

SUBJECT: Maths

UNIT:

Year 11 Algebra

SANDHILL VIEW

EST. 1993



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Key Concept

Iteration

Iteration is the **repetition** of a mathematical procedure applied to the result of a previous application, typically as a means of **obtaining successively closer approximations** to the solution of a problem.

Key Words

Estimate: Round each value to 1 significant figure, then complete the calculation using the rounded values.

Multiplier: A percentage wrote as a decimal, which can then be multiplied by an amount.

Examples

$$\text{When } x_0 = 0 \quad x_{n+1} = \frac{2}{x_n^2 + 3}$$

Calculate the values of x_1, x_2, x_3 to find an estimate for the solution to $x^3 + 3x = 2$

$$x_{0+1} = \frac{2}{0^2 + 3} = 0.\dot{6}$$

We substitute this value into the next step.

$$x_{1+1} = \frac{2}{0.\dot{6}^2 + 3} = 0.5806451613$$

$$x_{2+1} = \frac{2}{(0.58 \dots)^2 + 3} = 0.5993140006$$

An estimate of the solution is 0.6 because all of the solutions round to 1d.p.

$$y = x^3 + 1$$



Examples Transforming Cubics

$$y = x^3$$



$$y = -x^3$$



$$y = (x + 1)^3$$



$$y = (-x)^3$$



Key Concept – Transformation of Graphs

	Description of change	Change in x coordinate	Change in y coordinate
$f(x) \pm a$	Translates the graph in the y direction	No change	$+a$ shifts up by a $-a$ shifts down by a
$f(x \pm a)$	Translates the graph in the x direction	$+a$ shifts left by a $-a$ shifts right by a	No change
$-f(x)$	Reflection in x axis	No change	Changes the sign
$f(-x)$	Reflection in y axis	Changes the sign	No change

SUBJECT: Maths

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Year 11 Geometry

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Key Concept

Column Vectors

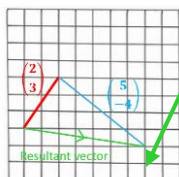
$\begin{pmatrix} x \\ y \end{pmatrix}$

 $\rightarrow$ + move right
 $\leftarrow$ - move left
 $\uparrow$ + move up
 $\downarrow$ - move down

Examples

Adding vectors:

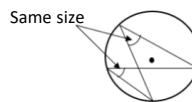
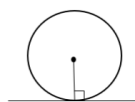
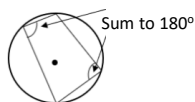
$$\begin{pmatrix} 2 \\ 3 \end{pmatrix} + \begin{pmatrix} 5 \\ -4 \end{pmatrix} = \begin{pmatrix} 2+5 \\ 3+(-4) \end{pmatrix} = \begin{pmatrix} 7 \\ -1 \end{pmatrix}$$



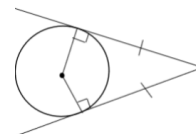
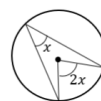
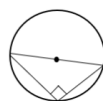
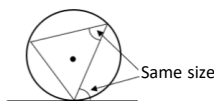
Key Words

Tangent: A straight line that touches a curve or circle at one singular point.

Vector: A mathematical property that has both direction and magnitude.

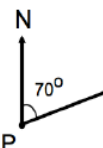


Circle Theorems



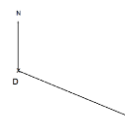
Key Concept

A **bearing** is an angle, measured **clockwise** from the **north** direction. It is given as a **3 digit** number.



Example

The diagram shows the position of a boat B and dock D.



a) State the bearing of the boat from the dock.

110°

b) Calculate the bearing of the dock from the dock.

180° - 110° = 70° because the angles are cointerior

360° - 70° = 290° because angles around a point equal 360°