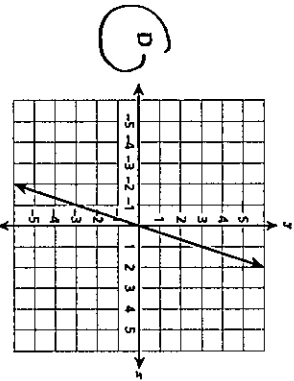
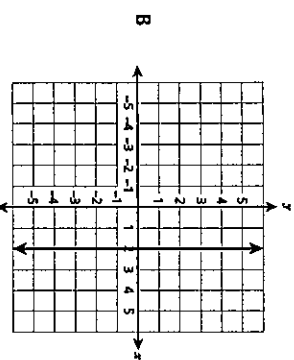
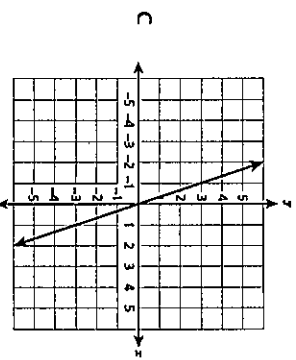
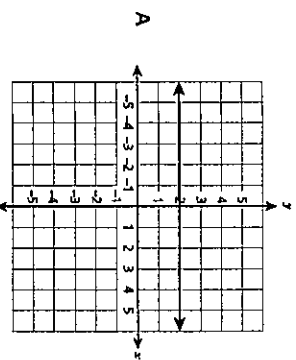


1

Which graph represents a function that is increasing?

*Positive slope*



2

What is the solution to the equation shown below?

$$2.5(x + 5) = 7.5x - 0.5$$

- A  $x = 2.6$
- B  $x = 1.1$
- C  $x = -2.6$
- D  $x = -1.1$

*Handwritten solution:*

$$2.5(x + 5) = 7.5x - 0.5$$

$$2.5x + 12.5 = 7.5x - 0.5$$

$$-2.5x$$


---


$$12.5 = 5x - 0.5$$

$$+0.5$$


---


$$13 = 5x$$

$$\frac{13}{5} = \frac{5x}{5}$$

$$x = 2.6$$

3

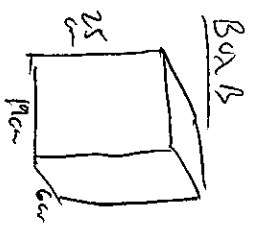
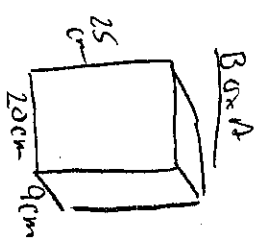
There are two boxes of cereal in the shape of rectangular prisms on a shelf. The dimensions of each box of cereal are listed below.

- Box A has a height of 25 centimeters, a length of 20 centimeters, and a width of 9 centimeters.
- Box B has a height of 25 centimeters, a length of 19 centimeters, and a width of 6 centimeters.

What is the difference in volume, in cubic centimeters, between the two boxes of cereal?

- A 1,650
- B 3,900
- C 4,500
- D 7,350

*Volume formula: L · W · H*



*Handwritten:*  $V = L \cdot W \cdot H$

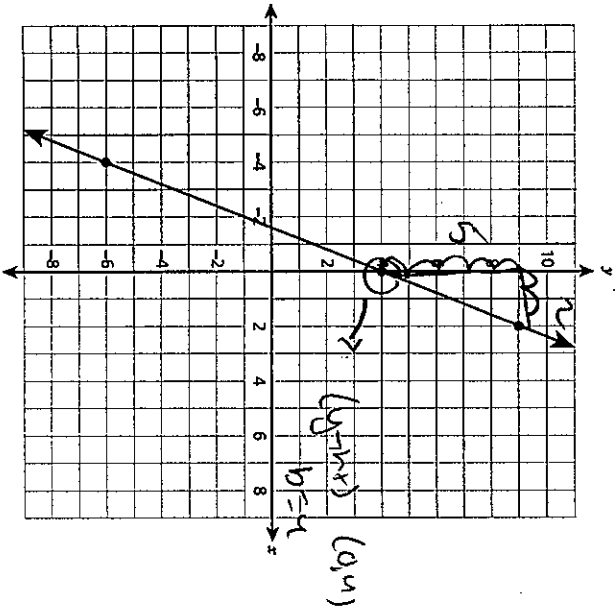
*Handwritten:*  $V = 20 \cdot 9 \cdot 25$   
 $V = 4500$

*Handwritten:*  $\frac{4500}{2850} = 1650$

*Handwritten:*  $V = L \cdot W \cdot H$

*Handwritten:*  $V = 19 \cdot 6 \cdot 25$   
 $V = 2850$

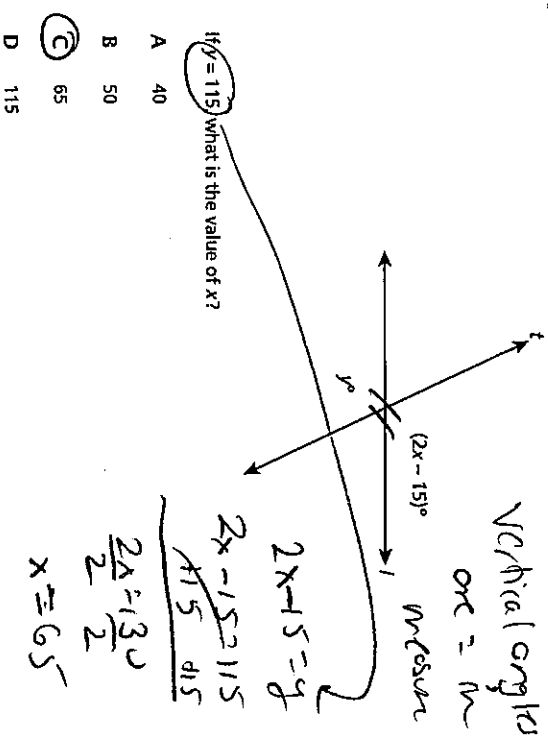
4 Which equation represents the line shown on the coordinate plane below?



- A  $y = \frac{2}{3}x + 4$
- B  $y = \frac{3}{2}x + 4$
- C  $y = \frac{3}{2}x + 4$
- D  $y = \frac{5}{2}x + 4$

$y = m \cdot x + b$   
 $m = \frac{1}{2}$   
 $b = 4$

5 Two intersecting lines,  $l$  and  $t$ , are shown in the diagram below.



- A 40
- B 50
- C 65
- D 115

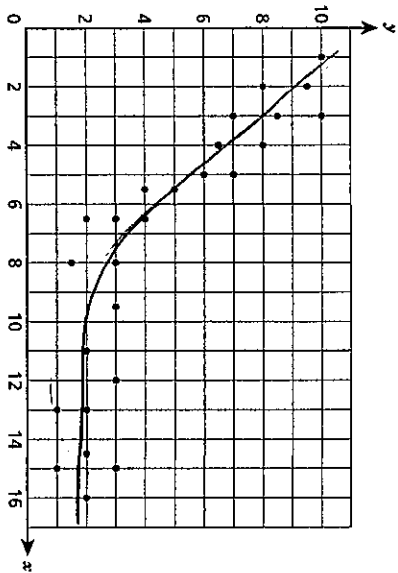
6 Triangle P undergoes a sequence of transformations resulting in triangle Q. Which sequence of transformations could be used to show that triangle Q is similar but not congruent to triangle P?

- A a reflection followed by a translation
- B a rotation followed by a reflection
- C a reflection followed by a rotation
- D a translation followed by a dilation

NOT the same size, so it MUST be dilation

7

A scatter plot is shown below.



Which statement **best** explains why these data can or cannot be modeled using a line of best fit?

- A A line would not be appropriate because there is a negative association.
- B A line would not be appropriate because the points follow a nonlinear pattern.
- C A line would be appropriate because there is a positive association.
- D A line would be appropriate because the points follow a nonlinear pattern.

8

What is the solution, if any, to the equation  $3(x - 2) + 4 = 3x + 6$ ?

- A  $x = 0$
- B  $x = 8$
- C There is no solution.
- D There are an infinite number of solutions.

Handwritten work for Question 8:

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

$$3x - 6 + 4 = 3x + 6$$

$$3x - 2 = 3x + 6$$

$$-2 = 2$$

Conclusion: No solution.

GO ON

14

Which expression is equivalent to  $(15^3)(15^{-7})$ ? \* When the bases are the same, you keep the base +

- A  $15^{-21}$
- B  $-15^4$
- C  $\frac{1}{15^4}$
- D  $\frac{1}{15^{-4}}$

Handwritten work for Question 14:  $(15^3) \cdot (15^{-7}) = 15^{3-7} = 15^{-4}$

15

Alex opened a savings account with an initial deposit of \$50. Each month, he deposits the same amount of money in his savings account in  $m$  months. What is the meaning of the unit rate?

- A 25; the amount of money Alex deposits each month
- B 50; the amount of money Alex deposits each month
- C 25; the amount of money Alex initially deposited
- D 50; the amount of money Alex initially deposited

16

What is the solution to the equation shown below?

- A  $y = \frac{19}{5}$
- B  $y = \frac{5}{27}$
- C  $y = -\frac{9}{5}$
- D  $y = -\frac{23}{5}$

Handwritten work for Question 16:

$$-\frac{1}{3}(6y + 6) + 21 = 3y$$

$$-2y - 2 + 21 = 3y$$

$$-2y + 19 = 3y$$

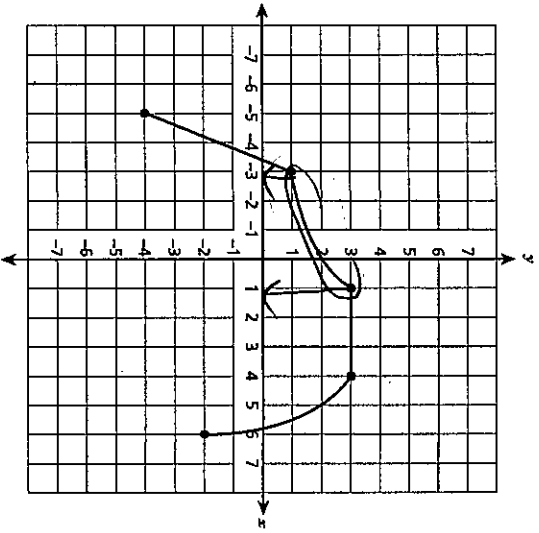
$$19 = 5y$$

$$y = \frac{19}{5}$$

GO ON

19

The graph of a function is shown on the coordinate plane below.



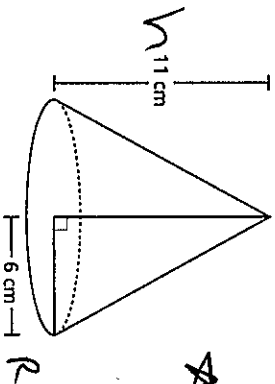
Between which two values of  $x$  is the function nonlinear and increasing?

- A -5 and -3
- B -3 and 1**
- C 1 and 4
- D 4 and 6

Curve positive slope /

23

The dimensions of a cone are shown in the figure below.



USE  $\sqrt{11}$  radius  
etc things don't  
say what you  
are for

What is the approximate volume, in cubic centimeters, of the cone?

- A 138
- B 415**
- C 622
- D 1,244

$$V = \frac{1}{3} \pi r^2 h$$

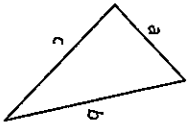
$$V = \frac{1}{3} \cdot \pi \cdot (6)^2 \cdot 11$$

$$V = \frac{1}{3} \cdot \pi \cdot 36 \cdot 11$$

$$V = 414.6902303 \dots$$

24

A triangle with side lengths  $a$ ,  $b$ , and  $c$  is shown below.



Which statement about the side lengths must be true?

- A  $a + b > c$
- B  $b + c < a$
- C  $a + b < c$
- D  $a + c < b$

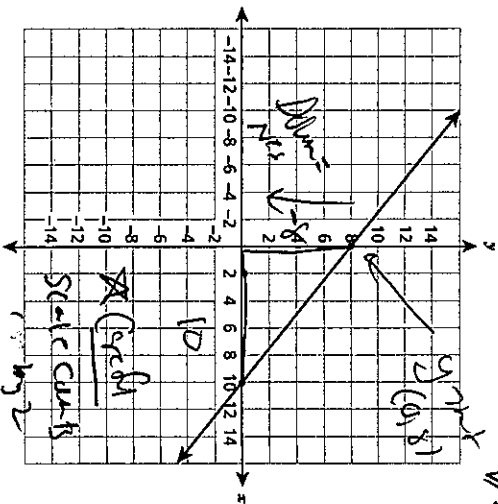
Reason: The sum of the 2 smaller sides must be larger than the 3rd!

$a + b$  are smaller than  $c$  so

$c + b > a$   
 $\uparrow$   
 minor

25

A line is graphed on the coordinate plane shown below.



What is the equation of the line?

- A  $y = -\frac{4}{5}x + 8$
- B  $y = \frac{4}{5}x + 10$
- C  $y = -\frac{5}{4}x + 8$
- D  $y = \frac{5}{4}x + 10$

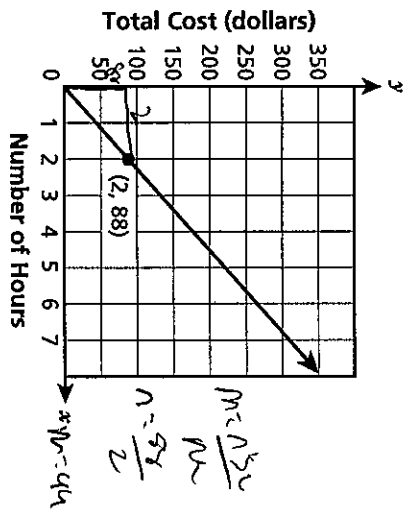
$y = mx + b$   
 $m = -\frac{4}{5}$   
 $b = 8$

$m = \frac{\text{rise}}{\text{run}}$   
 $m = -\frac{8}{10}$   
 $m = -\frac{4}{5}$

There are two mechanics who work on cars. For each mechanic, the relationship between  $x$ , the number of hours worked, and  $y$ , the total cost, in dollars, is described below.

- The equation  $y = 36x$  represents the total cost charged by Mechanic A for the number of hours worked.
- The graph shown below represents the total cost charged by Mechanic B for the number of hours worked.

**MECHANIC B CHARGES**



Based on the information, which statement is true?

- A Mechanic A charges \$8.00 more per hour than Mechanic B.
- B Mechanic B charges \$8.00 more per hour than Mechanic A.
- C Mechanic A charges \$52.00 more per hour than Mechanic B.
- D Mechanic B charges \$52.00 more per hour than Mechanic A.

A  
 $y = 36x \rightarrow$  charges \$36 per hour  
 $m = 36$   
 $b = 0$

B  
 $y = 44x \rightarrow$  charges \$44 per hour  
 $m = 44$   
 $b = 0$

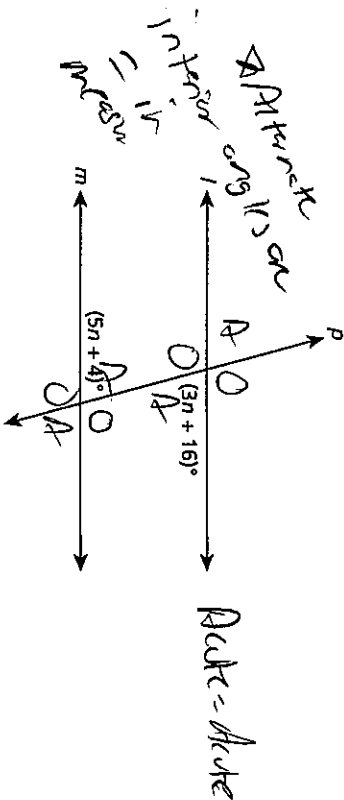
$\frac{44}{36}$   
 $\frac{11}{9}$

34 Cory drinks water from a bottle during a bike ride. The average amount of water, in ounces, in his water bottle can be represented by the equation  $y = -8x + 32$ , where  $y$  is the amount of water remaining after  $x$  hours. Based on the equation, what amount of water, in ounces, will remain in the bottle after Cory rides for  $2\frac{1}{2}$  hours?

- A 8
- B 12
- C 20
- D 32

$y = -8x + 32$   
 $y = -8(2\frac{1}{2}) + 32$   
 $y = -20 + 32$   
 $y = 12$

36 Lines  $l$  and  $m$  are parallel and intersect transversal  $p$ , as shown in the diagram below.



What is the value of  $n$ ?

- A 6
- B 10
- C 20
- D 24

$5n + 4 = 3n + 16$   
 $-3n \quad -3n$   
 $2n + 4 = 16$   
 $-4 \quad -4$   
 $2n = 12$   
 $\frac{2n}{2} = \frac{12}{2}$   
 $n = 6$

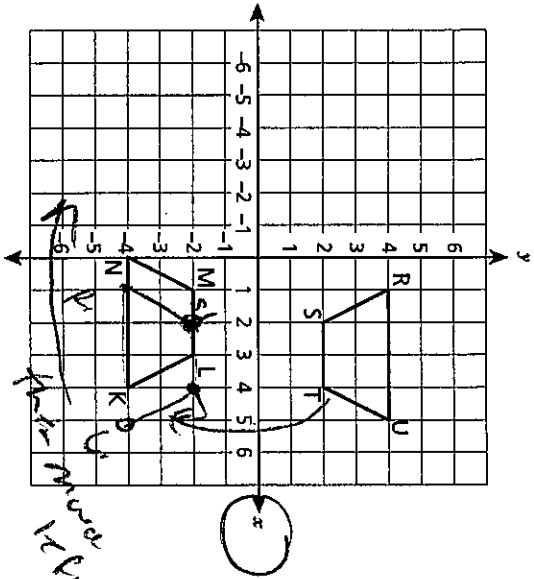
35 Which expression is equivalent to  $4^{-5} \times 4^8$ ?

- S.D.  $\rightarrow$  A  $\frac{4^{-2}}{4^{-1}} = 4^{-2} - (-1) = 4^{-1}$
  - B.P.  $\rightarrow$  B  $(4^8)^{-1} = 4^{8 \cdot -1} = 4^{-8}$
  - multiply  $\rightarrow$  C  $\frac{4^{-2}}{4^{-1}} = 4^{-2} - (-1) = 4^{-3}$
  - D  $(4^{-1})^3 = 4^{-1 \cdot 3} = 4^{-3}$
- S.D.  $\rightarrow$  multiply  
 B.P.  $\rightarrow$  multiply

Keep the base the same & add the exponents

$4^{-5} \cdot 4^8 = 4^{-5+8}$   
 $= 4^3$

- 37 Trapezoid RSTU and trapezoid NMLK shown on the coordinate plane are congruent.



- Which sequence of transformations will map trapezoid RSTU onto trapezoid NMLK?
- A a reflection over the  $y$ -axis, then a translation 1 unit to the right
  - B a reflection over the  $x$ -axis, then a translation 1 unit to the left
  - C a reflection over the  $y$ -axis, then a translation 1 unit down
  - D a reflection over the  $x$ -axis, then a translation 1 unit up

GO ON

- 38 Which set of ordered pairs represents a function?

- A  $(-20, 30), (-40, 0), (-40, 50)$
- B  $(-30, 0), (-30, 20), (-30, 50)$
- C  $(-40, 0), (20, -30), (60, -50)$
- D  $(-50, 0), (20, -30), (-50, 60)$

*x-values can not repeat*

- 39 What value for the constant,  $n$ , will result in no solution for the equation shown below?

$$n(5x + 7) = 10x + 12$$

- A 5
- B 2
- C -2
- D -5

*constants are =*

Handwritten work for question 39:

$n = 5$

$$n(5x + 7) = 10x + 12$$

$$5(5x + 7) = 10x + 12$$

$$25x + 35 = 10x + 12$$

$$-10x \quad -10x$$

$$\frac{15x + 35 = 12}{-35 \quad -35}$$

$$\frac{15x = -23}{15}$$

$$x = -\frac{23}{15}$$

*1 solution*

$n = 2$

$$n(5x + 7) = 10x + 12$$

$$2(5x + 7) = 10x + 12$$

$$10x + 14 = 10x + 12$$

$$-10x \quad -10x$$

$$14 = 12$$

*no solution*

GO ON

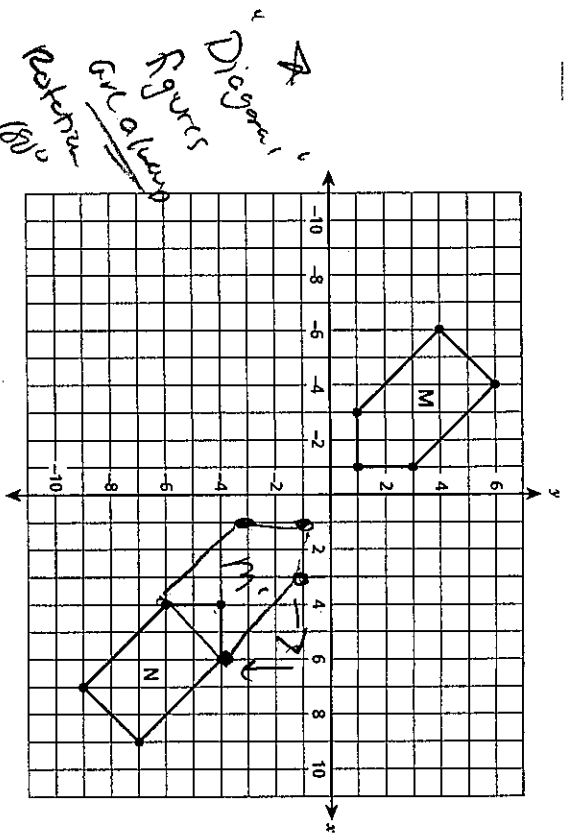




42

Figure M and its congruent image, figure N, are graphed on the coordinate plane below.

same size: NO dilation



Describe a sequence of transformations that will take figure M onto its congruent image, figure N.

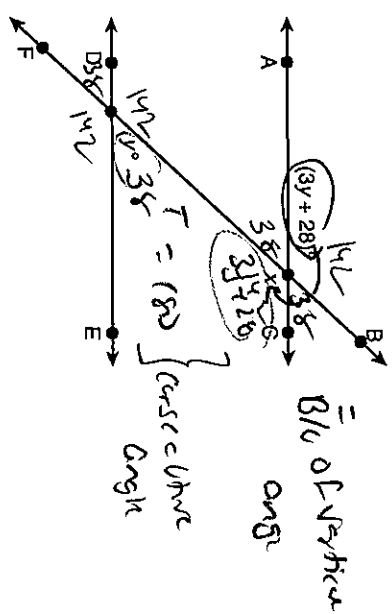
Explain your answer:

Rotate figure M  $180^\circ$  about the origin + then translate 3 units to the right + 3 units down

GO ON

43

In the figure shown below,  $\overline{AC}$  is parallel to  $\overline{DE}$  with transversal  $\overline{BF}$ .



Determine the values of x and y.

Show your work

$$3y + 28 + y = 180$$

$$4y + 28 = 180$$

$$-28 - 28$$

$$\frac{4y}{4} = \frac{152}{4}$$

$$y = 38$$
  

$$x = 3y + 28$$

$$x = 3(38) + 28$$

$$x = 114 + 28$$

$$x = 142$$
  

$$\frac{180}{-38}$$

$$\frac{142}{142}$$

Answer  $x = \frac{142}{38}$   
 $y = \frac{142}{38}$

GO ON

44

The steps a student took to solve an equation are shown below.

$$\frac{3}{4}(-8x + 20) = -8(-x - 3)$$

$$\frac{3}{4}(-8x + 20) = -8(-x - 3)$$

Step 1:  $-6x + 15 = 8x + 24$

Step 2:  $15 = 2x + 24$

Step 3:  $-9 = 2x$

Step 4:  $x = -\frac{9}{2}$

What error did the student make and what is the correct value of  $x$ ?

Explain your answer:

The student made an error in step 2. When they moved over the  $-6x$  they subtracted  $6x$  from  $8x$  to get  $2x$  instead of adding  $6x$  and  $8x$  to get  $14x$ .

Answer  $x = -\frac{9}{14}$

GO ON

45

Two functions are represented below.

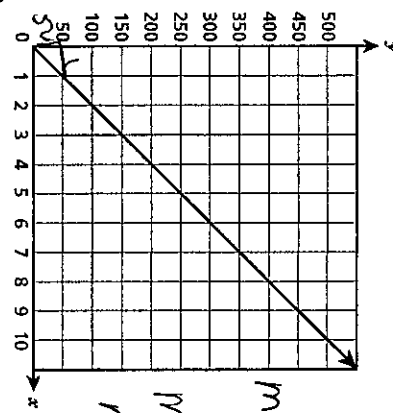
FUNCTION A

$$y = 35x$$

$$m = 35$$

$$b = 0$$

FUNCTION B



$$500 - 35 = 465$$

$$m = \frac{500}{10}$$

$$m = 50$$

What is the difference in the rate of change between Function A and Function B? Be sure to include the rate of change of each function in your answer.

Explain your answer:

Function A has a rate of change of 35 and Function B has a rate of change of 50. The difference between the rates of change is 15 because  $50 - 35 = 15$ .

GO ON



linear equation: highest exponent of the variable is 1 (constant)  
non-linear: highest exponent of the variable is not 1 or 0

48 Three equations are listed below.

•  $y = x(3x + 2) = y = 3x^2 + 2x$

•  $y = \frac{x}{3} + 2$

•  $y = 2 - 3x$

Identify one linear equation and one nonlinear equation from the list. State a reason why each equation you identified is linear or nonlinear.

Linear equation  $y = \frac{x}{3} + 2$  or  $y = 2 - 3x$

State your reason: highest exponent of  $x$  is 1

— The equation is linear if  $f(x)$  has an exponent of 0 or 1

OR — The equation is linear if  $ax + b$  form  
OR — when graphed, a straight line is drawn

Nonlinear equation  $y = x(3x + 2)$  ...  
 $y = 3x^2 + 2x$

State your reason.

— The equation is non-linear b/c it is a

quadratic equation b/c the highest

exponent is 2

— when graphed it would not be a straight line