

Higher Mathematics : Lesson Starters

Straight Line 1

Block 1 (The Straight Line)

Without using a calculator :

Task 1

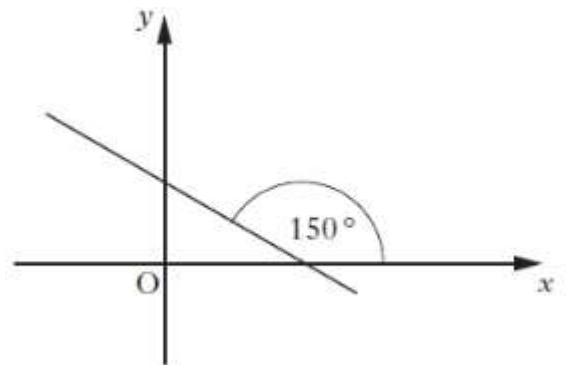
- 1 Calculate the gradient of the line joining the points $(0, 0)$ and $(-3, 4)$.
- 2 What is the gradient of the line $4y - 2x = 7$?
- 3 Simplify $\sqrt{200}$
- 4 A straight line with gradient -2 passes through the points $(p, 6)$ and $(12, 4)$.
Find the value of p .

Task 2

- 1 Draw the graph of $y = 2x + 4$ (for $-3 \leq x \leq 3$)
- 2 Find the equation of the vertical line which passes through the point $(1, 6)$.
- 3 Find the equation of the horizontal line which passes through the point $(1, 6)$.
- 4 Simplify $p^{-1}(p^{-3} + p)$

Task 3

- 1 What is the gradient of the line in the diagram?
- 2 Calculate the gradient of the line perpendicular to the line $5y + 2x = 1$.
- 3 The answer is $\frac{2}{7}$. What is the question?
- 4 Factorise $x^2 + 5x - 24$



Task 4

- 1 Find the midpoint of (4, 1) and (-6, 7).
- 2 The line L passes through the point (-2, -1) and is parallel to the line with equation $5x + 3y - 6 = 0$. What is the equation of L?
- 3 Triangle PQR has vertices at P(-3, -2), Q(-1, 4) and R(3, 6). PS is a median. What is the gradient of PS?
- 4 Multiply out the brackets and collect like terms.

$$(2x + 3)(x^2 - 5x + 2)$$

Task 5

- 1 The point (-1, -4) lies on the line $4x - 2y = 10$. (True or False?)
- 2 The **isosceles** triangle ABC has coordinates A(-3, 4), B(1, 0) and C(3, 6).
What is the equation of the axis of symmetry of triangle ABC?
- 3 Find the equation of the line through the point (-1, 4) which is parallel to the line with equation $3x - y + 2 = 0$.
- 4 Simplify
$$\frac{p^{\frac{1}{2}} \times p^{\frac{3}{2}}}{p^4}$$