - t$
$6 = t$

Answer: 6

						6

MA.912.A.7.8

54. A company's monthly profit, P, from a product is given by $P = -x^2 + 105x - 1050$, where x is the price of the product in dollars. What is the lowest price of the product, in dollars, that gives a monthly profit of $1550?

Solution:
$P = -x^2 + 105x - 1050$

$1550 = -x^2 + 105x - 1050$

$x^2 - 105x + 2600 = 0$

$(x - 40)(x - 65) = 0$

$x = 40$

$x = 65$

Answer: 40

					4	0

MA.912.D.7.1:

55. The set *S* represents even numbers from 2 to 30.

S = {2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30}

The set *C* represents multiples of 3 from 3 to 30.

C = {3, 6, 9, 12, 15, 18, 21, 24, 27, 30}

How many elements are in the set S ∩ C?

The symbol above represents S intersection C meaning the set of numbers that are in common between S and C. The numbers that S and C have in common are {6, 12, 18, 24, 30} which is 5 elements.

Answer: 5

						5

MA.912.D.7.1:

56. The zip code of a location consists of five digits chosen from the set *Z* shown below.

Z = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}

The set *L* represents the digits in the zip code for Key Largo.

L = {3, 3, 0, 3, 7}

The set *K* represents the digits in the zip code for Killarney.

K = {3, 4, 7, 4, 0}

How many odd numbers are in the set ~(L ∪ K)?

The symbols above represent not L union K meaning not the union of L and K. The union of L and K gives the set {3, 4, 0, 7}. From set Z we see that the values not included in this set are {1, 2, 5, 6, 8, 9}. Of these, {1, 5 ,9} are odd meaning that there are 3 odd numbers in this set.

Answer: 3

						3

MA.912.D.7.2:

57. In a school of 200 students, 80 students are in the band, 160 students are on sports teams, and 60 students participate in both activities. How many students in the school are neither in band nor on a sports team?
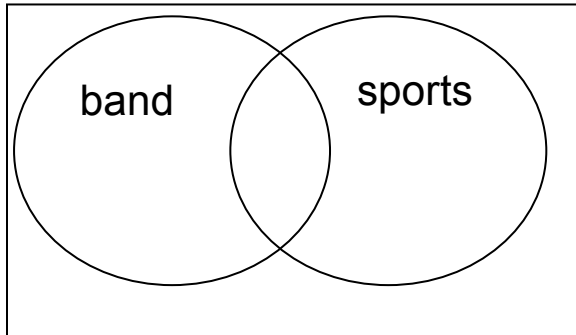
Solution:
If 60 students are in both band and sports, then 20 students are only in band and 100 are only in sports. The total in the 3 categories is 20 + 60 + 100 = 180. That leaves 20 students that are not in either a band or a sport.
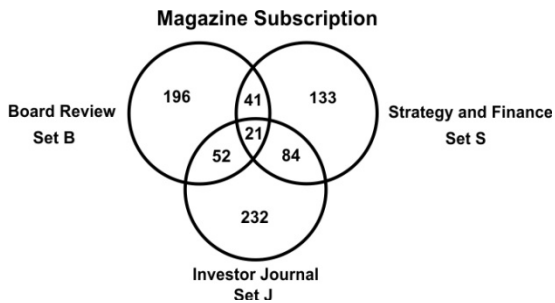
Answer: 20

MA.912.D.7.2:

58. A news agent conducted a survey of business magazine subscribers in a town and found that there was circulation of only three business magazines. He made the Venn diagram below to show the number of subscribers to each of the three magazines: Board Review, Strategy and Finance, and Investor Journal.

Magazine Subscription

How many subscribers belong to the set (~J ∩ S) ∪ B?

A. 484

B. 443 *

C. 422

D. 370

To find a solution to this problem, we must consider one element at a time. We have the intersection of the compliment of J and S which is 133 + 41. We then need the union of this and all of B. B is 196+52+21+41. The 41 value is repeated, so we need only use it once. Therefore, our final result is 133+41+196+52+21=443.

Answer Choice B

MA.912.G.1.4

59. Let c be any constant number. Which of the following will ALWAYS be perpendicular to $-3x + y = 2$?

A. $y = 3x + c$

B. $y = \dfrac{1}{3}x + c$

C. $y = -3x + c$

D. $y = -\dfrac{1}{3}x + c\,*$

$-3x + y = 2$

$y = 3x + 2$

As this line has slope 3, the line perpendicular to it will have a slope of -1/3.

Answer Choice D

MA.912.G.1.4

60. What is the slope of a line that passes through the point (−1, 1) and is parallel to a line that passes through (3, 6) and (1, −2)?

Find the slope of the line using the two points.

$$\frac{-2-6}{1-3} = \frac{-8}{-2} = \frac{4}{1} = 4$$

The slope of a line parallel to a given line must have the same slope.

Answer: 4

						4