

Finding the Equation of a Line Worksheet

Instructions: Find the equation of a line with the following conditions:

Part 1: Given slope and a point

a) with slope 1, passing through P(0, 3)

Slope and Point:

1. Plug the slope, m , and point, (x,y) , into the equation $y=mx+b$ and solve for b which is the y -intercept.

2. Write the equation in the form $y=mx+b$ by plugging in for m and b .

b) with slope -1 , passing through P(4, 0)

c) with slope 2, passing through P(1, 1)

d) with slope -3 , passing through $P(-4, 2)$

e) with slope $\frac{1}{5}$, passing through $P(10, 4)$

f) with slope $-\frac{1}{4}$, passing through $P(-4, -1)$

g) with slope $\frac{2}{5}$, and passing through $P(-10, 3)$

Part 2: Given a parallel or perpendicular line, and a point

a) Through (4,-4) and parallel to $y = -x-4$

Parallel and point:

- 1.** Use the parallel slope and point on the line to calculate the y-intercept.
- 2.** Write the equation in $y=mx+b$ form by plugging in the parallel slope for m, and the y-intercept for b.

Perpendicular and point:

- 1.** Find the perpendicular slope by finding the negative reciprocal
- 2.** Use the perpendicular slope and point on the line to solve for the y-intercept.
- 3.** Write the equation of the line in $y=mx+b$ form using the perpendicular slope and y-intercept.

b) Through (-4,-1) and parallel to $y = 2x + 5$

c) Through (2,0) and parallel to $y = \frac{1}{3}x - 7$

d) Through $(-2,4)$, parallel to $y = -\frac{5}{2}x + 5$

e) Through $(2,0)$ and perp. to $y = \frac{2}{3}x$

f) Through $(5,0)$ and perp. to $y = -x + 5$

g) Through $(2,4)$ and perp. to $y = -\frac{2}{7}x - 3$

h) Through $(-2,4)$ and perp. to $y = -\frac{3}{2}x + 3$

Part 3: Given two points

a) Through the points $(4,-2)$ and $(6,-4)$

Two points:

1. Find the slope using the two points
2. Use the slope and either point on the line to solve for the y-intercept
3. Write the equation of the line using the slope and y-intercept

b) Through the points $(-1,7)$ and $(-2,4)$

c) Through the points $(6,-12)$ and $(15,-3)$

d) Through the points $(9,3)$ and $(19,-17)$

e) Through the points $(19,-2)$ and $(-11,10)$

f) Through the points $(-4,7)$ and $(-6,-4)$

g) Through the points $(-2, 7)$ and $(3,-1)$

h) Through the points $(2,6)$ and $(5, 10)$

i) A line has an x -intercept of 3 and a y -intercept of 4.

j) has an x -intercept of -1 and a y -intercept of -9

Part 4: Applications

The mathematics department sponsors Math Family Fun Night every year. In the first year, there were 35 participants. In the third year there were 57 participants.

a) write an equation that can be used to predict the amount of participants, y , for any given year, x .

b) predict the number of participants in the 5th year.

Answers

Part 1: a) $y = x + 3$ b) $y = -x + 4$ c) $y = 2x - 1$ d) $y = -3x - 10$ e) $y = \frac{1}{5}x + 2$ f) $y = -\frac{1}{4}x - 2$ g) $y = \frac{2}{5}x + 7$

Part 2: a) $y = -x$ b) $y = 2x + 7$ c) $y = \frac{1}{3}x - \frac{2}{3}$ d) $y = \frac{-5}{2}x - 1$ e) $y = \frac{-3}{2}x + 3$ f) $y = x - 5$ g) $y = \frac{7}{2}x - 3$

h) $y = \frac{2}{3}x + \frac{16}{3}$

Part 3: a) $y = -x + 2$ b) $y = 3x + 10$ c) $y = x - 18$ d) $y = -2x + 21$ e) $y = \frac{-6}{15}x + \frac{28}{5}$ f) $y = \frac{11}{2}x + 29$

g) $y = \frac{-8}{5}x + \frac{19}{5}$ h) $y = \frac{4}{3}x + \frac{10}{3}$ i) $y = \frac{-4}{3}x + 4$ j) $y = -9x - 9$

Part 4: a) $y = 11x + 24$ b) 79