

Starter1) Simplify: $b^4 \times b^{-3}$ b 2) Find the gradient of the straight line joining $(5, 7)$ to $(10, 12)$.

$$\text{grad} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{12 - 7}{10 - 5} = \frac{5}{5} = 1$$

3) Write down the formula for the volume of a cylinder.

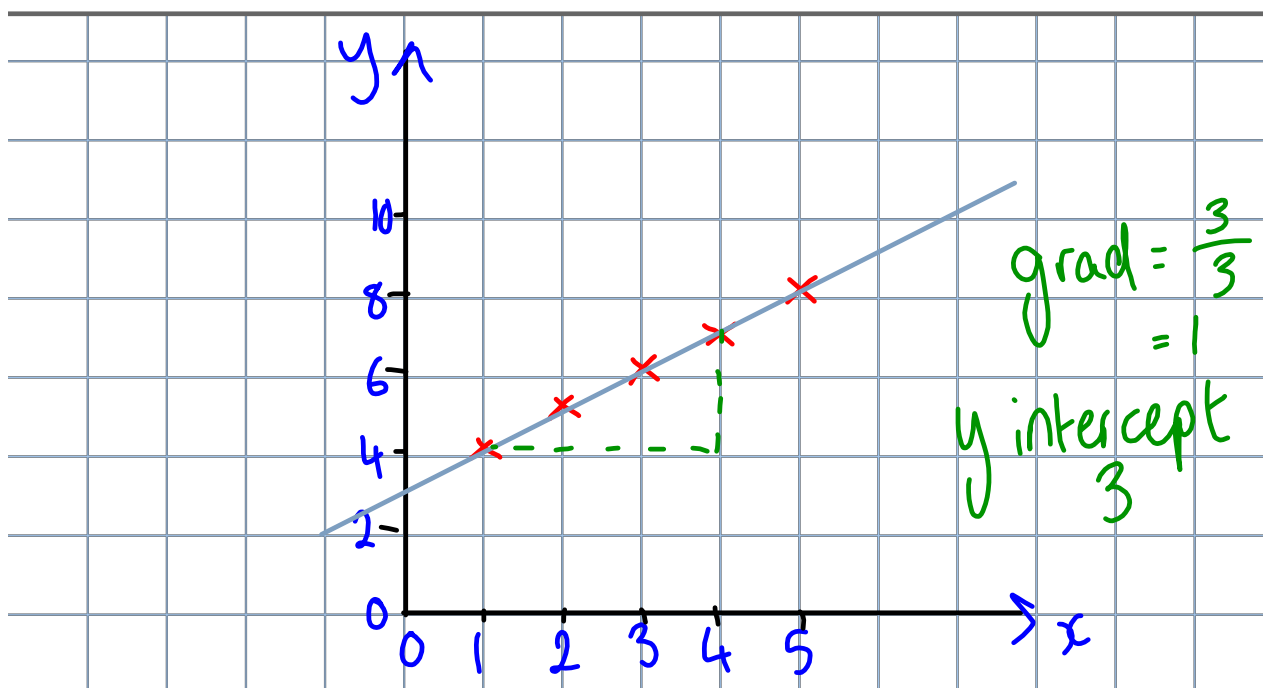
$$V = \pi r^2 h$$

Today's Learning:

To plot a straight line graph, given its equation or some coordinates and to state the equation of vertical and horizontal straight line graphs.

Plot the values and make a straight line graph:

x	1	2	3	4	5
y	4	5	6	7	8



Draw the straight line $y = 2x$ using these coordinates:

x	1	2	3	4	5
y	2	4	6	8	10

$$y = 2x - 1$$

x	1	2	7 7
y	1	3	14

Starter

1) Calculate $\frac{2}{y} - \frac{3}{z} = \frac{2z}{yz} - \frac{3y}{yz} = \frac{2z - 3y}{yz}$

2) Factorise $g^2 - 6g + 8$

$$(g - 4)(g - 2)$$

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

$$10m^2$$

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

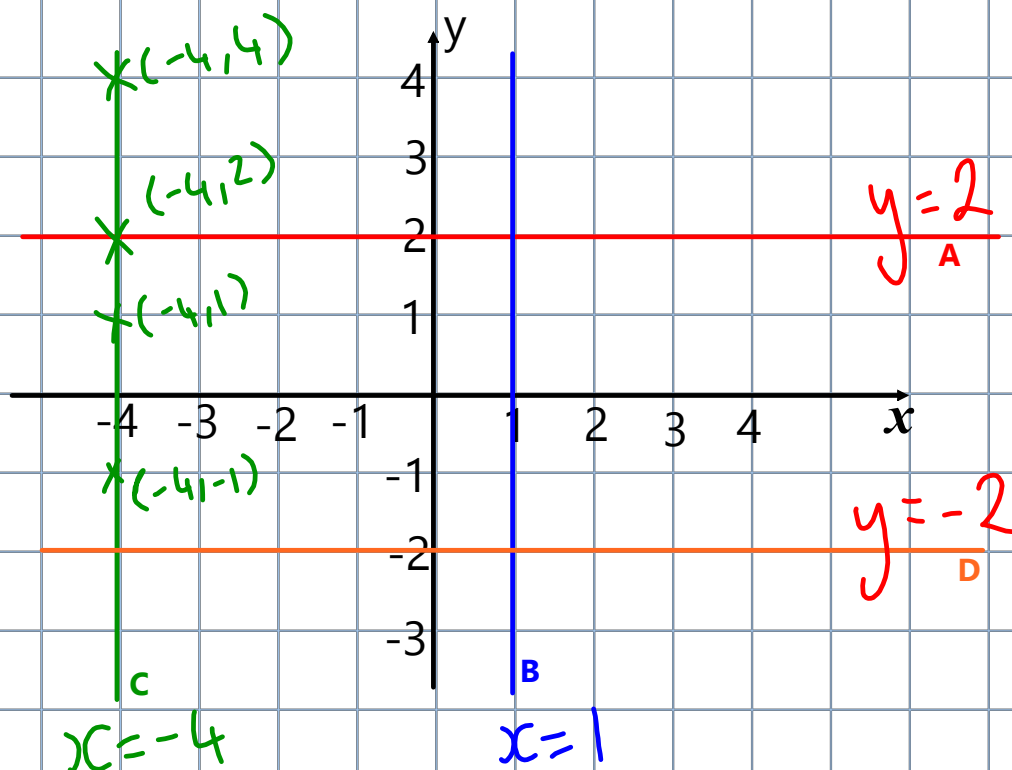
$$3f(f^2 + f - 2)$$

$$3f(f + 2)(f - 1)$$

$$\begin{array}{r} 8 \\ 4, 2 \\ 8, 1 \end{array}$$

$$\begin{array}{r} 2 \\ 1, 2 \end{array}$$

What is the equation of these lines?



Today's Learning:

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

Equation of a Straight Line

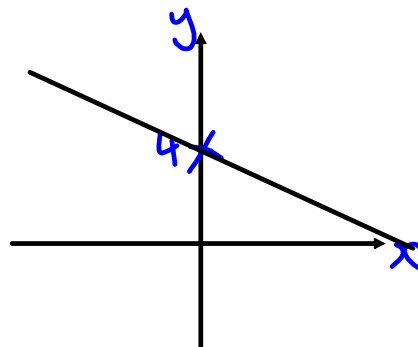
The general equation of any straight line is $y = mx + c$

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 $y = 2x - 3$

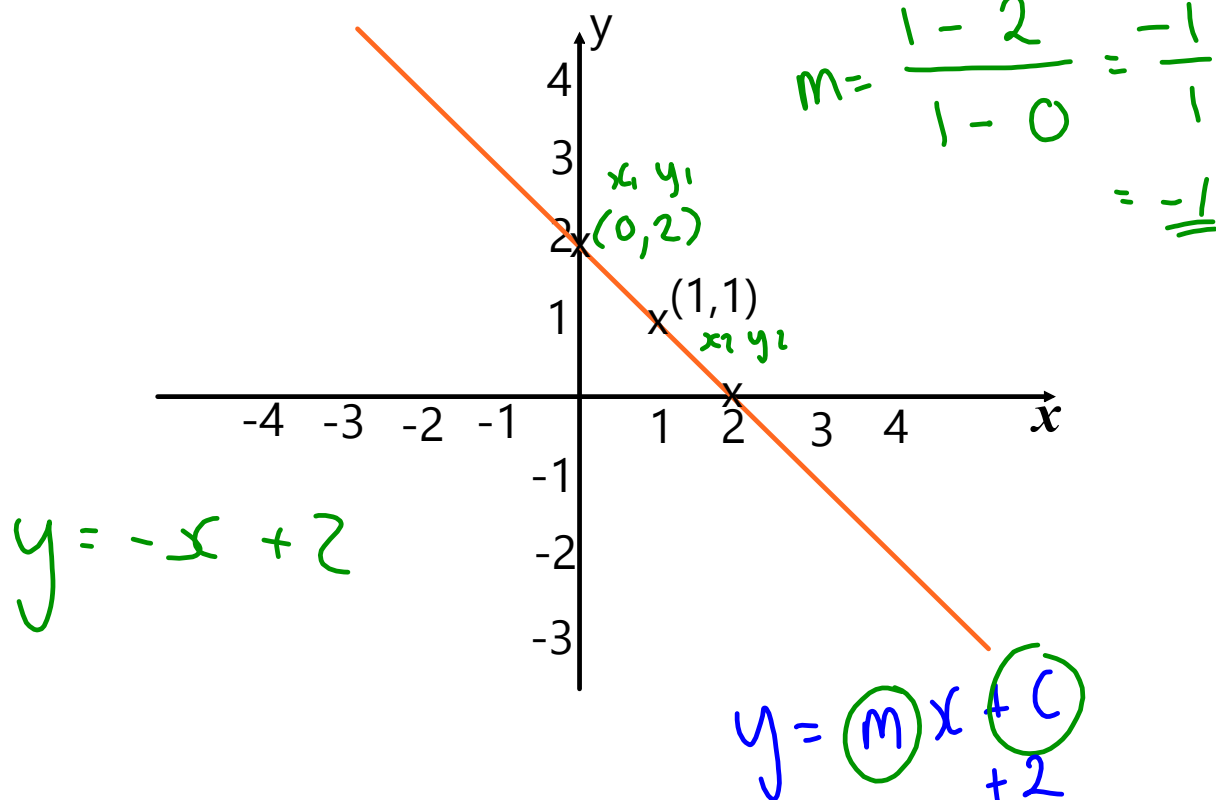
grad = 2 y-intercept = -3

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



Starter

What is the equation of this straight line?

**Rearranging the Equation of a Straight Line**e.g. 1) $2y = 6x - 1$

$$\begin{array}{cc} \div 2 & \div 2 \\ y = 3x - \frac{1}{2} \end{array}$$

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

$$\begin{array}{cc} -5 & -5 \\ y - 4x = -5 \\ +4x & +4x \\ y = 4x - 5 \end{array}$$

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

$$-5y \quad -5y$$

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

divide everything by -1

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

$$\div 5 \quad \div 5$$

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

Today's Learning:

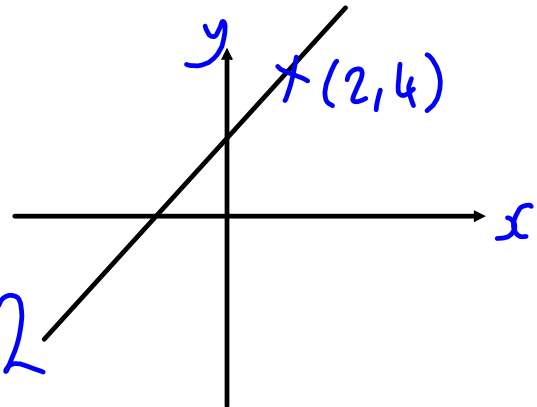
To find the equation of a straight line given a point and the gradient, or two points.

$$y = mx + c$$

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

$$\begin{aligned}
 y &= mx + c \\
 y &= 3x + c \\
 4 &= 3 \times 2 + c \\
 4 &= 6 + c \\
 -6 & \quad -6 \\
 -2 &= c
 \end{aligned}$$

$$y = 3x - 2$$

Substituting to Find the Equation

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

$$\begin{aligned}
 y &= mx + c \\
 7 &= 4x - 2 + c \\
 7 &= -8 + c \\
 +8 \quad +8 \\
 15 &= c
 \end{aligned}$$

Complete Question 7 on page 4

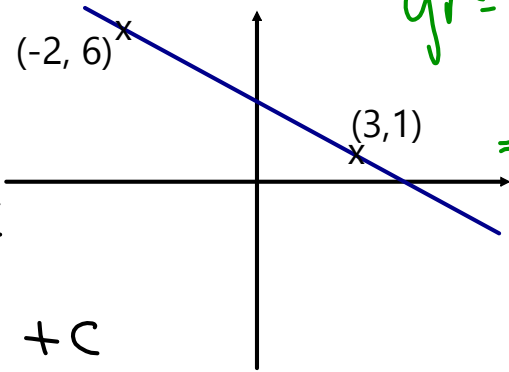
$$y = 4x + 15$$

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 $(3, 1)$



Handwritten calculations for the equation of the line:

$$y = mx + c$$

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

$$1 = -3 + c$$

$$+3 \quad +3$$

$$4 = c$$

$$y = -x + 4$$

Gradient calculation:

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

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

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

Finding the Equation using 2 PointsFind the gradient, then substitute into $y = mx + c$.e.g. 1) $A(x_1, y_1)$ and $B(x_2, y_2)$
 x y

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

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

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

$$y = mx + c$$

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

$$10 = 24 + c$$

$$\begin{array}{r} -24 \\ -14 = c \end{array}$$

$$y = 2x - 14$$

2) $G(x_1, y_1)$ and $H(x_2, y_2)$
 x y

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

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

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

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

$$y = mx + c$$

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

$$6 = 1 + c$$

$$\begin{array}{r} -1 \\ 5 = c \end{array}$$

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