

Functions Introduction Mixed Practice

Algebra I

Name:

Answers

A function is an equation that relates two variables, such as x and y , where each input (x) has exactly one output (y). We often use function notation to write functions, where x represents the input (the number going into the function) and $f(x)$ represents the y -value, the output or number coming out of the function.

- In a function, when we put a value into the equation for x we get out exactly one value for y .
- We call the numbers we put in for x the domain and the numbers that come out as y the range.

1a) Here's a linear function: $y = -3x + 4$. A domain (a list of x -values) is given. Your first mission is to find the range (y -values). In other words, put each x -value into the equation and see what y value it produces!

Domain: $\{-2, -1, 0, 1, 2, 3\}$

Find range for this domain:

$\{-5, -2, 1, 4, 7, 10\}$

$$y = -3(-2) + 4 = 10$$

$$y = -3(-1) + 4 = 7$$

$$y = -3(0) + 4 = 4$$

$$y = -3(1) + 4 = 1$$

$$y = -3(2) + 4 = -2$$

$$y = -3(3) + 4 = -5$$

b) Now let's write the ordered pairs we've just found.

$(-2, 10)$ $(1, 1)$
 $(-1, 7)$ $(2, -2)$
 $(0, 4)$ $(3, -5)$

c) Plot the points above on the set of axes.

d) Now let's say that the domain of this linear function is the set of real numbers. Join the points above with a line to show what the function would look like.

What's the range of this linear function?

All real numbers

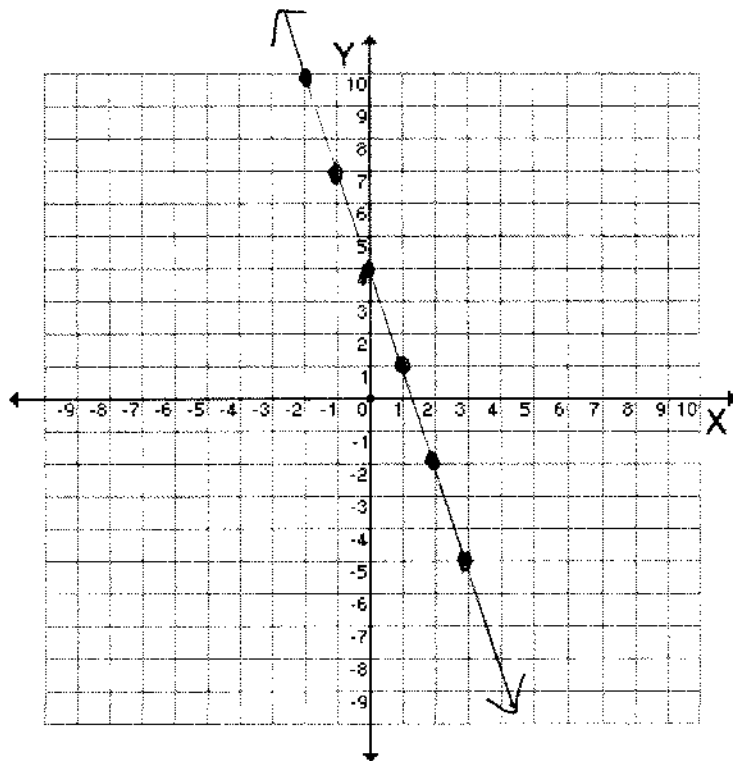
e) Often we use **function notation** to write a

function. We can write $y = -3x + 4$ as $f(x) = -3x + 4$ where x is the input and $f(x)$ is the output (the y).

What does $f(5)$ equal?

$$f(5) = -3(5) + 4 = -11$$

-11



Statistics Practice

2a) If we found a line of best fit for the scatter plot shown below, what could be the approximate value of the correlation coefficient (r) for the accompanying scatter plot?

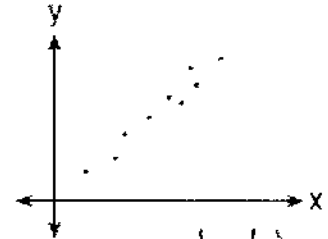
Multiple choice:

(a) $r = -0.8$

(b) $r = -0.2$

(c) $r = 0.2$

(d) $r = 0.8$



Explain why you chose the answer you chose:

This scatterplot shows a positive correlation (positive slope) and it looks strong, so $r = .8$ is + + close to $r = 1$.

2b) If you found a line of best fit for the scatter plot above and the residual plot had a nice curved pattern, what would that mean?

A curved pattern in the residual plot means the linear model is NOT best.

2c) What if instead the residual plot had no pattern at all. What would that mean?

No pattern in the residual plot means the linear model IS best.

Time studying (minutes)	Grade on quiz
10	70
15	70
15	78
20	77
25	82
25	88
42	86
54	92
70	95

3) The data below shows the time students spent studying and their grades on a statistics quiz.

a) Write the linear regression (line of best fit) of the data. Round coefficients to the nearest hundredth.

$$y = .39x + 69.90$$

b) Using this equation, make a prediction for the grade a student would receive if she studied for 1.25 hours. (How many minutes is that?)

$$1.25 \text{ hrs} \times 60 \text{ min} = 75 \text{ min}$$

$$y = .39(75) + 69.90$$

$$y = 99.15$$

c) Using this equation, make a prediction for the amount of time spend studying if a student received a 75 on the quiz. (Round to nearest minute.)

$$75 = .39x + 69.90$$

$$- 69.90 \quad - 69.90$$

$$5.1 = .39x$$

$$\frac{5.1}{.39} = x$$

$$13.08 = x$$

About 13 minutes

d) Does there appear to be a strong correlation between the variables? What might the correlation coefficient (r) equal? Explain your answer.

Yes, the correlation seems strong.

$$r \approx .9$$