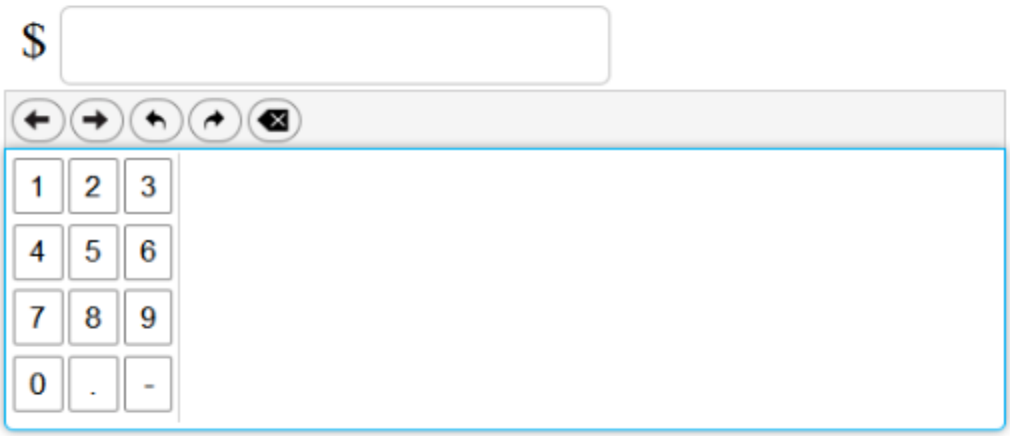
6th Grade Example

MAFS.6.RP.1.2

Dominic is buying candy by the pound for a party. For every 10 pounds of candy he buys, he pays $12.

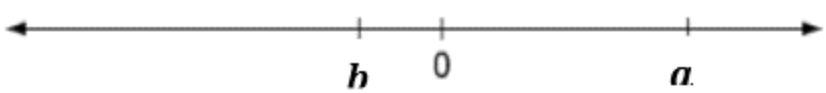
What is the cost per pound for the candy?



7th Grade Example

MAFS.7.NS.1.1

The sum of a and b is c. The number line shows a and b.



Which statements about c are true?

- ☐ $|a| < |c|$
- ☐ $|a| = |c|$
- ☐ $|a| > |c|$
- ☐ $c < 0$
- ☐ $c = 0$
- ☐ $c > 0$

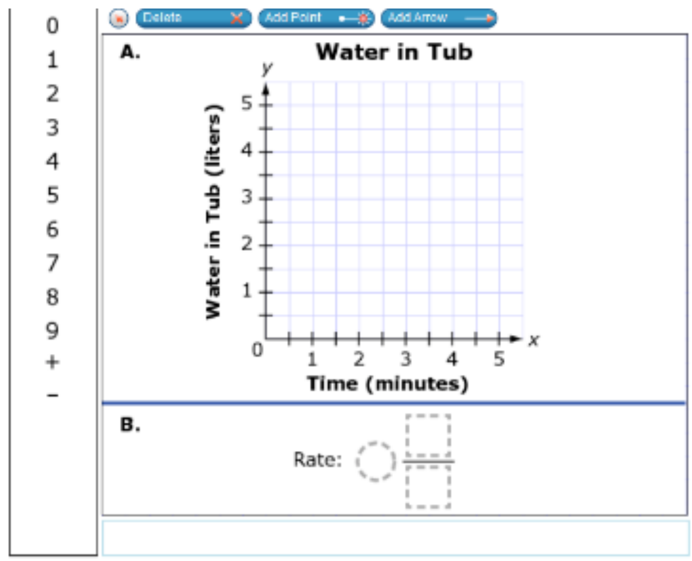
8th Grade Example

MAFS.8.EE.2.5

A tub that holds 18 liters of water fills with 2 liters of water every 2.5 minutes.

A. Use the Add Arrow tool to create a graph that models the situation for the first 5 minutes.

B. At what rate is the tub filling with water? Drag symbols to the circle and numbers to the boxes to show the rate.

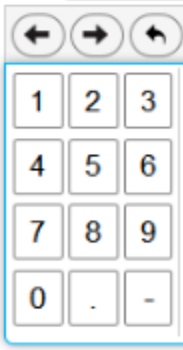


MAFS.6.RP.1.2

Dominic is buying candy by the pound for a party. For every 10 pounds of candy he buys, he pays $12.

What is the cost per pound for the candy?

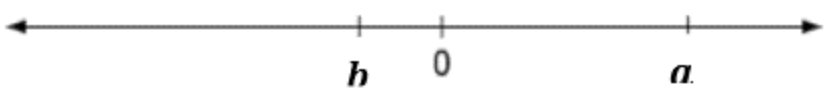
$ 1.20



Divide 12 by 10 to get $1.20

MAFS.7.NS.1.1

The sum of a and b is c. The number line shows a and b.



Which statements about c are true?

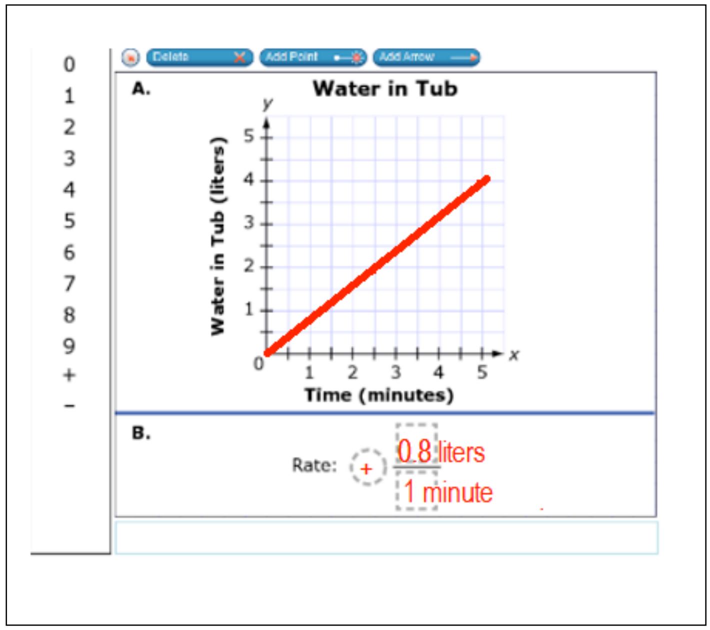
F	$\lvert a\rvert < \lvert c\rvert$	The absolute value of *a* is still positive and when you add and positive and negative number you will subtract and them and use the sign of the larger number, $\lvert 10\rvert + -2 = 8$.
F	$\lvert a\rvert = \lvert c\rvert$	Since we are subtracting a number the answer will not be larger the *a*.
T	$\lvert a\rvert > \lvert c\rvert$	Since we are subtracting a number a will have to be larger than the answer.
F	$c < 0$	Because of the placement of *a* and *b* on the number line *c* can not be less than 0.
F	$c = 0$	Because of the placement of *a* and *b* on the number line *c* can not be 0.
T	$c > 0$	Because of the placement of *a* and *b* on the number line *c* can be more than 0.

MAFS.8.EE.2.5

A tub that holds 18 liters of water fills with 2 liters of water every 2.5 minutes.

A. Use the Add Arrow tool to create a graph that models the situation for the first 5 minutes.

B. At what rate is the tub filling with water? Drag symbols to the circle and numbers to the boxes to show the rate.



Divide 2 liters by 2.5 minutes to get how many liters for each minute.

Algebra 1 FSA EOC Sample Problems

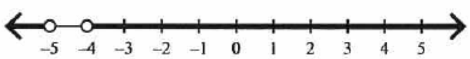
1. A copy center offers its customers two different pricing plans for black and white photocopies of 8.5 in. by 11 in. pages. Customers can either pay \$0.08 per page or pay \$7.50 for a discount card that lowers the cost to \$0.05 per page. Write and solve an equation to find the number of photocopies for which the cost of each plan is the same.

a. $0.08c = 0.05c + 7.50; c = 250$
b. $0.08c = 0.05c - 7.50; c = 250$
c. $0.05c = 0.08c + 7.50; c = 22.5$
d. $7.50 = 0.08c + 0.05c; c = 58$

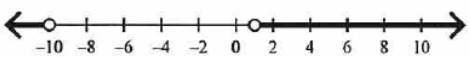
2. What are the solutions and the graph of the compound inequality?

$2x - 5 < -15$ or $2x + 5 > -3$

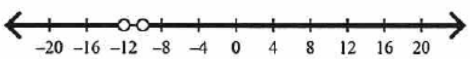
a. $x < -5$ or $x > -4$



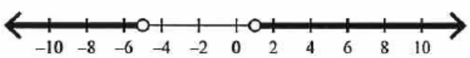
b. $x < -10$ or $x > 1$



c. $x < -12$ or $x > -10$

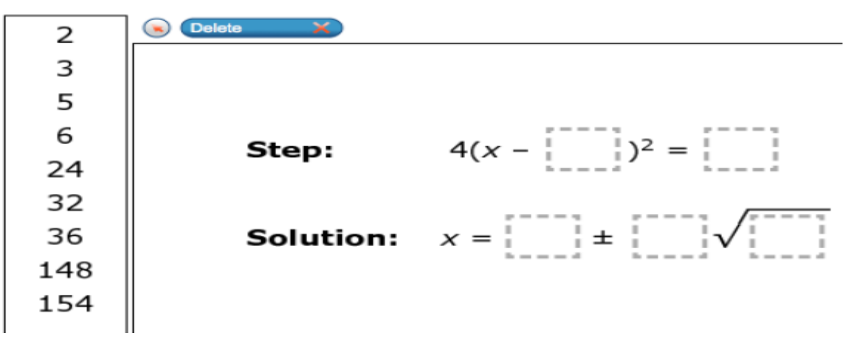


d. $x < -5$ or $x > 1$



3. Matthew solved the quadratic equation shown. $4x^2 - 24x + 7 = 3$

One of the steps that Matthew used ot solve the quation is shown. Drag values into the boxes to complete the step and the solution.



4. Angela and Neil are going to the movies. They each bought a medium popcorn, and Neil got a small soft drink. Angela had a $5 gift certificate to put toward the cost, and Neil paid the rest, which came to $28.80. A movie ticket costs $10.50 and a medium popcorn costs $5.10. How much does a small soft drink cost at the theater?
a. $2.60
b. $2.80
c. $18.20
d. $7.70

5. Holly has $150 to spend at the shopping mall. She decides to buy sweaters and pants with her money. Sweaters cost $35 each and pants cost $20 each.

a. Write an equation to represent this problem situation. Use (*s*) to represent the number of sweaters and *p* to represent the number of pants.
b. If Holly buys 3 sweaters, what is the greatest number of pants she can buy?
Show your work and explain your reasoning.
c. If Holly buys no pants, what is the greatest number of sweaters she can buy? Show your work and explain your reasoning.

6. The table shows the height of a plant as it grows. What equation in point-slope form gives the plant's height at any time? Let *y* stand for the height of the plant in cm and let *x* stand for the time in months.

Time (months)	Plant Height (cm)
3	15
5	25
7	35
9	45

a. y – 15 = 5/2(x – 3)
b. y – 15 = 5(x – 3)
c. y – 3 = 5/2(x – 15)
d. The relationship cannot be modeled

Algebra 1 FSA EOC Sample Problems Answer Key

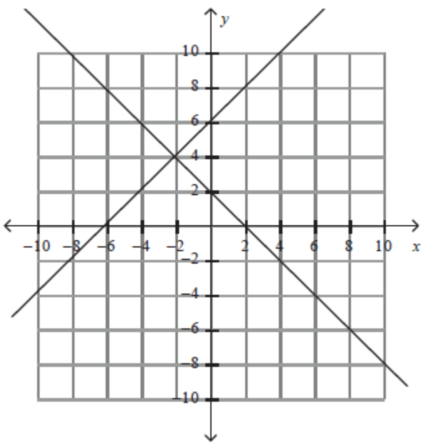
1. MAFS.A-CED.1.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions and simple rational, absolute, and exponential functions. (Calculator) Answer: A	2. MAFS.A-CED.1.3 Represent constraints by equations or inequalities and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. (Calculator) Answer: A
3. MAFS.A- REI.2.4 Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b. (Calculator) Answer: Step $4(x - 3)^2 = 32$ Solution: $x = 3 \pm 2\sqrt{2}$	4. MAFS.A-REI.1.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. (No Calculator) Answer: A
5. MAFS.A-CED.1.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (Calculator) Answer: a. $35s + 20p = 150$ b. $35s + 20p = 150$ $35(3) + 20p = 150$ $105 + 20p = 150$ $20p = 45$ $p = 2.25$ If Holly buys 3 sweaters, the greatest number of pants she can buy is 2. If she wants to buy more than 2, she will need more than $150. c. $35s + 20p = 150$ $35s + 20(0) = 150$ $35s + 0 = 150$ $35s = 150$ $s = 4.29$ If Holly buys no pants, the greatest number of sweaters she can buy is 4. If she wants to buy more than 4, she will need more than $150.	6. MAFS.912.F-IF.2.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. (Calculator) MAFS.912.A-SSE.1.1 Interpret expressions that represent a quantity in terms of its context. a) Interpret parts of an expression, such as terms, factors, and coefficients. Answer: B

ALGEBRA II FSA EOC Sample Problems

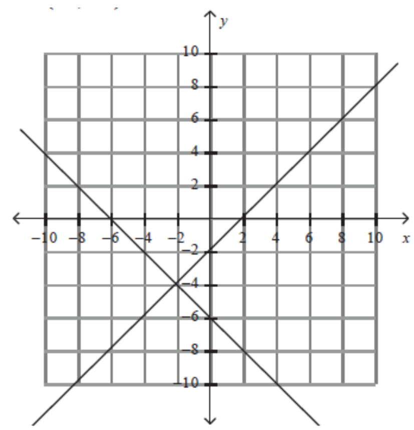
1. A school bake sale table is selling bags of cookies for \$2 each and fruit pies for \$5 each. Can the students make at least \$125 in the last hour of the bake sale if they sell no more than 30 items? If so, what is the largest number of cookie bags they could sell? If not, how many more items would they need to sell? Justify your answers.

2. Solve the system $\begin{cases} -2x + 2y = 4 \\ x + y = 6 \end{cases}$ by graphing.

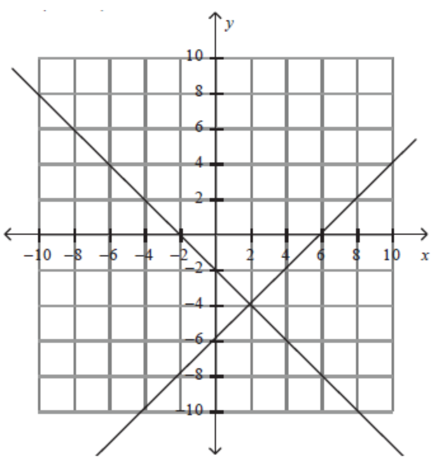
A. (-2, 4)



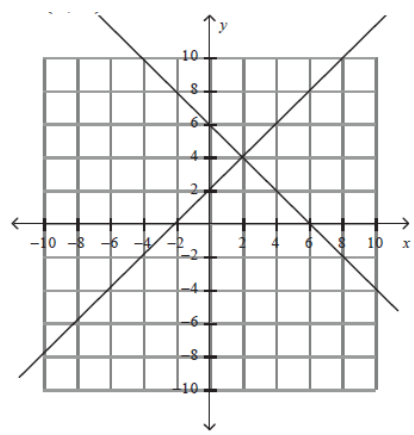
C. (-2, -4)



B. (2, -4)



D. (2, 4)



3. Find the product $(5x - 3)(x^3 - 5x + 2)$.

4. 12. Use the quadratic function $f(x) = x^2 + 7x + 12$.
Part A: Identify the zeros of $f(x)$.

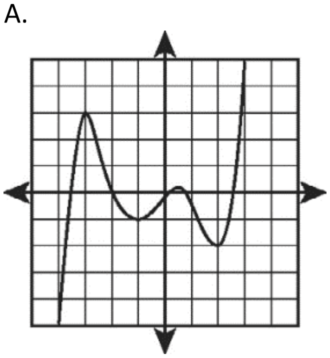
Part B: Graph $f(x)$.

5. The area of a rectangle is $6x^2 + 5x - 6$ and its width is $3x - 2$.
Part A: What is the length of the rectangle?

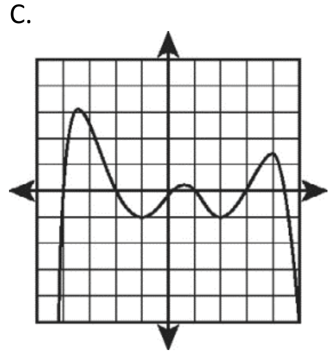
Part B: What would be the length of the rectangle if its width is doubled?

6. If $f(x)$ is an odd function with a negative leading coefficient, $g(x)$ is an even function with a negative leading coefficient, and $h(x)$ is the product of $f(x)$ and $g(x)$, which of the following could be the graph of $h(x)$?

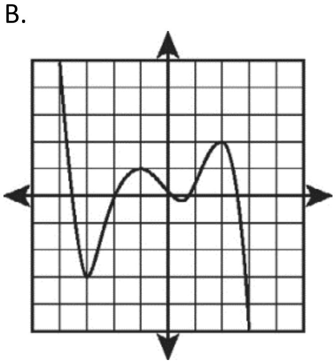
A.



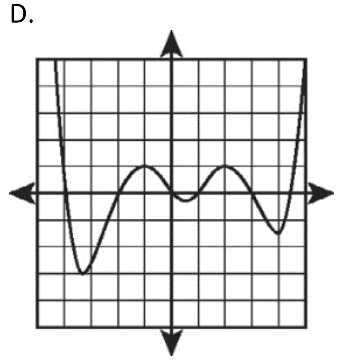
C.



B.



D.



ALGEBRA II FSA EOC Sample Problems Answer Key:

1. MAFS.912.A-CED.1.3 Represent constraints by equations or inequalities and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods*. **DOK 3**

Let c be the number of bags of cookies sold and let p be the number of pies sold.

$$c + p \le 30$$
$$p \le 30 - c$$

$$2c + 5p \ge 125$$
$$2c + 5(30 - c) \ge 125$$
$$2c + 150 - 5c \ge 125$$
$$-3c \ge -25$$
$$c \le 8\frac{1}{3}$$

It is possible for the students to make at least $125 selling no more than 30 items, but only if they do not sell more than 8 cookie bags.

2. MAFS.912.A-REI.3.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables **DOK 1**

Answer D

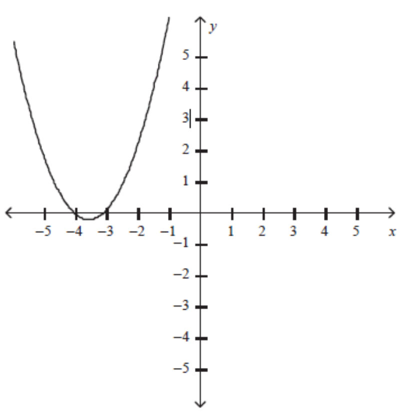
3. **MAFS.912.A-APR1.1** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. **DOK 1**

$5x^4 - 3x^3 - 25x^2 - 25x + 6$

4. **MAFS.912.A-APR.2.**3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. **DOK 2**

A. -4 and -3

B.



5. **MAFS.912.A-APR.4.6** Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system. **DOK 2**

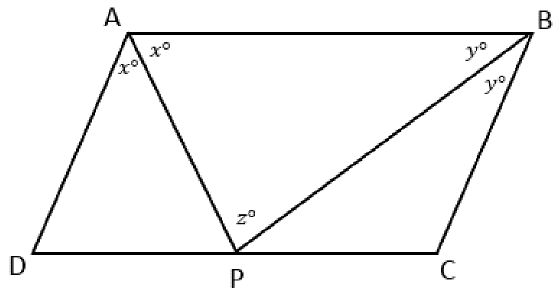
Part A: $2x + 3$ **Part B:** $x + \frac{3}{2}$

6. **MAFS.912.F-BF.2.3** Identify the effect on the graph of replacing f(x) by f(x) + *k*, *k*f(x), f(*k*x), and f(x + *k*) for specific values of k (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them* **DOK 3**

Answer A

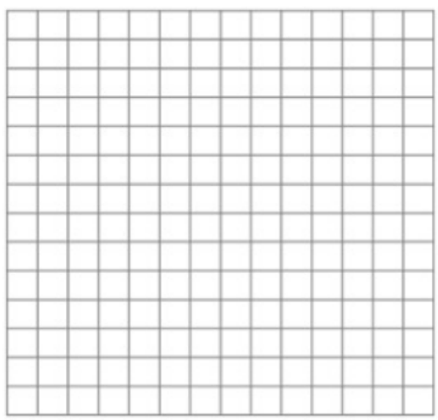
Geometry FSA EOC Sample Problems

1. *ABCD* is a parallelogram as shown below. $\overline{AP}$ $bisects\ \angle A\ and\ \overline{BP}\ bisects\ \angle B$. Suppose $m\angle BAP = x°, and\ m\angle ABP = y°, and\ m\angle APB = z°$.



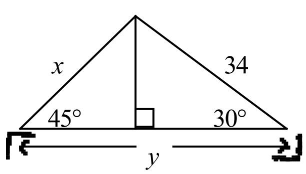
   a. Explain what you know about $x + y + z$.
   b. Explain what you know about $2x + 2y$.
   c. Explain why it must be the case that $DC = 2AD$.

2. The endpoints of one diagonal of quadrilateral WXYZ are W(7, 12) and Y(12, 2). The endpoints of the other diagonal are X(12, 12) and Z(4,8).



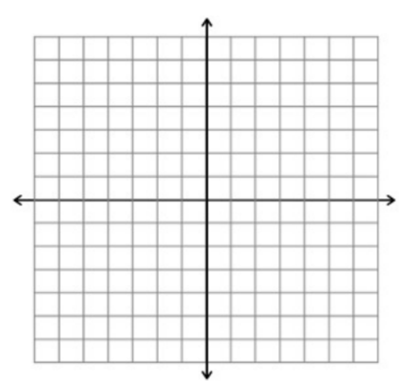
   a. Are the diagonals congruent? Explain how you know.
   b. Are the diagonal perpendicular? Explain.
   c. Do the diagonals bisect each other? Explain.
   d. What is the most descriptive name for quadrilateral WXYZ?

3. Find the value of *x* and *y* rounded to the nearest tenth. Check the box with the correct answer.



	x	y
24	☐	☐
48.1	☐	☐
46.4	☐	☐
139.3	☐	☐

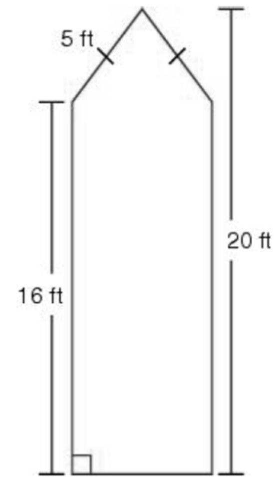
4. What is the perimeter of a rectangle with vertices at C(-1, 1), D(3, 4), E(6, 0), F(2, -3)? Round your answer to the nearest hundredth if necessary.



5. 4. Andrew is replacing a broken glass window. The shape and dimensions of the window are shown.

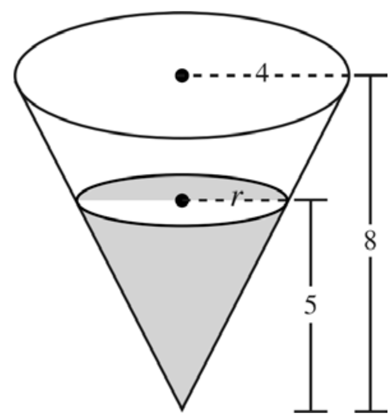
The glass will cost $8.75 per square foot. In addition, Andrew must replace the trim surrounding the glass. The trim costs $1.70 per foot.

What is the total amount Andrew will spend on the window?



MAFS.912.G-GMD.1.3 - Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

6. A paper water cup in the shape of a cone has a height of 8 units and a radius of 4 units as shown in the figure below. The water in the cup reaches a height of 5 units.



What is the value of r, the radius of the surface of the water?

a. 1.6 units b. 2.5 units c. 6.4 units d. 9.8 units

Geometry FSA EOC Sample Problems Answer Key

1. MAFS.912.G-CO.3.11: Prove theorems about parallelograms; use theorems about parallelograms to solve problems. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*

a. x + y + z = 180, because they are the interior angles of a triangle.

b. Angle A and Angle B are same side interior angles of two parallel lines cut by a transversal, so
2x + 2y = 180

c. Since segment AB is parallel to segment DC, angles DAP and DPA are alternate interior angles and are congruent.
This means ADP is an isosceles triangle and AD = DP.
The same reasoning can show BCP is isosceles and BC = CP.
Because ABCD is a parallelogram, AD = BC.

Using substitution, DC = DP + PC = AD + BC = AD + AD = 2AD.

2. MAFS.912.G-CO.3.11: Prove theorems about parallelograms; use theorems about parallelograms to solve problems. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*

a. The diagonals are not congruent. $WY = \sqrt{125} = 5\sqrt{5},\ XZ = \sqrt{80} = 4\sqrt{5}.$

b. The diagonals are perpendicular. Slope $WY = -\frac{10}{5} = -2,\ \text{slope}\ XZ = \frac{4}{8} = 2.$

c. Let m be the intersection of the two diagonals. M is the point (8, 10). This is the midpoint of segment XZ, not segment WY

d. Because the diagonals are perpendicular but do not bisect each other, the quadrilateral is a kite.

3. MAFS.912.G-SRT.3.6 - Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

	x	y
24	✓	
48.1		
46.4		✓
139.3		

4. MAFS.912.G-GPE.2.7 - Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

20

5. MAFS.912.G-MG.1.3 - Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

Base of triangle at the top of glass is 6 ft.
Area of triangle is 0.5(6)(4) = 12 ft^2
Area of rectangle at bottom of glass is (16)(6) = 96 ft^2
Area of glass is 12 + 96 = 108 ft^2
Cost of glass is 108(8.75) = $945.
Trim needed is 16 + 5 + 5 + 16 + 6 = 48 ft.
Cost of trim is (1.70)(48) = $81.60

Total cost of replacing window: 945 + 81.60 = $1026.60

6. MAFS.912.G-GMD.1.3 - Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

B. Solve the Proportion: $\frac{4}{r} = \frac{8}{5}$