**Starter**

1) Change the subject to T:　　4 - 3m = 2T

$$2T = 4 - 3m$$
$$T = \frac{4 - 3m}{2}$$

2) If k = 2 and j = - 3, evaluate 2k² - 3j

$$= 2(2^2) - 3(-3)$$
$$= 8 + 9$$
$$= 17$$

3) Solve the equation for $x$:　　3$x$ - 9 = 1 - 2$x$

$$5x - 9 = 1$$
$$5x = 10$$
$$x = 2$$

**Today's Learning:**

To know the general equation of a straight line and identify the equation of a straight line from its graph.

Plot these graphs using a table of values:　(-1,-1)　(0,1)

1) y = 2$x$ + 1

| $x$ | -1 | 0 | 1 | 2 |
|---|---|---|---|---|
| y | -1 | 1 |  |  |

2) y = 3$x$ - 4

| $x$ | -1 | 0 | 1 | 2 |
|---|---|---|---|---|
| y | -7 | -4 | -1 | 2 |

3) y = -2$x$ + 2

$$y = 3(-1) - 4 \qquad y = 3(0) - 4$$
$$y = -3 - 4 \qquad\quad y = 0 - 4$$
$$= -7 \qquad\qquad\quad = -4$$
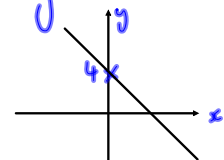
**Equation of a Straight Line**

The general equation of any straight line is **y = m$x$ + c**

where m is the gradient and c is the y-intercept.

**e.g. 1)** State the gradient and y-intercept of the line with equation y = 2$x$ - 3

gradient = 2
y-intercept = - 3

**2)** Sketch the graph y = -$x$ + 4

### Starter

1) Calculate $\dfrac{2}{y} - \dfrac{3}{z}$

2) Write in completed square form:   $g^2 - 6g + 4$

3) Calculate $5m^3 \times 2m^{-1}$

4) Fully factorise $3f^3 + 3f^2 - 6f$

$y = 7 + x \qquad y = 3 + x$

**Today's Learning:**

To rearrange the equation of a straight line to find the gradient and y-intercept.

$f(x) = 2 - (3 - x) \quad f(x) = x^2 - 3$
$f(-1) = 2 - (3 - -1) \qquad f(2) = 2^2 - 3$

### Rearranging the Equation of a Straight Line

e.g. 1) $2y = 6x - 1$

$y = 3x - \dfrac{1}{2}$

2) $y - 4x + 5 = 0$

$+4x \qquad +4x$
$\quad -5 \qquad -5$

$y = 4x - 5$

3) $0 = 5y + 4x - 1$

$-4x = 5y - 1$
$-4x + 1 = 5y$

$\dfrac{-4}{5}x + \dfrac{1}{5} = y$

$y = \dfrac{-4}{5}x + \dfrac{1}{5}$

$-y = 2x - 4$

$y = -2x + 4$

**Challenge:**

$y = mx + c$

State the gradient and y-intercept of the line with equation

$$2y + 3 = 4x$$

$\ominus 3 \qquad \ominus 3$

$2y = 4x - 3$
$y = 2x - \dfrac{3}{2}$

**Substituting to Find the Equation**

e.g. Write the equation of the straight line with gradient 4 that passes through (-2, 7).

$y = 7$    $x = -2$

$m = 4$

$y = mx + c$

$7 = 4x - 2 + c$

$7 = -8 + c$
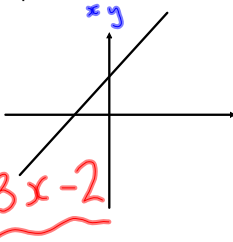
$+8 \quad +8$

$15 = c$

$y = 4x + 15$

**Challenge:**

Write down the equation of the straight line that has gradient 3 and passes through the point (2, 4)

$y = mx + c$

$4 = 3(2) + c$

$4 = 6 + c$

$-2 = c$

$y = 3x - 2$

**Starter**

1) If a = 2, b = 4 and c = -1, evaluate b² - 4ac

$= 4^2 - 4 \times 2x - 1$

$= 16 - 8x - 1$

$= 16 + 8 = 24$

2) Solve for g:   3(g - 2) = 11

$3g - 6 = 11$

$3g = 17$

$g = \frac{17}{3}$

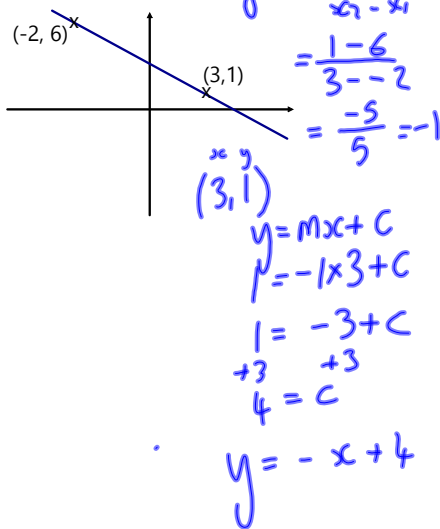3) If b = -3 and F = 1, evaluate b² - F³

$= (-3)^2 - (1)^3$

$= 9 - 1 = 8$

**Today's Learning:**

Finding the equation of straight lines when we are given 2 points.

## Challenge:

Find the equation of the straight line that passes through the points (-2, 6) and (3,1)

(-2, 6)

(3,1)

$$y = mx + c$$

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

$$= \frac{1 - 6}{3 - -2}$$

$$= \frac{-5}{5} = -1$$

$$(3, 1)$$

$$y = mx + c$$

$$1 = -1 \times 3 + c$$

$$1 = -3 + c$$

$$+3 \quad +3$$

$$4 = c$$

$$y = -x + 4$$

## Finding the Equation using 2 Points

Find the gradient, then substitute into y = m$x$ + c.

e.g. 1) A(12, 10) and B(6, -2)

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

$$= \frac{-2 - 10}{6 - 12}$$

$$= \frac{-12}{-6} = 2$$

$$y = mx + c$$

$$10 = 2 \times 12 + c$$

$$10 = 24 + c$$

$$-24 \quad -24$$

$$-14 = c$$

$$y = 2x - 14$$

2) G(2, 6) and H(-4, 3)

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

$$= \frac{3 - 6}{-4 - 2}$$

$$= \frac{-3}{-6} = \frac{-1}{-2}$$

$$= \frac{1}{2}$$

$$y = mx + c$$

$$6 = \frac{1}{2} \times 2 + c$$

$$6 = 1 + c$$

$$c = 5$$

$$y = \frac{1}{2}x + 5$$

## Starter

1) Factorise fully:        $3T^2 - 5T - 2$

2) Change the subject of the formula to b:

$$T - 1 = \frac{2b}{5}$$

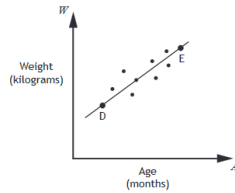3) Find the arc length of a quarter-circle with radius 10 cm.

4) Simplify the surd   $\sqrt{72}$

## Today's Learning:

Exam Practice

**5.** A cattle farmer records the weight of some of his calves.

The scattergraph shows the relationship between the age, $A$ months, and the weight, $W$ kilograms, of the calves.



Point D represents a 3 month old calf which weighs 100 kilograms.

Point E represents a 15 month old calf which weighs 340 kilograms.

(a) Find the equation of the line of best fit in terms of $A$ and $W$.

Give the equation in its simplest form.　　　　　　　　**3**

X747/75/01　　　　　　　　　　　　**Mathematics**
**Paper 1**
**(Non-Calculator)**

TUESDAY 19 MAY

**8.** Find the equation of the line joining the points $(-2, 5)$ and $(3, 15)$.

Give the equation in its simplest form.　　　　**3**

$$\text{grad} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{15 - 5}{3 - -2}$$

$$= \frac{10}{5} = \frac{2}{1} = 2 \checkmark$$

$$15 = 2 \times 3 + C$$
$$15 = 6 + C$$
$$\frac{-6 \quad -6}{9 = C} \checkmark$$

$$y = 2x + 9 \checkmark$$

1) State the gradient and y-intercept of the straight line with equation　$4y - 3x = 7$

2) Find the equation of the straight line that goes through $(-2, 9)$ and $(4, 15)$