

# 10:06 | Point-Gradient Form

Name: \_\_\_\_\_

Class: \_\_\_\_\_

## Examples



The formula  $y - y_1 = m(x - x_1)$  is used to find the equation of the line with gradient  $m$  through the point  $(x_1, y_1)$ .

Find the equation of the line when:

- |  |   |  |
|--|---|--|
| <p>1 <math>(x_1, y_1) = (6, 2), m = 3</math><br/> <math>\therefore y - 2 = 3(x - 6)</math><br/> <math>y - 2 = 3x - 18</math><br/> <math>y = 3x - 16</math><br/>                 (or <math>3x - y - 16 = 0</math><br/>                 in general form)</p> | <p>2 <math>(x_1, y_1) = (-1, 5), m = -2</math><br/> <math>\therefore y - 5 = -2(x - (-1))</math><br/> <math>y - 5 = -2x - 2</math><br/> <math>y = -2x + 3</math><br/>                 (or <math>2x + y - 3 = 0</math><br/>                 in general form)</p> | <p>3 <math>(x_1, y_1) = (2, -7), m = \frac{3}{4}</math><br/> <math>\therefore y - (-7) = \frac{3}{4}(x - 2)</math><br/> <math>4(y + 7) = 3(x - 2)</math><br/> <math>4y + 28 = 3x - 6</math><br/> <math>3x - 4y - 34 = 0</math></p> |
|--|---|--|

## Exercise

- 1 Use  $y - y_1 = m(x - x_1)$  to find the equation of the line when:
- |  |  |
|--|--|
| a $(x_1, y_1) = (7, 4), m = 2$             | b $(x_1, y_1) = (-1, 3), m = -2$           |
| c $(x_1, y_1) = (2, 3), m = 5$             | d $(x_1, y_1) = (3, -1), m = -3$           |
| e $(x_1, y_1) = (-2, 0), m = 6$            | f $(x_1, y_1) = (-6, -2), m = 4$           |
| g $(x_1, y_1) = (0, 4), m = -3$            | h $(x_1, y_1) = (5, 6), m = \frac{1}{3}$   |
| i $(x_1, y_1) = (-2, 2), m = 1\frac{1}{4}$ | j $(x_1, y_1) = (4, -7), m = -\frac{3}{5}$ |
- 2 Find the equation of the line that:
- passes through  $(5, -1)$  with a gradient of 4
  - passes through the origin with a gradient of  $-3$
  - passes through  $(-2, -5)$  and has a gradient of  $2\frac{1}{2}$
  - passes through  $(-5, 0)$  and has a gradient of  $\frac{1}{10}$
  - has a slope of  $-1$  and passes through  $(-3, 4)$
  - has a gradient of  $-\frac{4}{3}$  and passes through  $(2, 9)$

## Fun Spot 10:06 | What coat can you put on only when it's wet?

Rearrange each equation into general form ( $ax + by + c = 0$ ).

Match the answers below with the letters.

A  $3x + y = 6$

C  $3x = y + 6$

F  $3x + y = -6$

I  $y = 3x + 6$

N  $3y = 2 - 7x$

O  $3y = 7x + 2$

P  $7x = 3y + 2$

T  $3y = -7x - 2$

$3x + y - 6 = 0$

$3x - y - 6 = 0$

$7x - 3y + 2 = 0$

$3x + y - 6 = 0$

$7x + 3y + 2 = 0$

$7x - 3y + 2 = 0$

$3x + y + 6 = 0$

$7x - 3y - 2 = 0$

$3x + y - 6 = 0$

$3x - y + 6 = 0$

$7x + 3y - 2 = 0$

$7x + 3y + 2 = 0$



10:06 Point-Gradient Form

1 a  $y = 2x - 10$

e  $y = 6x + 12$

i  $5x - 4y + 18 = 0$

2 a  $y = 4x - 21$

e  $y = -x + 1$

b  $y = -2x + 1$

f  $y = 4x + 22$

j  $3x + 5y + 23 = 0$

b  $y = -3x$

f  $4x + 3y - 35 = 0$

c  $y = 5x - 7$

g  $y = -3x + 4$

c  $5x - 2y = 0$

d  $y = -3x + 8$

h  $x - 3y + 13 = 0$

d  $x - 10y + 5 = 0$