

MCAS ALGEBRA  
REVIEW  
MCAS Geometry  
REVIEW

Name: \_\_\_\_\_

You may not use a calculator on this page!

- 1 A farmer harvested a total of 364 pumpkins. The pumpkins had an average weight of 10.9 pounds. Which of the following is closest to the total weight, in pounds, of the pumpkins the farmer harvested?

- A. 3,000  
B. 3,300  
C. 4,000  
D. 4,400

(C)

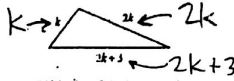
- 2 Which of the following integers is closest to the value of the expression below?

$$\sqrt{10^2 - 3^2}$$

- A. 2  
B. 5  
C. 9  
D. 11

(C)

- 3 The dimensions of a triangle, in units, are represented by expressions, as shown in the diagram below.

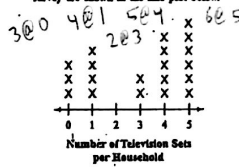


Which of the following expressions represents the perimeter, in units, of the triangle?

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

(D)

- 4 Ashley surveyed 20 people at random about the number of television sets in their households. The results of her survey are shown in the line plot below.



Based on the line plot, what is the mean number of television sets per household?

- A. 2  
B. 3  
C. 4  
D. 5

(B)

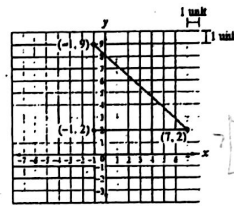
0  
4  
6  
20  
20

60 TV'S TOTAL  
20 HOUSEHOLDS

3 TV'S PER  
1 HOUSE

You may not use a calculator on this page!

- 11 A triangle is shown on the coordinate plane below.



What is the area of the triangle?

- A. 21 square units  
B. 26 square units  
C. 28 square units  
D. 56 square units

(C)

- 12 The bowling scores for 9 friends are shown in the box below.

110	62	80
132	126	194
95	78	95

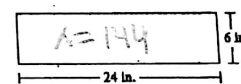
The mean score is 108 and the median score is 95. Which statement best explains why the mean score is greater than the median score?

- A. The score of 95 occurs twice.  
B. The data set includes only a few scores.  
C. The minimum score is well below the other scores.  
D. The maximum score is well above the other scores.

62  
78  
80  
95  
95 ← AVG 108  
110  
126  
132  
194 ← wow!

(D)

- 13 The diagram below shows a rectangle and its dimensions.



A square has the same area as the rectangle. What is the length of each side of the square?

- A. 12 in.  
B. 15 in.  
C. 30 in.  
D. 36 in.

(A)

- 14 Jaya is buying a new car that has a price of \$28,495. She is required to pay a sales tax that is 6.25% of the car's price. Which of the following estimates is closest to the amount of sales tax Jaya will pay for the car?

- A. \$1,200  
B. \$1,400  
C. \$1,800  
D. \$2,100

(C)

KEY

(2)

(1)

You may use a calculator on this page!

22. Hooke's law states that the force needed to stretch a spring varies directly with the length the spring is stretched.  
A force of 20 newtons will stretch a spring 5 centimeters. What is the total number of centimeters that a force of 60 newtons will stretch the same spring?

- A. 15  
B. 20  
C. 100  
D. 240

$$y = kx$$

$$5 = k(20)$$

$$\frac{1}{4} = k$$

$$y = \frac{1}{4}(60)$$

$$y = 15$$

$$\frac{S}{20} = \frac{x}{60}$$

$$20x = 300$$

$$x = 15$$

23. The table below shows the numbers of televisions sold at a store in different price ranges last month.

Price Range	Number of Televisions
\$100-\$149	8
\$150-\$199	3
\$200-\$249	5
\$250-\$299	4
\$300-\$349	1

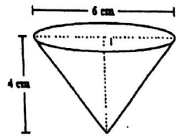
Which of the following could be the median price of the televisions sold at the store last month?

- A. \$140  
B. \$180  
C. \$210  
D. \$240

Median

100-149  
100-149  
100-149  
100-149  
100-149  
100-149  
100-149  
100-149  
150-199  
150-199  
150-199  
200-249  
200-249  
200-249  
200-249  
200-249  
250-299  
250-299  
250-299  
250-299  
300-349

24. A right circular cone and some of its measurements are shown in the diagram below.



Based on the diagram, which of the following is closest to the volume of the cone?

- A. 13 cm<sup>3</sup>  
B. 38 cm<sup>3</sup>  
C. 115 cm<sup>3</sup>  
D. 151 cm<sup>3</sup>

$$V = \frac{1}{3}Bh$$

$$= \frac{1}{3}(9\pi)(4)$$

$$= 12\pi$$

25. In the equation below,  $k$  and  $m$  represent rational numbers.

$$km = 1$$

Which of the following must be true?

- A. either  $k$  or  $m$  is equal to 1  
B.  $k$  and  $m$  are both less than 0  
C.  $k$  is the multiplicative inverse of  $m$   
D.  $k$  and  $m$  are both the same distance from 0 on a number line

You may use a calculator on this page!

26. The radius of a large sphere is 8 times the radius of a small sphere.  
The surface area of the large sphere is how many times the surface area of the small sphere?

- A. 8  
B. 32  
C. 64  
D. 512

$$r = 1$$

$$SA = 4\pi r^2$$

$$= 4\pi(1)^2 = 4\pi$$

$$r = 8$$

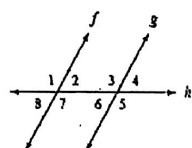
$$SA = 4\pi(8)^2 = 256\pi$$

$$= 64 \times 4\pi$$

WHICH DIAGRAM SHOWS TRIANGLE PQR TRANSLATED 4 UNITS UP AND THEN REFLECTED OVER THE Y-AXIS?

27. On a coordinate grid, triangle PQR is translated 4 units up and then reflected over the y-axis to form triangle P'Q'R'. Which diagram could show triangle PQR, and the location of triangle P'Q'R' after the transformation?

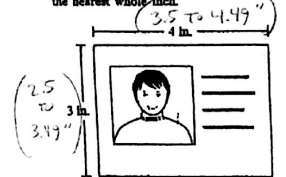
28. In the diagram below, line  $h$  is a transversal of lines  $f$  and  $g$ .



Which of the following relationships proves that lines  $f$  and  $g$  are parallel?

- A.  $\angle 1 \cong \angle 4$   
B.  $\angle 1 \cong \angle 5$   
C.  $\angle 1 \cong \angle 6$   
D.  $\angle 1 \cong \angle 7$

29. In the diagram below, the dimensions of a student ID card are shown rounded to the nearest whole-inch.



Which of the following could be the actual area, in square inches, of the front of the card?

- A. 8  
B. 8.5  
C. 15.5  
D. 16

MIN:  $(2.5)(3.5)$   
AREA = 8.75

MAX:  $(3.49)(4.49)$   
AREA = 15.67

You may use a calculator on this page!

38. A rectangle has a length of 15 centimeters and a width of 8 centimeters.

Which of the following is closest to the radius of a circle that has an area equal to the area of the rectangle?

- A. 3 centimeters
- B. 6 centimeters
- C. 11 centimeters
- D. 19 centimeters

(B)

$$A = 120$$

$$15$$

$$\pi r^2 = 120$$

$$r^2 = \frac{120}{\pi}$$

$$r = 6.18$$

39. The first four terms of a quadratic sequence are shown below.

6, 9, 14, 21, ...

What is the difference between the 5th term and the 6th term of the quadratic sequence?

- A. 3
- B. 7
- C. 11
- D. 13

(C)

1st	6	+3	
2nd	9	+5	+2
3rd	14	+7	+2
4th	21	+9	+2
5th	30	+11	+2
6th	41		

40. Which of the following figures has 90° rotational symmetry?



(D)

41. A student is knitting sweaters to give as gifts. The time it takes the student to knit each sweater is 10% less than the time it took the student to knit each previous sweater. It took the student 14 hours to knit the first sweater.

Which of the following is closest to the time it will take the student to knit the third sweater?

- A. 10.2 hours
- B. 11.3 hours
- C. 12.6 hours
- D. 16.9 hours

(B)

$$14$$

$$-1.4$$

$$\hline 12.6$$

$$12.6$$

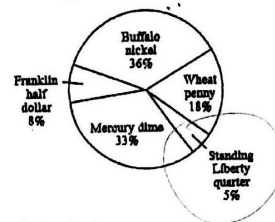
$$-1.26$$

$$\hline 11.34$$

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42. The circle graph below shows the percentages of the types of coins in a collection.

Types of Coins in Collection

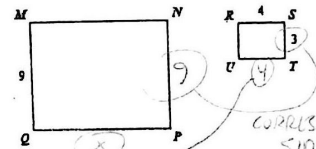


There are 700 coins in the collection. What is the total number of Standing Liberty quarters in the collection?

$$(700)(.05) = 35$$

THIRTY FIVE STANDING LIBERTY QUARTERS

43. In the diagram below, rectangle MNPQ is similar to rectangle RSTU.



Based on the given dimensions, what is the length of  $\overline{QP}$ ?

$$\frac{9}{3} = \frac{x}{4}$$

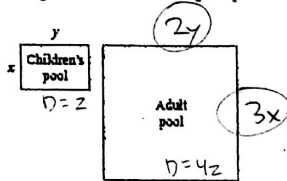
$$3x = 36$$

$$x = 12$$

3=1 RATIO

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- 21 The children's pool and the adult pool in a recreation center are both in the shape of right rectangular prisms. In the diagram below, the two rectangles represent the children's pool and the adult pool.



Define  $x$  and  $y$  as follows:

- $x$  = the width, in yards, of the children's pool
- $y$  = the length, in yards, of the children's pool

- a. Write an expression using  $x$  and  $y$  to represent the area of the children's pool.

$A = xy$

The adult pool has the following measurements:

- The width of the adult pool is 3 times the width of the children's pool.
- The length of the adult pool is 2 times the length of the children's pool.

- b. Write an expression using  $x$  and  $y$  to represent the area of the adult pool.

$A = 6xy$  or  $A = 3x \cdot 2y$

- c. What is the ratio of the area of the children's pool to the area of the adult pool? Show or explain how you got your answer.

$1 = 6$  ( $A = xy$  vs.  $A = 6xy$ )

Both of the pools will be filled with water. The depth of the adult pool is 4 times the depth of the children's pool.

- d. What is the ratio of the volume of water in the children's pool to the volume of water in the adult pool? Show or explain how you got your answer.

$V = xyz$  CHILDREN'S  
 $V = (3x)(2y)(4z)$  ADULT  
 $1 = 24$   
 $V = 24xyz$

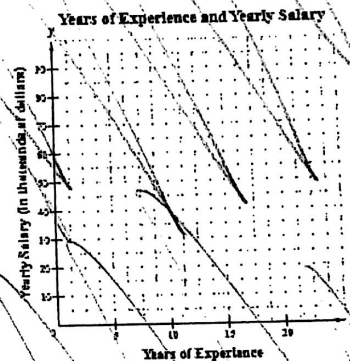
You may not use a calculator on this page!

- 21 The table below shows the number of years of work experience and the yearly salary, in thousands of dollars, of 8 people who have the same job.

Years of Experience and Yearly Salary

Years of Experience, $x$	0	0	5	5	10	10	20	25
Yearly Salary, $y$ (in thousands of dollars)	15	30	35	40	50	55	70	75

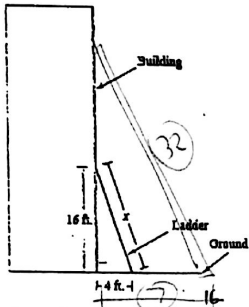
On the grid in your Student Answer Booklet, copy the title, the axes, and the labels exactly as shown below.



- a. On the grid you copied into your Student Answer Booklet, make a scatterplot using the data from the table.
- b. Draw a line of best fit for the data on the scatterplot you made in part (a).
- c. Use the line of best fit you drew in part (b) to predict the yearly salary, in thousands of dollars, for a person who has the same job and 13 years of work experience. Show or explain how you got your answer.
- d. Write an equation that represents the line of best fit you drew on the scatterplot. Show or explain how you got your answer.

You may use a calculator on this page!

- 11 A ladder is leaning against the side of an office building, as shown in the diagram below.



The top of the ladder reaches a point on the building that is 16 feet above the ground. The bottom of the ladder is 4 feet from the base of the building.

- a. Write an equation that could be used to find  $x$ , the length in feet of the ladder.

$$x = \sqrt{16^2 + 4^2}$$

- b. Use the equation you wrote in part (a) to find  $x$ , the length, to the nearest tenth of a foot, of the ladder. Show or explain how you got your answer.

$$x = 16.5 \text{ feet}$$

A second ladder that is 32 feet in length will be leaned against the same building. The bottom of the second ladder will be placed 7 feet from the base of the building.

- c. What is the height, to the nearest tenth of a foot, of the point the top of the second ladder will reach on the building? Show or explain how you get your answer.

$$x = \sqrt{32^2 - 7^2}$$

$$x = 31.2 \text{ feet}$$



$$x^2 + 7^2 = 32^2$$

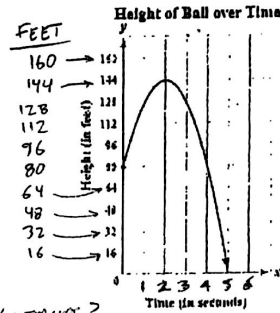
$$x^2 = 32^2 - 7^2$$

$$x = \sqrt{32^2 - 7^2}$$

$$x = 31.2$$

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- 12 The graph below represents  $y$ , the height in feet of a ball,  $x$  seconds after the ball was thrown upward from a bridge that crosses a river.



WHAT'S THE Y-INTERCEPT?

- a. What is the  $y$ -intercept of the graph? Show or explain how you get your answer.
- b. What does the  $y$ -intercept represent in the context of this situation? WHAT DOES IT REPRESENT?
- c. After how many seconds did the ball reach its maximum height? Show or explain how you got your answer. HOW LONG DOES IT TAKE TO REACH MAX. HEIGHT?
- d. What is the maximum height, in feet, the ball reached? Show or explain how you got your answer. WHAT IS THE MAX HEIGHT?
- e. After how many seconds did the ball reach the surface of the river? Show or explain how you got your answer. HOW LONG DOES IT TAKE TO REACH THE SURFACE OF THE RIVER?

PART A: 16 feet

PART B: 16 REPRESENTS THE STARTING HEIGHT OF THE BALL UP ON THE BRIDGE BEFORE IT IS THROWN UPWARD.

PART C: IT TAKES 2 SECONDS TO REACH MAX. HEIGHT. (THAT'S THE X-COORDINATE OF THE VERTEX.)

PART D: THE BALL APPEARS TO REACH A MAXIMUM HEIGHT OF 144 FEET ACCORDING TO THE GRAPH.

PART E: THE BALL APPEARS TO REACH THE RIVER'S SURFACE AT 5 SECONDS

Name: \_\_\_\_\_  
 You may not use a calculator on this page!

6. The dimensions of a triangle, in units, are represented by expressions, as shown in the diagram below.

Which of the following expressions represents the perimeter, in units, of the triangle?

A.  $3x + 3$   
 B.  $6x + 1$   
 C.  $4x + 3$   
 D.  $3x - 3$

7. Which of the following is not a solution of the equation below?

$$3x^2 - 11x(x-2) = 0$$

A.  $x = 0$   
 B.  $x = 1$   
 C.  $x = 2$   
 D.  $x = 3$

$3x(x-1)(x-2) = 0$   
 $3x = 0 \quad x-1 = 0 \quad x-2 = 0$   
 $x = 0 \quad x = 1 \quad x = 2$

(D)

8. WHICH HAS AN X-INTERCEPT OF -2?

Which of the following graphs represents a line that has an x-intercept of -2?

(A)

MCAS Algebra

9. Which of the following graphs represents the solution of the system of inequalities below?

$$y < x - 2$$

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

WHICH GRAPH IS A SOLUTION TO THE SYSTEM:

You may not use a calculator on this page!

10. A linear equation is shown below.

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

What is the value of x when  $y = \frac{2}{3}$ ?

A.  $3\frac{1}{2}$   
 B.  $3\frac{1}{4}$   
 C.  $1\frac{1}{2}$   
 D.  $1\frac{1}{9}$

$\frac{2}{3} = \frac{2}{3}x + 2$   
 $-\frac{2}{3} = \frac{2}{3}x - 2$   
 $(\frac{5}{3}) \cdot \frac{3}{2} = \frac{2}{3}x \cdot (\frac{3}{2})$   
 $\frac{5}{2} = x$  (or  $1\frac{1}{2}$ )

11. If  $y \neq 0$ , which of the following is equivalent to the expression below?

$$\frac{15y^3}{5y^2}$$

A.  $3y^3$   
 B.  $3y^5$   
 C.  $10y^3$   
 D.  $10y^5$

(B)

10. A linear equation is shown below.

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

What is the value of x when  $y = \frac{2}{3}$ ?

A.  $3\frac{1}{2}$   
 B.  $3\frac{1}{4}$   
 C.  $1\frac{1}{2}$   
 D.  $1\frac{1}{9}$

(C)

13. Which of the following is equivalent to the expression below?

$$-2(x-5)$$

A.  $-2x - 5$   
 B.  $-2x + 5$   
 C.  $-2x - 10$   
 D.  $-2x + 10$

(D)

15. One solution of the quadratic equation below is  $x = -2$ .

$$x^2 + 3x + 2 = 0$$

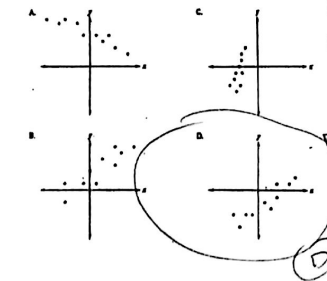
What is the other solution of the quadratic equation?

$(x+2)(x+1) = 0$   
 $x+2 = 0 \quad x+1 = 0$   
 $x = -2 \quad x = -1$

JANICE NOTICED THE POSTERS ON HER WALL ALWAYS HAD HEIGHTS GREATER THAN THEIR WIDTHS. WHICH SCATTERPLOT COULD REPRESENT THE DIMENSIONS OF HER POSTERS?

You may use a calculator on this page!

TOMAS MADE A SCATTERPLOT OF SOME DATA. HE DETERMINED THE Y-INTERCEPT OF THE LINE OF BEST FIT IS NEGATIVE.



WHICH COULD BE THE SCATTERPLOT?

Which of the following equations is true for all rational number values of x, y, and z?

- A.  $x(y+z) = (y+z)x$
- B.  $x(y+z) = (x+y)x$
- C.  $x(y+z) = xy+z$
- D.  $x(y+z) = (xy)(xz)$

(A)

Ben researched the population of his town for each of the last ten years. He created a scatterplot of the data and noticed that the population increased by about the same amount each year. Ben will determine the equation of the line of best fit for his data.

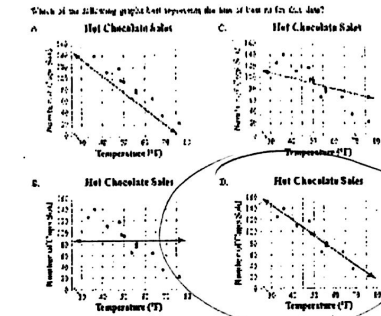
- A. The slope is zero.
- B. The slope is positive.
- C. The slope is negative.
- D. The slope is undefined.

(B)

The scatterplot below shows the relationship between the temperature in degrees Fahrenheit at a football game and the number of cups of hot chocolate sold during the game.



WHICH GRAPH SHOWS THE LINE OF BEST FIT?



(D)

(13)

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Ms. Culjak is giving her students their scores on the last math test. She provides each student with an expression that has a value equal to the number of points the student scored on the test. Leo must score a minimum of 80 points on the test to maintain a B in the class. The expression below represents the number of points Leo scored on the test.

$$4 \cdot 6 + 3 + 3(2-6)^2 \quad 4 \cdot 6 + 3 + 5(2-6)^2$$

a. Did Leo score enough points to maintain a B in the class? Show your work or explain how you got your answer.

$$24 + 3 + 5(-4)^2 \quad 24 + 3 + 5(16) \quad 24 + 3 + 80 = 107 \text{ points (Yes)}$$

Gerard estimates that he scored 90 points on the test. The expression below represents the actual number of points Gerard scored on the test.

$$9 + 8[4 + 2(3-5)^2] - 3 \cdot 4 \quad 9 + 8[4 + 2(3-5)^2] - 3 \cdot 4$$

b. What is the difference between Gerard's estimate and the actual number of points he scored on the test? Show your work or explain how you got your answer.

$$93 - 90 = 3 \text{ points}$$

Tia was given the expression below to represent the number of points she scored on the test.

$$\frac{26 - 10 \cdot 10 - 8}{8 \div 4} \quad \frac{26 - 10 \cdot 10 - 8}{8 \div 4}$$

c. Tia claims that the expression cannot represent the number of points she scored on the test. Explain why Tia's claim is correct.

$$\frac{26}{8 \div 4} = -41 \text{ (SCORE IS NEGATIVE)}$$

Ms. Culjak confirms that Tia's claim is correct. She says Tia's expression is missing one set of parentheses. Ms. Culjak also says that Tia scored 76 points on the test.

d. In your Student Answer Booklet, copy Tia's expression and insert one set of parentheses in the expression so that the value of the expression is 76.

$$\frac{26 - 10 \cdot 10 - 8}{8 \div 4} = 76$$

$$\frac{26 - 10 \cdot 10 - 8}{2} = 76.2$$

$$(26 - 10) \cdot 10 - 8 = 152$$

$$16 \cdot 10 - 8 = 152$$

$$160 - 8 = 152$$

$$152 = 152$$

Part D:

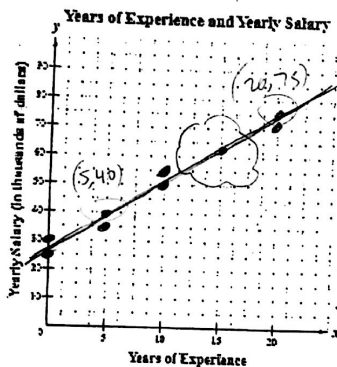
$$\frac{(26 - 10) \cdot 10 - 8}{8 \div 4}$$

You may not use a calculator on this page!

- 21 THE TABLE SHOWS # OF YEARS OF WORK EXPERIENCE & YEARLY SALARY.  
 The table below shows the number of years of work experience and the yearly salary, in thousands of dollars, of 6 people who have the same job.

Years of Experience, x	0	0	5	5	10	10	20	20
Yearly Salary, y (in thousands of dollars)	25	30	35	40	50	55	70	75

On the grid in your Student Answer Booklet, copy the title, the axes, and the labels exactly as shown below.



- a. On the grid you copied into your Student Answer Booklet, make a scatterplot using the data from the table. **MAKE A SCATTERPLOT**
- b. Draw a line of best fit for the data on the scatterplot you made in part (a). **DRAW A LINE OF BEST FIT**
- c. Use the line of best fit you drew in part (b) to predict the yearly salary, in thousands of dollars, for a person who has the same job and 15 years of work experience. Show or explain how you got your answer. **PREDICT THE SALARY FOR 15 YEARS OF WORK EXPERIENCE**
- d. Write an equation that represents the line of best fit you drew on the scatterplot. Show or explain how you got your answer. **WRITE AN EQUATION FOR YOUR LINE OF BEST FIT**

PART C = 60-65 THOUSAND \$ PER YEAR (MAYBE \$0.5K?)

PART D:  $y = 2.3x + 27$

$y = 2.3(15) + 27$   
 $y = 35 + 27$   
 $y = 62$  (CHECK FOR PART C)

You may use a calculator on this page!

- 22 A chef is making 20 pounds of fruit salad to sell in his shop. The chef will use only grapes and blueberries in the fruit salad.

Let x and y be defined as follows:

- x = the number of pounds of grapes the chef will use
- y = the number of pounds of blueberries the chef will use

- a. Write an equation in terms of x and y that can be used to represent the total number of pounds of fruit salad the chef will make.

Grapes cost \$2.50 per pound, and blueberries cost \$4.00 per pound. The chef spent a total of \$59.00 for grapes and blueberries for the fruit salad.

- b. Write an equation in terms of x and y that can be used to represent the total cost, in dollars, of the fruit salad.

- c. Use your answers from parts (a) and (b) to determine the number of pounds of grapes and the number of pounds of blueberries the chef will use to make the fruit salad. Show or explain how you got your answer.

PART A:  $x + y = 20$

x = grapes (lbs)  
 y = blueberries (lbs)

PART B:  $2.50x + 4.00y = 59.00$

$-y(x+y) = 20(-4)$   
 $2.50x + 4y = 59$

14 lbs of grapes  
 6 lbs of blueberries

$-4x - 4y = -80$   
 $2.50x + 4y = 59$   
 $-1.5x = -21$   
 $-1.5 \quad -1.5$   
 $x = 14$