

SHOW WORK WHENEVER APPROPRIATE. NO CREDIT GIVEN OTHERWISE. ANSWER MUST BE CIRCLED.

Due: Wednesday February 6

Evaluate the expression. Show all steps!!!

$$1) \left(-\frac{2}{7}\right)^{-3} = \left(\frac{-2}{7}\right)^{-3} = \boxed{-\frac{343}{8}}$$

Solve.

- 2) If P dollars is deposited in a savings account paying r% annual interest, then the amount A in the account after x years is given by $A = P\left(1 + \frac{r}{100}\right)^x$. Find the amount in the account after 6 years if we deposit \$560 dollars at 6% annual interest.

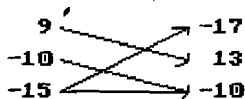
$x=6$ $P=560$ $r=6$

$$P = 560\left(1 + \frac{6}{100}\right)^6 = \boxed{\$794.37}$$

Simplify the expression. Use positive exponents. Assume variables represent nonnegative numbers.

$$3) \frac{x^5(x-7)^{-7}}{(x-5)^{-9}} = \frac{x^5 x^{49}}{x^{45}} = \frac{x^{54}}{x^{45}} = \boxed{x^9}$$

- 4) For the given relation:



- a) Is this a function? YES

NO

EXPLAIN *Because for $x = -15$ there are two y values*

- b) Give the domain

$$\{-15, -10, 9\}$$

- c) Give the range

$$\{-17, -10, 13\}$$

Complete the table using the formula.

5) Given $y = \frac{1}{3}x + 2$

a) Complete the table:

x	9	12	15	18	21
y	5	6	7	8	9

b) This relation is a FUNCTION because *For every input (x) there is only one output (y).*

c) This relation is a LINEAR FUNCTION because

Because the slope (Rate of Change) is constant.

d) Rewrite using function notation: $f(x) = \frac{1}{3}x + 2$

e) Complete the following table showing steps in all cases. Write answers as fractions.

<p>Find $f(12) =$</p> $= \frac{1}{3}(12) + 2$ $4 + 2 = \boxed{6}$	<p>Find $f(-24) =$</p> $\frac{1}{3}(-24) + 2$ $= -8 + 2 = \boxed{-6}$	<p>Find the value of the function when $x = 3$</p> $y = \frac{1}{3}(3) + 2$ $= \boxed{3}$	<p>Find $f(-5)$</p> $f(-5) = \frac{1}{3}(-5) + 2$ $= -\frac{5}{3} + \frac{6}{3} = \frac{1}{3}$
<p>Solve $f(x) = 12$</p> $12 = \frac{1}{3}x + 2$ $10 = \frac{1}{3}x$ $\boxed{x = 30}$	<p>Solve $f(x) = -24$</p> $-24 = \frac{1}{3}x + 2$ $-26 = \frac{1}{3}x$ $\boxed{-78 = x}$	<p>Find x when $y = -4$</p> $-4 = \frac{1}{3}x + 2$ $\frac{-4}{-2} = \frac{\frac{1}{3}x + 2}{-2}$ $-6 = \frac{1}{3}x$ $\boxed{-18 = x}$	<p>Find x when $f(x) = -5$</p> $-5 = \frac{1}{3}x + 2$ $\frac{-5}{-2} = \frac{\frac{1}{3}x + 2}{-2}$ $-7 = \frac{1}{3}x$ $\boxed{-21 = x}$

f) What numbers can you put in place of x and get answers for y ? That is, what is the domain of this function?

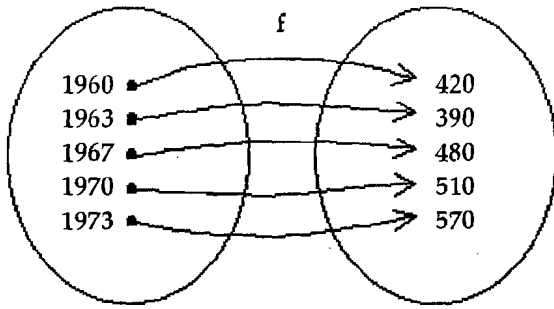
All Real Numbers

The Domain of this function is all Real Numbers

Solve the problem.

6) The function f , given in the diagram below, computes the average cost of an item during year x .

a) Evaluate $f(1967)$.



$$f(1967) = 480$$

b) Explain the meaning to your answer on part (a) within the context of the problem.

In 1967 the average cost of the item was \$480

c) Solve $f(x) = 570$

$$x = 1973$$

d) Explain the meaning to your answer on part (c) within the context of the problem.

In 1973 the average cost of the item was \$570

Determine whether f might be a linear function.

7)	x	-2	-1	0	1
	$f(x)$	-10	-4	2	8

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 +6 +6 +6

YES

NO

EXPLAIN

The slope is constant

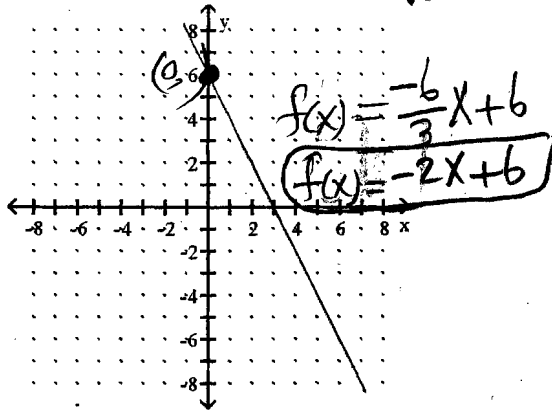
8) Make up a table listing 6 ordered pairs in such a way that you have A FUNCTION WHICH IS NOT LINEAR.

x	-2	-1	0	1
$f(x)$	-10	5	7	13

Write a linear function for each one of the following graphs.

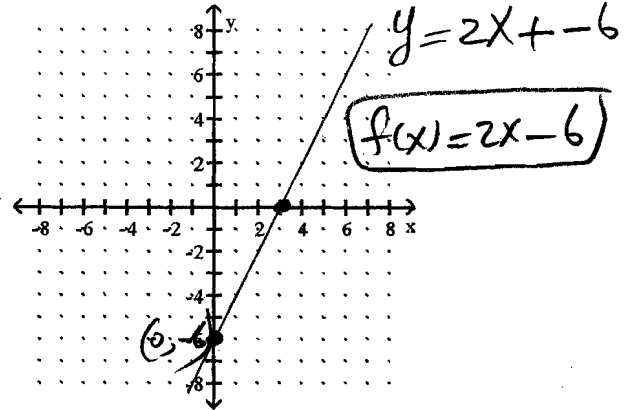
9)

A)



$$\text{slope} = \frac{\text{Rise}}{\text{Run}} = \frac{-6}{3} = -2$$

$$\frac{\text{Rise}}{\text{Run}} = \frac{6}{3} = 2$$



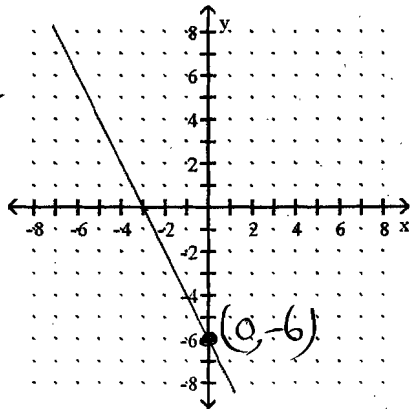
$$y = 2x + -6$$

$$f(x) = 2x - 6$$

C)

$$m = \frac{-6}{3} = -2$$

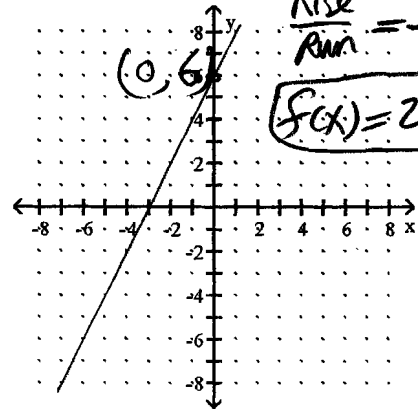
$$f(x) = -2x - 6$$



D)

$$\frac{\text{Rise}}{\text{Run}} = \frac{6}{3} = 2$$

$$f(x) = 2x + 6$$



Write the slope-intercept form for a line satisfying the stated conditions.

10) The line passes through $(0, -\frac{11}{2})$ and $(1, 0)$.

$$m = \frac{0 - (-11/2)}{1 - 0} = \frac{11}{2}$$

and y-intercept is $(0, -\frac{11}{2})$

$$y = \frac{11}{2}x - \frac{11}{2}$$

Find the slope and y-intercept of the linear function

11) $7x - 5y = 15$

$$-5y = -7x + 15$$

$$y = \frac{7}{5}x - \frac{15}{5}$$

$$y = \frac{7}{5}x - 3$$

$$\text{slope} = \frac{7}{5}$$

$$\text{y-intercept} = (0, -3)$$

The table below represents a linear function.

12) x	-4	-2	0	2	4
f(x)	-12	-7	-2	3	8

$\begin{matrix} \nearrow +5 & \nearrow +5 & \nearrow +5 & \nearrow +5 \end{matrix}$

$$m = \frac{-7 - (-12)}{-2 - (-4)} = \frac{5}{2}$$

a) Find the missing values in the table.

see above

b) What is the slope?

$$m = \frac{5}{2}$$

c) What is the y-intercept?

$$(0, -2)$$

d) Write the equation of this line. $y = \frac{5}{2}x - 2$

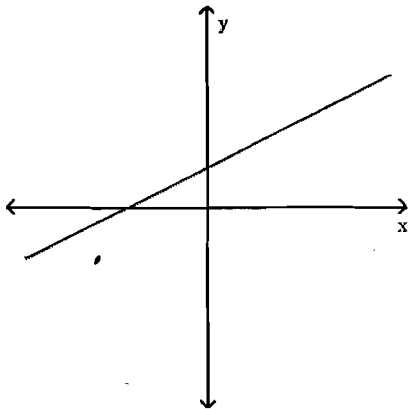
e) Complete the statement.

In this linear function, y is increasing / decreasing (circle one) at a rate of $\frac{5}{2}$ units per unit

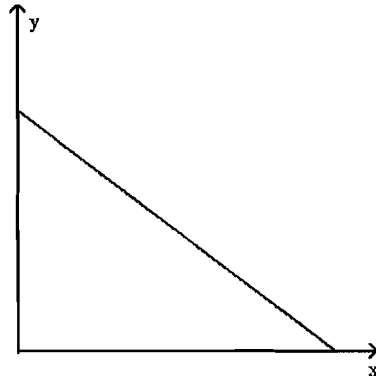
Match the situation to the graph that models it best.

13) The average cost y of college tuition from 1990 to 1997

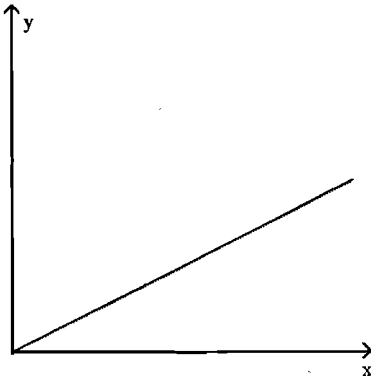
A)



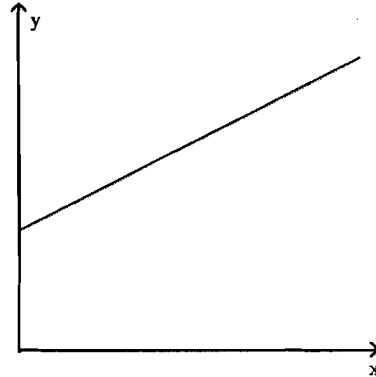
B)



C)

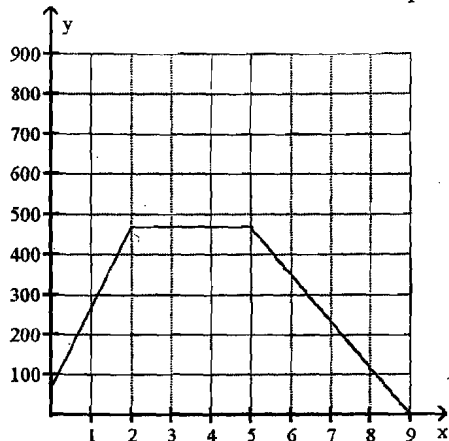


D)



Use the line graph to solve the problem.

- 14) The line graph represents the gallons of water in a swimming pool after x hours. There is a pump that can either add or remove water from the pool.



- a) Find the slope of the line segment from $(5, 467)$ to $(9, 0)$.

$$m = \frac{0 - 467}{9 - 5} = -\frac{467}{4}$$

- b) Name the time interval over which the amount of water in the pool is constant:

$$2 \leq x \leq 5 \text{ hours}$$

- c) Select the correct interpretation of the slope as a rate of change from choices A-D given below.

A) $m = \frac{467}{4}$; The pump is adding water at a rate of $\frac{467}{4}$ gallons per hour.

B) $m = \frac{467}{2}$; The pump is adding water at a rate of $\frac{467}{2}$ gallons per hour.

C) $m = -\frac{467}{2}$; The pump is removing water at a rate of $\frac{467}{2}$ gallons per hour.

D) $m = -\frac{467}{4}$; The pump is removing water at a rate of $\frac{467}{4}$ gallons per hour.

Solve the problem.

- 15) The value, in dollars, of a copy machine is given by the function $f(x) = -350x + 5000$, where x is the number of years that have passed since the machine was purchased. Interpret the slope of the graph of f as a rate of change.

A) The copy machine increases in value by \$175 each year.

B) The copy machine increases in value by \$350 each year.

C) The copy machine decreases in value by \$350 each year.

D) The copy machine decreases in value by \$175 each year.