Outcome 1 – Calculating the gradient between two points

Bronze example

Examples...

Find the gradient of the line passing through (1, -2) and (2, 5).

To find the gradient between the points (x_1, y_1) and (x_2, y_2) use...

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{5 - (-2)}{2 - 1} = \frac{7}{1} = 7$$

**Sub into formula **

Lines that slope...

- upwards have a positive gradient.
- downwards have a negative gradient.

Horizontal lines have a gradient of zero.

Silver example

Examples...

Sometimes the gradient might not be a whole number.

To find the gradient between the points (x_1, y_1) and (x_2, y_2) use...

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Leave your answer as a fraction in its simplest form!

Find the equation of the line passing through (1, -2) and (3, 9).

$$m = \frac{9 - (-2)}{3 - 1} = \frac{11}{2}$$

**Sub into formula **

Gold example

Examples...

Working backwards

To find the gradient between the points (x_1, y_1) and (x_2, y_2) use...

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

The line through (1, -2) and (7, x) has a gradient of 3. What is the value of x?

$$\frac{x - (-2)}{7 - 1} = 3$$

**Sub into formula **

$$\frac{x + 2}{6} = 3$$

$$x + 2 = 18$$

**Set equal to gradient **

$$x = 16$$

**Solve! **

Bronze Questions

Calculate the gradient of the straight lines passing through the points...

1. (2, 4) and (4, 10)
2. (5, 3) and (7, 11)
3. (4, 2) and (6, 12)
4. (2, 1) and (5, 10)
5. $(1, -3)$ and (5, 9)
6. $(1, -1)$ and (4, 5)
7. (1, 8) and (3, 4)
8. (2, 10) and $(6, -2)$
9. $(-1, 4)$ and (4, 9)
10. (2, 3) and $(4, -7)$

Silver Questions

Calculate the gradient of the straight lines passing through the points...

1. (1, 4) and (4, 11)
2. (2, 7) and (8, 9)
3. (4, 2) and (9, 10)
4. (4, 2) and (7, 12)
5. $(1, -3)$ and (3, 10)
6. $(2, -1)$ and (6, 6)
7. (1, 9) and (6, 7)
8. $(-2, -9)$ and (0, 2)
9. $(-1, 9)$ and (5, 8)
10. (1, 0) and $(5, -5)$

Gold Questions

For each of the following, work out the value of the missing letter...

1. $(2, 6)$ and $(8, y)$ $m = 1$
2. $(1, 5)$ and $(3, z)$ $m = 5$
3. $(0, 1)$ and $(5, d)$ $m = 2$
4. $(-1, 4)$ and $(h, 12)$ $m = 2$
5. $(2, n)$ and $(3, -6)$ $m = -3$
6. $(g, -8)$ and $(7, 2)$ $m = 5$

Bronze Answers

1. m = 3
2. m = 4
3. m = 5
4. m = 3
5. m = 3
6. m = 2
7. m = -2
8. m = -3
9. m = 1
10. m = -5

Silver Answers

1. m = 7/3
2. m = 1/3
3. m = 8/5
4. m = 10/3
5. m = 13/2
6. m = 7/4
7. m = -2/5
8. m = 11/2
9. m = -1/6
10. m = -5/4

Gold Answers

1. y = 10
2. z = 15
3. d = 11
4. h = 3
5. n = -3
6. g = 5