



Math

Spring Operational 2015

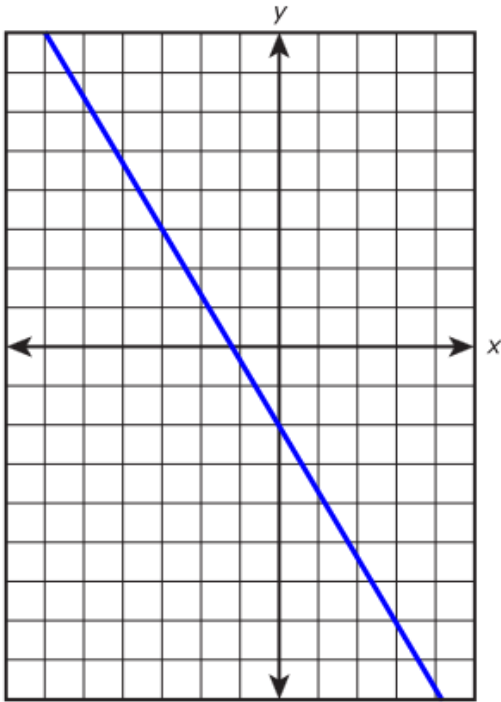
Integrated Mathematics I
Performance Based Assessment
Released Items

1. Which of these represent a linear function?

Select **all** that apply.

A. $(3, 6), (0, 2), (3, 5)$

B.



C.

x	y
2	4
2	2
2	0
2	-2

D. For each square whose sides have length s , the perimeter is $4s$.

E. $y = |x|$

2. Graph lines m and t on the xy -coordinate plane shown. Then plot the point of intersection P .

- Line m : $y = -\frac{2}{3}x - 4$
- Line t : $y = x + 6$

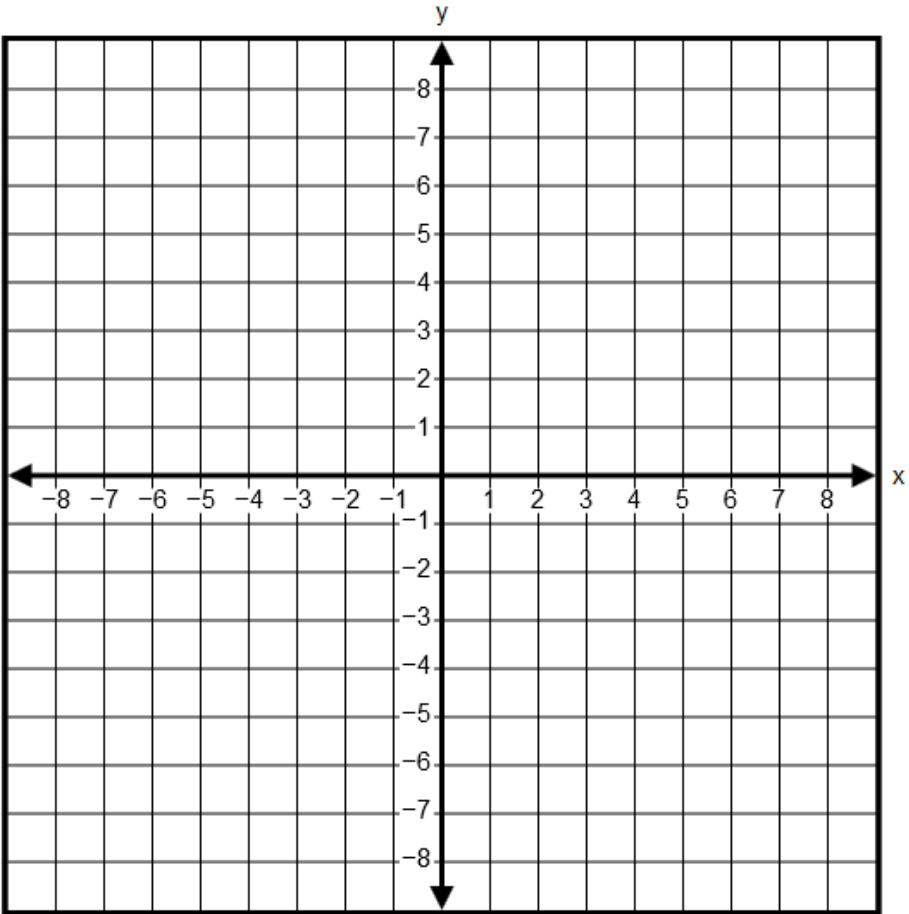
To graph a line, select two points on the coordinate plane. A line will be drawn through the points.

Select the place on the coordinate plane to plot the point.

Line m

Line t

Point P



3. A set production designer creates a right circular cylindrical pillar. The designer knows the amount of material used for the surface of the pillar and needs to find the height for a reinforcement rod.

Use $A = (2\pi r)h + \pi r^2$, where r represents the radius, h represents the height of the pillar, and A represents the surface area of the pillar. What is a formula for h in terms of the other variables that can be used to find the height?

- A. $h = \frac{A - \pi r^2}{2\pi r}$
- B. $h = \frac{A + \pi r^2}{2\pi r}$
- C. $h = \frac{A}{3\pi r^2}$
- D. $h = \frac{A}{2\pi r} - \frac{1}{2}$

4. Select from the drop-down menus to correctly complete each sentence.

The set of all points in a plane that are equidistant from a given point is called a

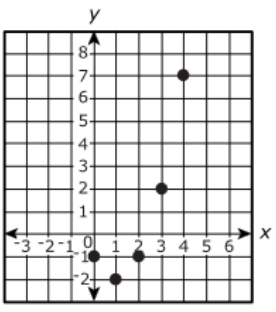
Choose...
square
sphere
segment
circle

The given point is called the

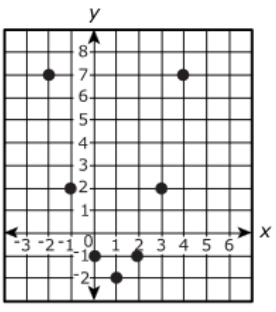
Choose...
square
sphere
segment
circle

5. Which is the graph of the function $y = (x - 1)^2 - 2$?

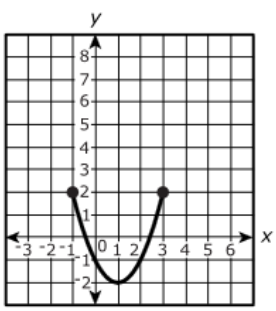
A.



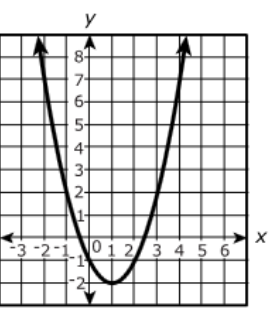
B.



C.

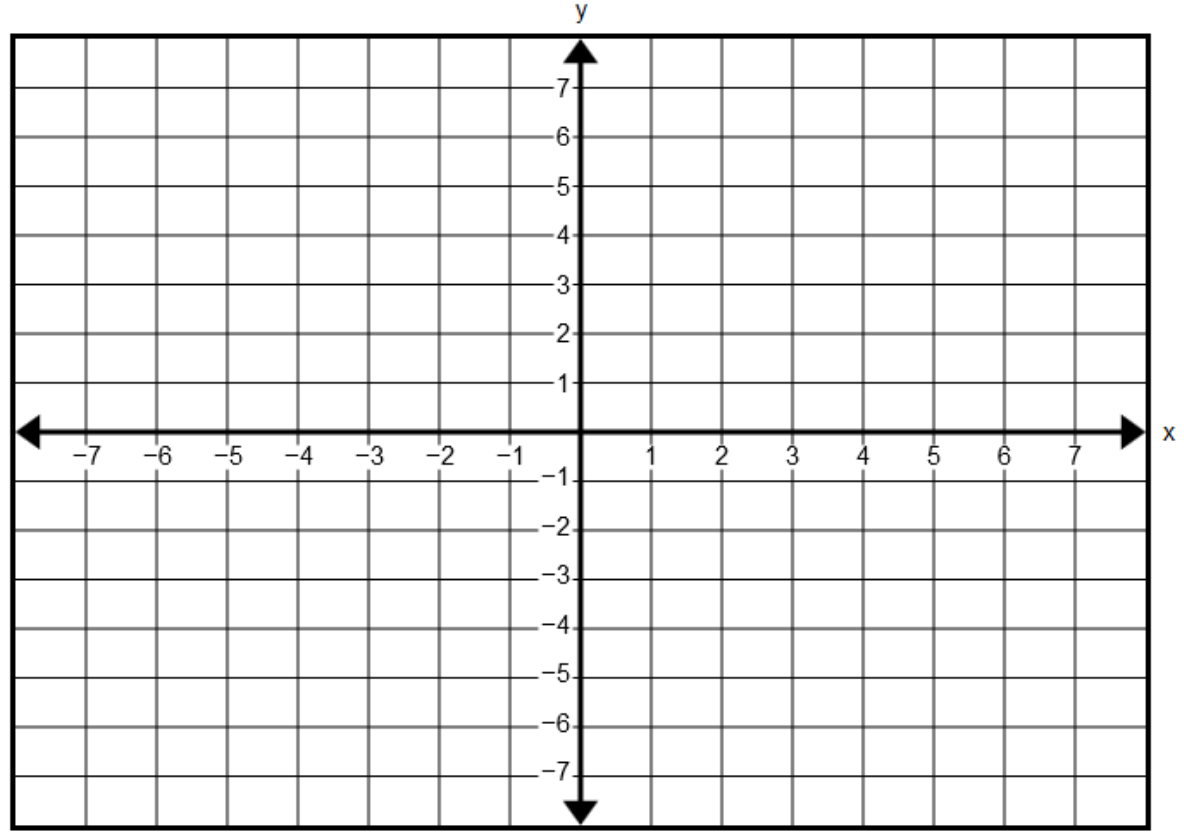


D.




6. On the coordinate plane provided, graph the line with equation $5y - 3x = -15$ by selecting the x - and y - intercepts. A correct response must have the points placed at the intercepts.

Select the places on the coordinate plane to plot the points.



7. Select from the drop-down menu to correctly complete the sentence.

Given distinct noncollinear points A , B , and C , the set of all points between A and C including A and C is

Choose... 

- a ray
- a circle
- an angle
- a line segment

8. **Part A**

Marcella wants a job as a sales representative. She receives two job offers from companies that sell office machines to businesses.

- *Office Essentials* offers Marcella a salary of \$2,500 per month, plus a commission of \$125 for every office machine she sells.
- *Everything Office* offers her a salary of \$2,000 per month, plus a commission of \$150 for every office machine she sells.

Let M represent the total monthly earnings, in dollars, and let n represent the number of office machines sold in a month. For **each** company, write an equation that represents the relationship between M and n .

Enter your equations in the space provided.



- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

Part B

Marcella wants to earn a total of at least \$4,000 per month. For each company, find the least number of office machines she would need to sell each month in order to meet this goal. Show your work.

Enter your answers and your work in the space provided.



- ▶ Math symbols
- ▶ Relations
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- ▶ Statistics
- ▶ Greek

Part C

Compare Marcella's possible earnings at *Office Essentials* to her possible earnings at *Everything Office*. How many machines would Marcella have to sell for the earnings at both companies to be the same? Find the interval of machines sold for which the total earnings at *Everything Office* are greater than the total earnings at *Office Essentials*. Show your work.

Enter your answers and your work in the space provided.



- ▶ Math symbols
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- ▶ Greek

9. Two Web sites launched on the same day. At the end of the first week, the number of visitors to each Web site was 25. For the first eight weeks, the number of visitors to each Web site increased according to the corresponding rules.

Web site A: The number of visitors doubled each week.











Web site B: The number of visitors increased by 150 each week.

Part A

Complete the table to show the number of visitors to **each** Web site for the first eight weeks.

Enter your answers in the table.

	Web Site A	Web Site B
Week 1:	25	25
Week 2:	<input type="checkbox"/>	<input type="checkbox"/>
Week 3:	<input type="checkbox"/>	<input type="checkbox"/>
Week 4:	<input type="checkbox"/>	<input type="checkbox"/>
Week 5:	<input type="checkbox"/>	<input type="checkbox"/>
Week 6:	<input type="checkbox"/>	<input type="checkbox"/>
Week 7:	<input type="checkbox"/>	<input type="checkbox"/>
Week 8:	<input type="checkbox"/>	<input type="checkbox"/>

						
	y^x	$\sqrt{\quad}$	$\sqrt[3]{\quad}$	=	(-)	%
						

Part B

Based on the data for the first eight weeks, Jose claims that the number of visitors to each Web site can be modeled as a linear function of the number of weeks online. For **each** Web site, decide if Jose's claim is correct. If it is correct, explain why. If it is not correct, explain why and describe a more appropriate model.

Enter your answers and your explanations in the space provided.

			[A]	[π]
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- [▶ Math symbols](#)
- [▶ Relations](#)
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- [▶ Trigonometry](#)
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10. **Part A**

Suppose that $y = 2x - 3$. The following points lie on the graph of this equation:

$$A(a, 2a - 3) \quad B(b, 2b - 3) \quad C(c, 2c - 3)$$

Amy claims that the slopes of \overline{AB} , \overline{BC} and \overline{AC} are equal. Prove that Amy's claim is correct. Show your work and explain your reasoning.

Enter your answer, your work, and your explanation in the space provided.



- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

Part B

Are the points $(-1, 1)$ and $(1, -1)$ on the graph of $y = 2x - 3$?

Show your work and explain your reasoning.

Enter your answer, your work, and your explanation in the space provided.



- ▶ Math symbols
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- ▶ Statistics
- ▶ Greek

11. A quality-control technician at a candle factory tested eight 16-ounce candles, each 3 inches in diameter. These candles came from the same production run. The table shows the decrease in weight of each candle after burning for 3 hours. Candle makers believe that the rate at which the candles burn is constant.

Candle	1	2	3	4	5	6	7	8
Weight Loss (ounces)	0.5	0.6	0.5	0.7	0.7	0.5	0.5	0.6

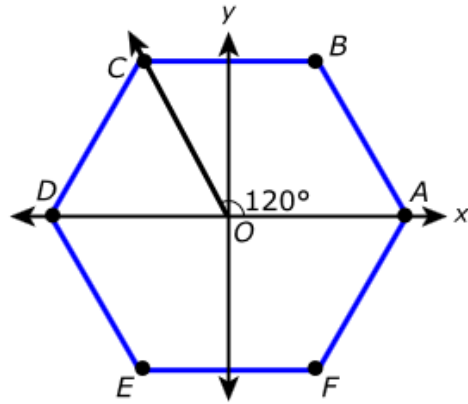
Write an equation that can be used to model the weight, w , of such a candle as a function of the number, h , of hours burning. Then, explain how the equation can be used to predict the weight of a candle that has burned for 5 hours.

Enter your equation and your explanation in the space provided.



- ▶ Math symbols
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12. This diagram shows regular hexagon $ABCDEF$ with center at O .



Justine made these claims.

- The only lines of symmetry for regular hexagon $ABCDEF$ are the lines that contain one vertex and O .
- The only angle of rotation that shows rotational symmetry is 120° .

Explain why Justine is correct or incorrect.

Enter your explanation in the space provided.



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