Outcome 3 – Calculating the equation of a straight line

Bronze example

Examples... $y = mx + c$

To find the equation of a straight line given the gradient, m, and any point (a, b) use...

$$y - b = m(x - a)$$

Find the equation of the line with m = 2 passing through (1, -3).

$y + 3 = 2(x - 1)$ **Remove Bracket**

$y + 3 = 2x - 2$

$y = 2x - 5$ Subtract the 3

Silver example

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

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

Find the equation of the line passing through (1, -2) and (2, 4).

$m = \frac{4 - (-2)}{2 - 1} = \frac{6}{1} = 6$ **Find the gradient **

$y - 4 = 6(x - 2)$ **Using m = 6 and ANY point on the line, sub into y - b = m(x - a) **

$y - 4 = 6x - 12$

$y = 6x - 8$

Gold example

Examples...

Find the equation of the line passing through (1, -2) and (3, 7).

$m = \frac{7 - (-2)}{3 - 1} = \frac{9}{2}$ **Find the gradient **

$y - 7 = \frac{9}{2}(x - 3)$ ** y - b... **

$\times 2)\ 2y - 14 = 9(x - 3)$

$2y - 14 = 9x - 27$ ** Eliminate the fraction **

$2y = 9x - 13$

$y = \frac{9}{2}x - \frac{13}{2}$

Bronze Questions

Calculate the equation of the straight lines with...

1. $m = 3$ and passing through $(2, 4)$
2. $m = 5$ and passing through $(1, 6)$
3. $m = 2$ and passing through $(-3, 1)$
4. $m = 6$ and passing through $(4, -2)$
5. $m = 1$ and passing through $(-2, -3)$
6. $m = -2$ and passing through $(6, 2)$
7. $m = -3$ and passing through $(1, -5)$
8. $m = -1$ and passing through $(5, -2)$
9. $m = 2$ and passing through $(-1, 3)$
10. $m = -8$ and passing through $(-1, -2)$

Silver Questions

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

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

Gold Questions

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

1. $(1, 4)$ and $(4, 11)$
2. $(2, 7)$ and $(5, 9)$
3. $(4, 2)$ and $(9, 9)$
4. $(4, 1)$ and $(7, 14)$
5. $(1, -3)$ and $(3, 6)$
6. $(2, -1)$ and $(5, 4)$
7. $(1, 9)$ and $(4, 8)$
8. $(-2, -9)$ and $(1, 1)$
9. $(-1, 9)$ and $(2, 7)$
10. $(1, 0)$ and $(5, -7)$

Bronze Answers

1. $y = 3x - 2$
2. $y = 5x + 1$
3. $y = 2x + 7$
4. $y = 6x - 26$
5. $y = x - 1$
6. $y = -2x + 14$
7. $y = -3x - 2$
8. $y = -x + 3$
9. $y = 2x + 5$
10. $y = -8x - 10$

Silver Answers

1. $y = 2x$
2. $y = 3x - 12$
3. $y = 4x - 14$
4. $y = 5x - 14$
5. $y = 6x - 9$
6. $y = 3x - 7$
7. $y = -x + 9$
8. $y = -3x + 5$
9. $y = 2x + 5$
10. $y = -4x + 11$

Gold Answers

1. $y = 5/3x + 7/3$
2. $y = 2/3x + 17/3$
3. $y = 7/5x - 18/5$
4. $y = 13/3x - 49/3$
5. $y = 9/2x - 15/2$
6. $y = 5/3x - 13/3$
7. $y = -1/3x + 28/3$
8. $y = 10/3x - 13/3$
9. $y = -2/3x + 25/3$
10. $y = -7/4x + 7/4$