Maths Points

Junior and Leaving Cert

JCOL BASIC SKILLS

PACK 5

Junior Cert Ordinary level

JCOL Basic Skills: Pack 5 – Table of Contents

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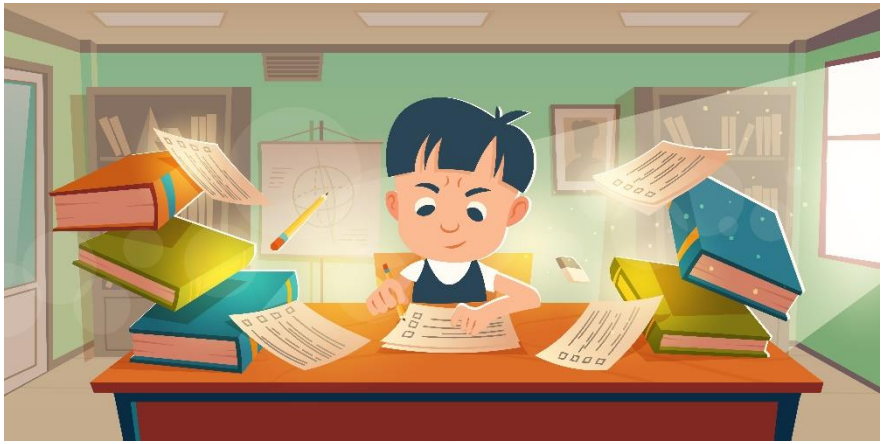

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Factorise each of the following.

(i)

$4xy - 8y$

$4xy - 8y$

$= 4y(x - 2)$

Common Factor

(ii)

$xy - xz + 3y - 3z$

$xy - xz + 3y - 3z$

$= x(y - z) + 3(y - z)$

$= (x + 3)(y - z)$

Factorise by Grouping

(iii)

$x^2 + 7x + 12$

$x^2 + 7x + 12$

$= (x + 3)(x + 4)$

Quadratic

(iv)

$x^2 - 64$

$x^2 - 64$

$= (x + 8)(x - 8)$

Difference of Two Squares

Oisín earns €30 000 per year. He pays tax at 20%.

Work out Oisín's **gross tax** per year.

Calculate 20% of €30,000.

$30{,}000 \times 0.20$

$= €6{,}000$

(ii)

Oisín's tax credits are €3300 per year.

Work out his **net pay** per year.

Tax Payable = Gross Tax − Tax Credits

$$\begin{array}{r} 6{,}000 - \\ 3{,}300 \\ \hline €2{,}700 \end{array}$$

Net Pay = Gross Income − Tax Payable

$$\begin{array}{r} 30{,}000 - \\ 2{,}700 \\ \hline 27{,}300 \end{array}$$

Oisín's net pay is €27,300.

The co-ordinate diagram below shows part of the town where Ben lives.

Show that the **slope** of the line from the Shop to Home is $\frac{1}{3}$.

The formula for the **Slope** is on **page 18** of the Maths Formulae Book.

Slope

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

$(-3, 1)$
$\rightarrow (x_1, y_1)$
$(3, 3)$
$\rightarrow (x_2, y_2)$

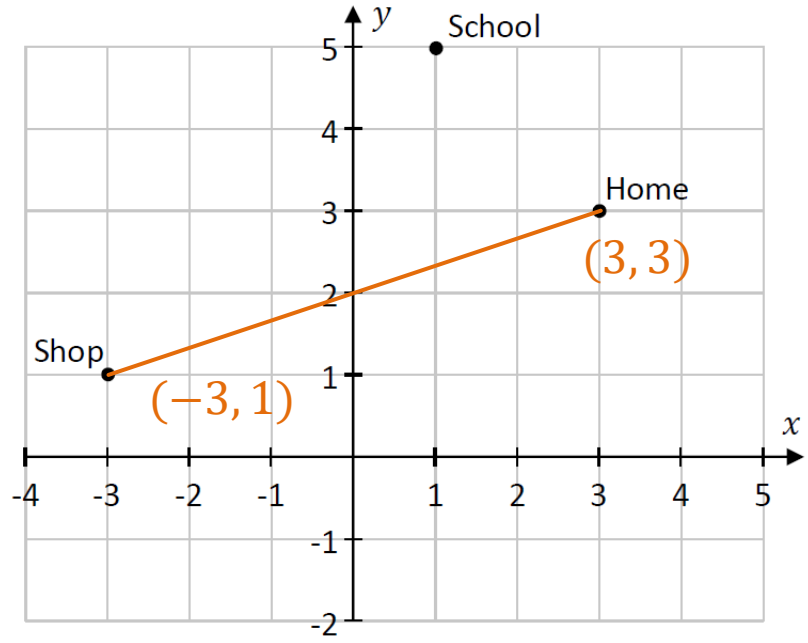
$$m = \frac{y_2 - y_1}{y_2 - y_1}$$

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

$$m = \frac{2}{6}$$

$$m = \frac{1}{3}$$

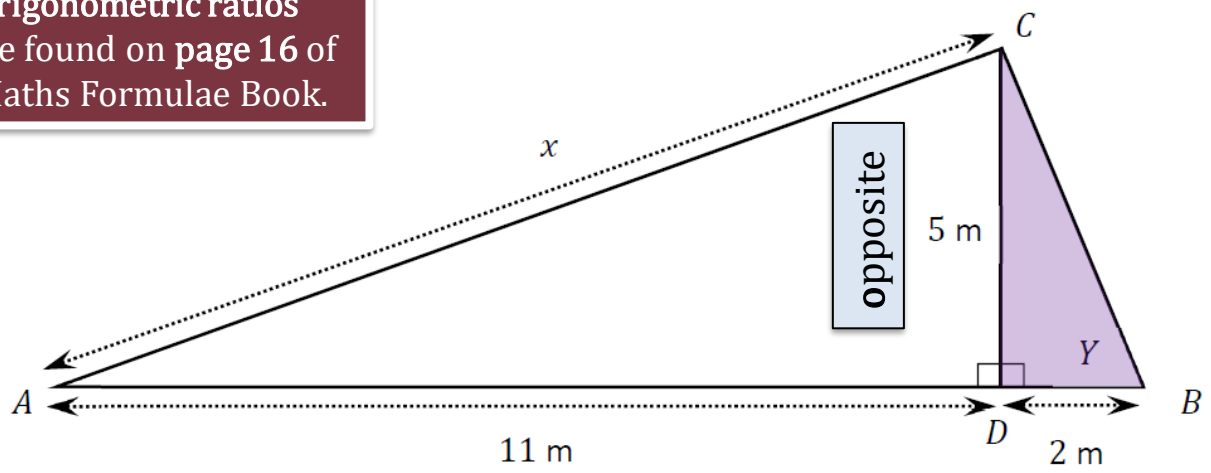
As required.



Y is one of the angles in the triangle DBC.

Write down the length of the side opposite Y and the side adjacent to Y **in DBC**.

The **trigonometric ratios** can be found on **page 16** of the Maths Formulae Book.



adjacent

Opposite Y = 5

Adjacent to Y = 2

Steps:

1. Label the sides.
2. Pick a ratio.
3. Write an equation.
4. Solve for x.

(ii)

Use your answer from part **(c)(i)** to write tan Y as a fraction.

Trigonometry Ratio

$$\tan = \frac{\text{opposite}}{\text{adjacent}}$$

$$\tan Y = \frac{5}{2}$$

(iii)

Hence, use a calculator to find the size of the angle Y, correct to the nearest degree.

$$\tan Y = \frac{5}{2}$$

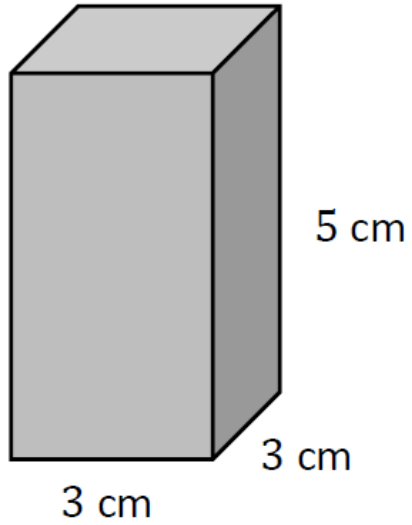
$$Y = \tan^{-1}\left(\frac{5}{2}\right)$$

$$Y = 68.2°$$

$$Y \approx 69°$$

A closed rectangular box has a square base with sides of length 3 cm, and a height of 5 cm.

Find the **volume** of the box.



Volume of Cuboid

V = Length × Breath × Height

Volume = Length × Breath × Height

$V = 3 \times 3 \times 5$

$V = 45 \text{ cm}^3$

The volume of the box is 45 cm^3.

You must learn off the formula for the volume of a cuboid as it is not contained in the Maths Formulae Booklet.

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