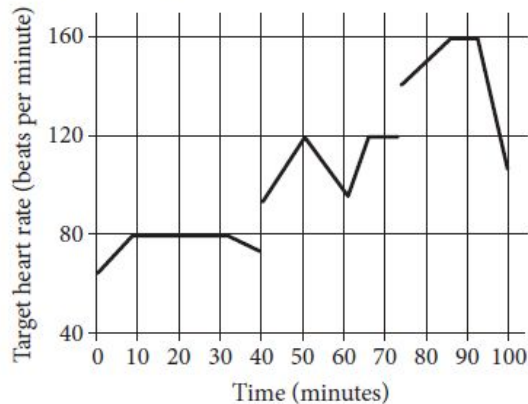# Math-With Calculator

1

John runs at different speeds as part of his training program. The graph shows his target heart rate at different times during his workout. On which interval is the target heart rate strictly increasing then strictly decreasing?

A) Between 0 and 30 minutes
B) Between 40 and 60 minutes
C) Between 50 and 65 minutes
D) Between 70 and 90 minutes

Answer: B

Strictly increasing means we're looking for an interval that starts out with y increasing as x increases (line goes from bottom left corner to top right corner). This eliminates answer choice C and D.

Strictly decreasing means we're looking for the opposite of the above to happen, creating a sharp point where the direction changes. Option A plateaus and stays steady, so eliminate that answer.

This leaves us with choice B.

written by Elise Favia

Problem Solving and Data Analysis

2

If $y = kx$, where k is a constant, and $y = 24$ when $x = 6$, what is the value of y when $x = 5$?

A) 6
B) 15
C) 20
D) 23

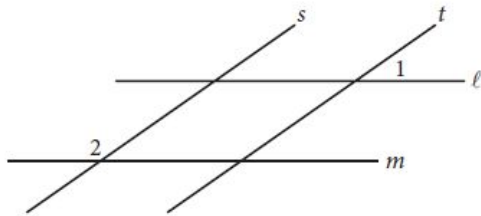Answer: C
Find k:
y=kx
24= k(6)
k=24/6 = 4

plug into equation
y = kx
y=(4)(5) = 20
written by Elise Favia

Problem Solving and Data Analysis

3

In the figure above, lines ℓ and m are parallel and lines s and t are parallel. If the measure of $\angle 1$ is $35°$, what is the measure of $\angle 2$?

A) $35°$

B) $55°$

C) $70°$

D) $145°$

Answer: D

Let's examine the parallelogram created by these lines. That's the enclosed shape in the middle.

If we look at $\angle 1$, which is created by the intersection of *t* and *l*. The angle opposite of angle 1 as the same measurement. Notice that this is the upper right corner of the parallelogram. The angle opposite it in the shape (bottom left corner) will have the same measure.

We have now established that the bottom left angle of the parallelogram is $35°$. Notice this angle is adjacent to $\angle 2$. Adjacent angles that form a line add up to $180°$.

So the measure of $\angle 2 = 180° - 35° = 145°$, which is choice D.

Written by Elise Favia

4

If $16 + 4x$ is 10 more than 14, what is the value of $8x$?

A) 2

B) 6

C) 16

D) 80

Algebra

Answer: C

$16 + 4x = 14 + 10$
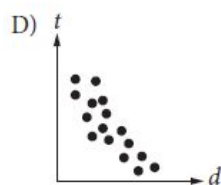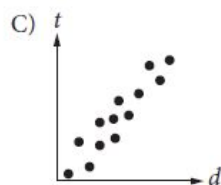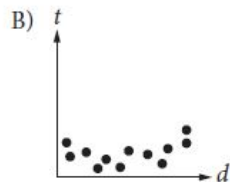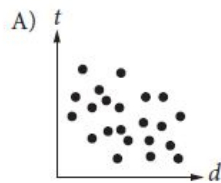$4x = 14 + 10 - 16$
$4x = 24 - 16$
$4x = 8$
$x = 8/4 = 2$

Now plug in the value of x
$8x = 8(2) = 16$, which is choice C

Written by Elise Favia

Heart of Algebra

5

Which of the following graphs best shows a strong negative association between d and t ?

A) t

B) t

C) t

D) t

Answer: D
The best way of approaching a problem like this is through process of elimination.

Choice A has points that are scattered all over the place covering the majority of the graph, which means it shows no association. Eliminate it.

Choice B doesn't have much variation in the t values on the graph, which does not show an association, so eliminate it.

Choice C shows a positive association because the slope is positive (creates a "line" going from bottom left to top right), so eliminate it.

This leaves us with Choice D which in fact shows a negative association because it has a negative slope. This is the correct choice.

Written by Elise Favia

Problem Solving and Data Analysis

6

| 1 decagram = 10 grams |
| 1,000 milligrams = 1 gram |

A hospital stores one type of medicine in 2-decagram containers. Based on the information given in the box above, how many 1-milligram doses are there in one 2-decagram container?

A)   0.002
B)   200
C)   2,000
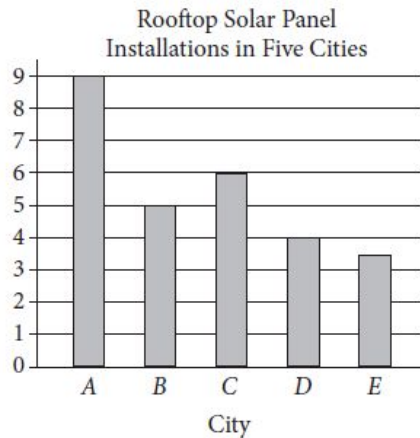D)   20,000

Answer: D

We have 2 decagrams of medicine.

1 decagram = 10 grams
so 2 decagrams = 2*10 = 20 grams

1 gram = 1,000 milligrams
so 20 grams = 20*1,000 = 20,000 milligrams.

Written by Elise Favia

Problem Solving and Data Analysis

7

Rooftop Solar Panel
Installations in Five Cities

The number of rooftops with solar panel installations in 5 cities is shown in the graph above. If the total number of installations is 27,500, what is an appropriate label for the vertical axis of the graph?

A) Number of installations (in tens)
B) Number of installations (in hundreds)
C) Number of installations (in thousands)
D) Number of installations (in tens of thousands)

Answer: C

Add up the number of installations that the graph shows.

City A has 9
City B has 5
City C has 6
City D has 4
City E has 3.5
total = 27.5

but we are told that the total is actually 27,500

27,500/27.5 = 1,000

This means each installation on the graph represents 1,000 installations. In other words, the number of installations is in thousands, which is choice C.

Written by Elise Favia

Problem Solving and Data Analysis

8

For what value of n is $|n - 1| + 1$ equal to 0 ?

A) 0
B) 1
C) 2
D) There is no such value of n.

Answer: D

$|n - 1| + 1 = 0$
$|n - 1| = 0 - 1$
$|n - 1| = -1$

To solve this equation, we need to find an (n-1) that has an absolute value, or distance from 0 of -1. Absolute value is always positive, however, so there is no solution.

Written by Elise Favia

Heart of Algebra

Questions 9 and 10 refer to the following information.

$$a = 1,052 + 1.08t$$

The speed of a sound wave in air depends on the air temperature. The formula above shows the relationship between a, the speed of a sound wave, in feet per second, and t, the air temperature, in degrees Fahrenheit (°F).

9

Which of the following expresses the air temperature in terms of the speed of a sound wave?

A) $t = \dfrac{a - 1,052}{1.08}$

B) $t = \dfrac{a + 1,052}{1.08}$

C) $t = \dfrac{1,052 - a}{1.08}$

D) $t = \dfrac{1.08}{a + 1,052}$

Answer: A

$a = 1,052 + 1.08t$
$a - 1052 = 1.08t$
$\dfrac{a-1052}{1.08} = t$

written by Elise Favia

Passport to Advanced Math

Questions 9 and 10 refer to the following information.

$$a = 1,052 + 1.08t$$

The speed of a sound wave in air depends on the air temperature. The formula above shows the relationship between a, the speed of a sound wave, in feet per second, and t, the air temperature, in degrees Fahrenheit (°F).

10

At which of the following air temperatures will the speed of a sound wave be closest to 1,000 feet per second?

A) −46°F
B) −48°F
C) −49°F
D) −50°F

Answer: B

Use our answer from question 9
$\dfrac{a-1052}{1.08} = t$

$t = \dfrac{1,000 - 1052}{1.08}$

$t = \dfrac{-52}{1.08} = -48.148 \approx -48°F$

Written by Elise Favia

Heart of Algebra

11

Which of the following numbers is NOT a solution of the inequality $3x - 5 \geq 4x - 3$?

A) -1

B) -2

C) -3

D) -5

Answer: A

let's simplify the inequality

$3x - 5 \geq 4x - 3$
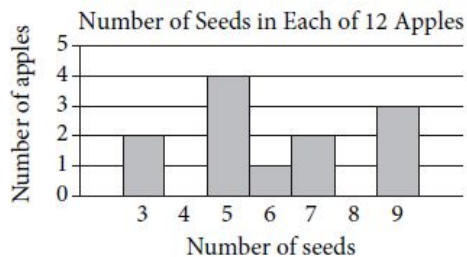$-5 + 3 \geq 4x - 3x$
$-2 \geq x$
$x \leq -2$

$-1 > -2$, so A is our answer

Written by Elise Favia

Heart of Algebra

12

Number of Seeds in Each of 12 Apples

Based on the histogram above, of the following, which is closest to the average (arithmetic mean) number of seeds per apple?

A) 4

B) 5

C) 6

D) 7

Answer: C

We need to find the total number of seeds

Multiply each seed frequency by the number of apples that have that frequency.

2 apples have 3 seeds
4 apples have 5 seeds
1 apple has 6 seeds
2 apples have 7 seeds
3 apples have 9 seeds

$total\ seeds = 2 * 3 + 4 * 5 + 1 * 6 + 2 * 7 * 3 * 9$
$= 6 + 20 + 6 + 14 + 27$
=73

$average = \frac{total\ seeds}{number\ of\ apples} = \frac{73}{12} = 6.08$

This is closest to 6, which is choice C

Written by Elise Favia

Problem Solving and Data Analysis

		Course			
		Algebra I	Geometry	Algebra II	Total
Gender	Female	35	53	62	150
	Male	44	59	57	160
	Total	79	112	119	310

A group of tenth-grade students responded to a survey that asked which math course they were currently enrolled in. The survey data were broken down as shown in the table above. Which of the following categories accounts for approximately 19 percent of all the survey respondents?

A) Females taking Geometry

B) Females taking Algebra II

C) Males taking Geometry

D) Males taking Algebra I

Answer: C

we want 19% of all survey respondents
19% of 310 = .19*310 = 58.9 respondents
The closest whole number to 58.9 is 59
59 Males take geometry, so the answer is C

Written by Elise Favia

Problem Solving and Data Analysis

Lengths of Fish (in inches)

8	9	9	9	10	10	11
11	12	12	12	12	13	13
13	14	14	15	15	16	24

The table above lists the lengths, to the nearest inch, of a random sample of 21 brown bullhead fish. The outlier measurement of 24 inches is an error. Of the mean, median, and range of the values listed, which will change the most if the 24-inch measurement is removed from the data?

A) Mean

B) Median

C) Range

D) They will all change by the same amount.

Answer: C

Let's find the current mean, median, and range.

range = 24-8= 16
median = 12 (find the value in the middle by crossing out values starting from the outside working in)

$mean = \frac{total\ lengths}{number\ of\ fish}$

$mean = \frac{8+3*9+2*10+2*11+4*12+3*13+2*14+2*15+16+24}{21}$

$mean = \frac{262}{21} = 12.476$

Let's do the same without 24
range = 16-8=8
median = 12

$mean = \frac{8+3*9+2*10+2*11+4*12+3*13+2*14+2*15+16}{20}$
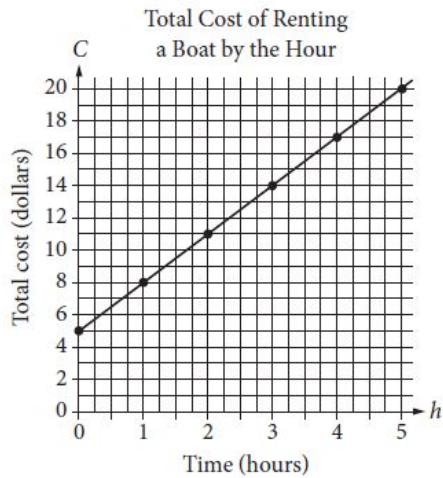
$mean = \frac{238}{20} = 11.9$

You can see that the range changed drastically by 8, the median remained the same, and the mean decreased by less than 1

The answer is range

Written by Elise Favia

Problem Solving and Data Analysis

Questions 15 and 16 refer to the following information.

Total Cost of Renting a Boat by the Hour

The graph above displays the total cost C, in dollars, of renting a boat for h hours.

15

What does the C-intercept represent in the graph?

A) The initial cost of renting the boat
B) The total number of boats rented
C) The total number of hours the boat is rented
D) The increase in cost to rent the boat for each additional hour

Answer: A

C represents cost in dollars

The C-intercept is found when h is 0.

h represents time, so the C-intercept represents the cost in dollars when time is 0 hours, which is the time the boat is rented.

So the C-intercept represents the initial cost of the boat.

Written by Elise Favia

Heart of Algebra

Questions 15 and 16 refer to the following information.

Total Cost of Renting a Boat by the Hour

The graph above displays the total cost C, in dollars, of renting a boat for h hours.

Which of the following represents the relationship between h and C ?

A) $C = 5h$

B) $C = \dfrac{3}{4}h + 5$

C) $C = 3h + 5$

D) $h = 3C$

Answer: C

Let us use point-slope formula: $y - y_1 = m(x - x_1)$

we can use the C-intercept (0,5) for the formula

Let's find the slope by using a second point (1,8)

$m = \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{8-5}{1-0} = \dfrac{3}{1} = 3$

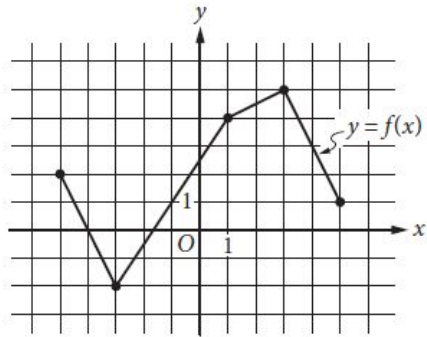using the point-slope formula and the C-intercept

$C - C_1 = m(h - h_1)$

$C - 5 = 3(h - 0)$

$C = 3h + 5$

Written by Elise Favia

Heart of Algebra

17

The complete graph of the function f is shown in the xy-plane above. For what value of x is the value of $f(x)$ at its minimum?

A) −5

B) −3

C) −2

D) 3

Answer: B

The minimum value of this function is -2
This occurs when x is -3

Written by Elise Favia

Problems Solving and Data Analysis

18

$$y < -x + a$$
$$y > x + b$$

In the xy-plane, if $(0, 0)$ is a solution to the system of inequalities above, which of the following relationships between a and b must be true?

A) $a > b$

B) $b > a$

C) $|a| > |b|$

D) $a = -b$

Answer: A

$y < -x + a$ and $y > x + b$

plug in (0,0)
$0 < -0 + a$ and $0 > 0 + b$
$a > 0$ and $0 > b$

a is positive and b is negative,
so $a > b$

written by Elise Favia

Heart of Algebra

19

A food truck sells salads for $6.50 each and drinks for $2.00 each. The food truck's revenue from selling a total of 209 salads and drinks in one day was $836.50. How many salads were sold that day?

A) 77
B) 93
C) 99
D) 105

Answer: B

Let $s = $ *number of salads* and
$d = $ *number of drinks*

total items sold $= s + d$
$s + d = 209$

total revenue $= 6.5s + 2d$
$6.5s + 2d = 836.5$

solve the system of equations
$6.5s + 2d = 836.5$
$-(s + d = 209) * 2$

_____

$4.5s = 418.5$
$s = 93$

we don't need to find d because the problem only asks about salads

Written by Elise Favia

Heart of Algebra

20

Alma bought a laptop computer at a store that gave a 20 percent discount off its original price. The total amount she paid to the cashier was p dollars, including an 8 percent sales tax on the discounted price. Which of the following represents the original price of the computer in terms of p ?

A) $0.88p$

B) $\dfrac{p}{0.88}$

C) $(0.8)(1.08)p$

D) $\dfrac{p}{(0.8)(1.08)}$

Answer: D

$$(0.8)(1.08) * Price_{Original} = p$$

$$Price_{Original} = \frac{p}{(0.8)(1.08)}$$

0.8 = 80% = 20 percent off

8% Tax means payed additional 0.08 to 100 percent

Written by Liam Mulcahy

Problem Solving and Data Analysis

21

Dreams Recalled during One Week

	None	1 to 4	5 or more	Total
Group X	15	28	57	100
Group Y	21	11	68	100
Total	36	39	125	200

The data in the table above were produced by a sleep researcher studying the number of dreams people recall when asked to record their dreams for one week. Group X consisted of 100 people who observed early bedtimes, and Group Y consisted of 100 people who observed later bedtimes. If a person is chosen at random from those who recalled at least 1 dream, what is the probability that the person belonged to Group Y ?

A) $\frac{68}{100}$

B) $\frac{79}{100}$

C) $\frac{79}{164}$

D) $\frac{164}{200}$

Answer: C

We need to find the number of people who recalled at least one dream

$people_{recalled1+} = people_{recalled1to4} + people_{recalled5+}$
$= 39 + 125 = 164$

How many of these people were in group Y?

$Y_{recalled1+} = Y_{recalled1to4} + Y_{recalled5+}$
$= 11 + 68 = 79$

$probability = \frac{Y_{recalled1+}}{people_{recalled1+}} = \frac{79}{164}$

Written by Elise Favia

Problem Solving and Data Analysis

Questions 22 and 23 refer to the following information.

Annual Budgets for Different Programs in Kansas, 2007 to 2010

Program	Year			
	2007	2008	2009	2010
Agriculture/natural resources	373,904	358,708	485,807	488,106
Education	2,164,607	2,413,984	2,274,514	3,008,036
General government	14,347,325	12,554,845	10,392,107	14,716,155
Highways and transportation	1,468,482	1,665,636	1,539,480	1,773,893
Human resources	4,051,050	4,099,067	4,618,444	5,921,379
Public safety	263,463	398,326	355,935	464,233

The table above lists the annual budget, in thousands of dollars, for each of six different state programs in Kansas from 2007 to 2010.

22

Which of the following best approximates the average rate of change in the annual budget for agriculture/natural resources in Kansas from 2008 to 2010 ?

A) $50,000,000 per year
B) $65,000,000 per year
C) $75,000,000 per year
D) $130,000,000 per year

Answer: B

According to the table:
-in 2010, the annual budget for Agriculture/natural resources was 488,106 thousand
-in 2008, the annual budget for Agriculture/natural resources was 358,708 thousand

$$change = 488,106 - 358,708 = 129,398$$

but this was over the span of two years
$$rate\ of\ change\ = \frac{129,398}{2} = 64,699\ thousand$$

The closest answer choice is B 65,000 thousand

written by Elise Favia
Problem Solving and Data Analysis

Questions 22 and 23 refer to the following information.

Annual Budgets for Different Programs in Kansas, 2007 to 2010

Program	Year			
	2007	2008	2009	2010
Agriculture/natural resources	373,904	358,708	485,807	488,106
Education	2,164,607	2,413,984	2,274,514	3,008,036
General government	14,347,325	12,554,845	10,392,107	14,716,155
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Human resources	4,051,050	4,099,067	4,618,444	5,921,379
Public safety	263,463	398,326	355,935	464,233

The table above lists the annual budget, in thousands of dollars, for each of six different state programs in Kansas from 2007 to 2010.

23

Of the following, which program's ratio of its 2007 budget to its 2010 budget is closest to the human resources program's ratio of its 2007 budget to its 2010 budget?

A) Agriculture/natural resources
B) Education
C) Highways and transportation
D) Public safety

Answer: B

Let's round our budgets to make our comparisons easier

Human resources ratio of 2007 to 2010
$\frac{4,051,050}{5,921379} \approx \frac{4,000,000}{6,000,000} = \frac{4}{6} = \frac{2}{3}$

Agriculture resources ratio of 2007 to 2010
$\frac{373,904}{488,106} \approx \frac{400,000}{500,000} = \frac{4}{5}$

Education resources ratio of 2007 to 2010
$\frac{2,164,607}{3,008,036} \approx \frac{2,000,000}{3,000,000} = \frac{2}{3}$

Highways resources ratio of 2007 to 2010
$\frac{1,468,482}{1,773,893} \approx \frac{1,000,000}{2,000,000} = \frac{1}{2}$

Public safety resources ratio of 2007 to 2010
$\frac{263,463}{464,233} \approx \frac{300,000}{500,000} = \frac{3}{5}$

Both human resources and education have a ratio similar to $\frac{2}{3}$, so education is the closest.

written by Elise Favia
Problem Solving and Data Analysis

24

Which of the following is an equation of a circle in the xy-plane with center $(0, 4)$ and a radius with endpoint $\left(\frac{4}{3}, 5\right)$?

A) $x^2 + (y-4)^2 = \dfrac{25}{9}$

B) $x^2 + (y+4)^2 = \dfrac{25}{9}$

C) $x^2 + (y-4)^2 = \dfrac{5}{3}$

D) $x^2 + (y+4)^2 = \dfrac{3}{5}$

Answer: A

The equation for a circle is
$$(x - x_{center})^2 + (y - y_{center})^2 = (radius)^2$$

let's find the $(radius)^2$ by using the distance formula
$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
$$d^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$$
$$r^2 = (\tfrac{4}{3} - 0)^2 + (5 - 4)^2$$
$$r^2 = (\tfrac{4}{3})^2 + (1)^2$$
$$r^2 = \tfrac{16}{9} + 1$$
$$r^2 = \tfrac{16}{9} + \tfrac{9}{9}$$
$$r^2 = \tfrac{25}{9}$$

$$(x - x_{center})^2 + (y - y_{center})^2 = (radius)^2$$
$$(x - 0)^2 + (y - 4)^2 = \tfrac{25}{9}$$
$$x^2 + (y - 4)^2 = \tfrac{25}{9}$$

Written by Elise Favia

25

$$h = -4.9t^2 + 25t$$

The equation above expresses the approximate height h, in meters, of a ball t seconds after it is launched vertically upward from the ground with an initial velocity of 25 meters per second. After approximately how many seconds will the ball hit the ground?

A) 3.5

B) 4.0

C) 4.5

D) 5.0

Answer: D

$$h = -4.9t^2 + 25t$$
the ball hits the ground when the height is 0
$$0 = -4.9t^2 + 25t$$
$$0 = t(-4.9t + 25)$$
$$t = 0 \text{ or } -4.9t + 25 = 0$$
$$-4.9t = -25$$
$$4.9t = 25$$
$$t = \tfrac{25}{4.9} = 5.1$$
the closest answer choice is 5.0

written by Elise Favia

Passport to Advanced Math

26

Katarina is a botanist studying the production of pears by two types of pear trees. She noticed that Type A trees produced 20 percent more pears than Type B trees did. Based on Katarina's observation, if the Type A trees produced 144 pears, how many pears did the Type B trees produce?

A) 115

B) 120

C) 124

D) 173

Answer: B

Type A trees produced 20 percent

More pears than Type B

So: $A = 1.2B$

$\dfrac{A}{1.2} = B$

Therefore: $\dfrac{144}{1.2} = B$

B=120

Problem Solving and Data Analysis

27

A square field measures 10 meters by 10 meters. Ten students each mark off a randomly selected region of the field; each region is square and has side lengths of 1 meter, and no two regions overlap. The students count the earthworms contained in the soil to a depth of 5 centimeters beneath the ground's surface in each region. The results are shown in the table below.

Region	Number of earthworms	Region	Number of earthworms
A	107	F	141
B	147	G	150
C	146	H	154
D	135	I	176
E	149	J	166

Which of the following is a reasonable approximation of the number of earthworms to a depth of 5 centimeters beneath the ground's surface in the entire field?
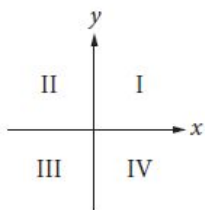
A)   150

B)   1,500

C)   15,000

D) 150,000

Answer: C

107+147+146+1135+149+141+150+154+176+166=2471

Because there are 100 of those squares we multiply by 10

2471x10=24710 which is closest to 15,000 (C)

Problem Solving and Data Analysis
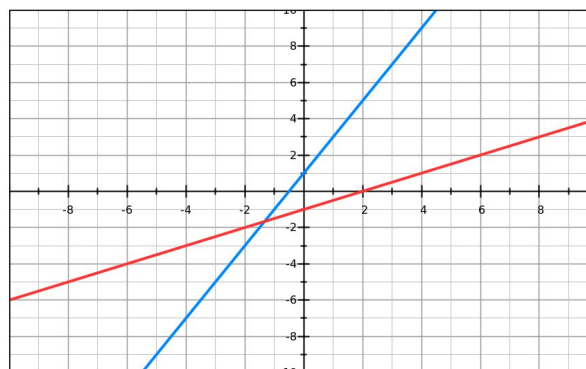
28

y

II | I

III | IV

If the system of inequalities $y \geq 2x + 1$ and

$y > \dfrac{1}{2}x - 1$ is graphed in the xy-plane above, which

quadrant contains no solutions to the system?

A) Quadrant II
B) Quadrant III
C) Quadrant IV
D) There are solutions in all four quadrants.

Answer: C

$y = 2x + 1$

$y = \dfrac{1}{2} - 1$

We are looking for y values

That are above both lines

Quadrant IV is not possible

Heart of Algebra

29

For a polynomial $p(x)$, the value of $p(3)$ is -2.
Which of the following must be true about $p(x)$?

A) $x - 5$ is a factor of $p(x)$.
B) $x - 2$ is a factor of $p(x)$.
C) $x + 2$ is a factor of $p(x)$.
D) The remainder when $p(x)$ is divided
by $x - 3$ is -2.

Answer: D

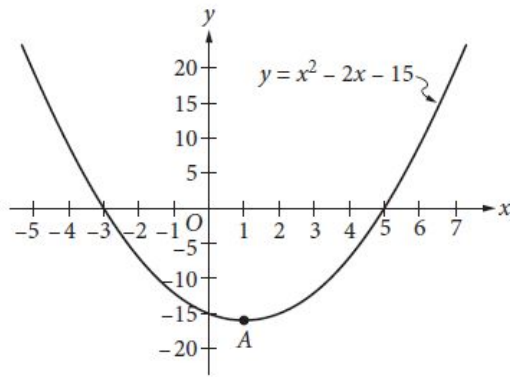The Remainder Theorem states that if and only if $p(x_0) = y$, then

$the\ remainder\ of\ (\dfrac{p(x)}{x - x_0}) = y$

In this case,

$p(3) = -2$ so $the\ remainder\ of\ (\dfrac{p(x)}{x-3}) = -2$

written by Elise Favia

Passport to Advanced Math

30

Which of the following is an equivalent form of the equation of the graph shown in the *xy*-plane above, from which the coordinates of vertex *A* can be identified as constants in the equation?

A) $y = (x+3)(x-5)$

B) $y = (x-3)(x+5)$

C) $y = x(x-2) - 15$

D) $y = (x-1)^2 - 16$

Answer: D

$y = x^2 - 2x - 15$

let's use a method called completing the square

$x^2 - 2x$ + what will allow us to factor?

1

break apart -15 into 1-16

$y = x^2 - 2x + 1 - 16$

$y = (x-1)^2 - 16$

written by Elise Favia

Passport to Advanced Math

31

Wyatt can husk at least 12 dozen ears of corn per hour and at most 18 dozen ears of corn per hour. Based on this information, what is a possible amount of time, in hours, that it could take Wyatt to husk 72 dozen ears of corn?

Answer: Any number between 4-6, inclusive

the greatest amount of time is when Wyatt husks the fewest ears of corn per hour.

$t = \frac{total\ corn}{ears\ per\ hour} = \frac{72}{12} = 6$

the least amount of time is when Wyatt husks the most ears of corn per hour.

$t = \frac{total\ corn}{ears\ per\ hour} = \frac{72}{18} = 4$

so it can take Wyatt 4-6 hours to husk 72 dozen ears of corn. Respond with any number between 4-6, inclusive

Written by Elise Favia

Heart of Algebra

32

The posted weight limit for a covered wooden bridge in Pennsylvania is 6000 pounds. A delivery truck that is carrying x identical boxes each weighing 14 pounds will pass over the bridge. If the combined weight of the empty delivery truck and its driver is 4500 pounds, what is the maximum possible value for x that will keep the combined weight of the truck, driver, and boxes below the bridge's posted weight limit?
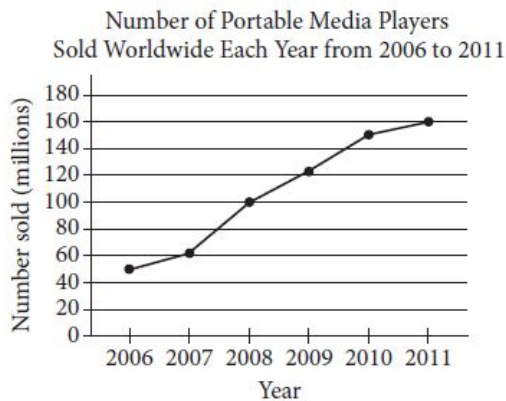
Answer: 107

$$6000 - 4500 = 1500$$

$$\frac{1500}{14} = 107.14$$

Since boxes must be identical x=107

Heart of Algebra

33

Number of Portable Media Players
Sold Worldwide Each Year from 2006 to 2011

According to the line graph above, the number of portable media players sold in 2008 is what fraction of the number sold in 2011 ?

Answer: ⅝ or 0.625

The number sold in 2008 is 100 million

The number sold in 2011 is 160 million

$$\frac{number\ sold\ in\ 2008}{number\ sold\ in\ 2011} = \frac{100}{160} = \frac{10}{16} = \frac{5}{8}$$

written by Elise Favia

Problem Solving and Data Analysis

34

A local television station sells time slots for programs in 30-minute intervals. If the station operates 24 hours per day, every day of the week, what is the total number of 30-minute time slots the station can sell for Tuesday and Wednesday?
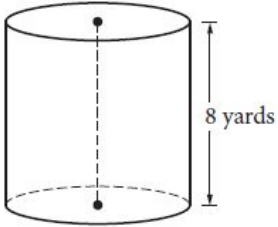
Answer: 96

Tuesday and Wednesday gives us two days a week to look at

2*24 hours = 48 hours

but the times slots are in 30-min intervals which means 2 slots every hour

	48 hours * 2 slots each = 96 slots
	written by Elise Favia
	Problem Solving and Data Analysis

35 A dairy farmer uses a storage silo that is in the shape of the right circular cylinder above. If the volume of the silo is 72π cubic yards, what is the <u>diameter</u> of the base of the cylinder, in yards?	Answer: 6 The formula for volume of cylinder is $$v = \pi r^2 h$$ $$72\pi = \pi r^2 (8)$$ $$9\pi = \pi r^2$$ $$9 = r^2$$ $$r = 3$$ $$d = 2r = 2(3) = 6$$ written by Elise Favia

36 $$h(x) = \frac{1}{(x-5)^2 + 4(x-5) + 4}$$ For what value of x is the function h above undefined?	Answer: 3 we need to figure out when $$(x-5)^2 + 4(x-5) + 4 = 0$$ since dividing by 0 produces undefined $$(x-5)^2 + 4(x-5) + 4 = 0$$ $$x^2 - 10x + 25 + 4x - 20 + 4 = 0$$ $$x^2 - 6x + 9 = 0$$ $$(x-3)^2 = 0$$ $$x = 3$$ Written by Elise Favia Passport to Advanced Math

Questions 37 and 38 refer to the following information.

Jessica opened a bank account that earns 2 percent interest compounded annually. Her initial deposit was $100, and she uses the expression $\$100(x)^t$ to find the value of the account after t years.

37

What is the value of x in the expression?

Answer: 1.02

Every year, Jessica receives .02 of her current balance as interest

$next\ balance = balance + balance * .02$
$next\ balance = balance(1 + .02)$
$next\ balance = 1.02 * balance$

so every year, we multiply by 1.02
$balance = 100(1.02)^t$

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Passport to Advanced Math

Questions 37 and 38 refer to the following information.

Jessica opened a bank account that earns 2 percent interest compounded annually. Her initial deposit was $100, and she uses the expression $\$100(x)^t$ to find the value of the account after t years.

38

Jessica's friend Tyshaun found an account that earns 2.5 percent interest compounded annually. Tyshaun made an initial deposit of $100 into this account at the same time Jessica made a deposit of $100 into her account. After 10 years, how much more money will Tyshaun's initial deposit have earned than Jessica's initial deposit? (Round your answer to the nearest cent and ignore the dollar sign when gridding your response.)

Answer: 6.11

Jessica's balance can be found using
$balance = 100(1.02)^t$

Tyshaun's balance can be found using
$balance = 100(1.025)^t$

we are given $t = 10$
$Jessica's\ balance = 100(1.02)^{10} \approx 121.90$
$Tyshaun's\ balance = 100(1.025)^{10} \approx 128.01$

$Tyshaun's - Jessica's = 121.9 - 128.01 = 6.11$

written by Elise Favia

Passport to Advanced Math