
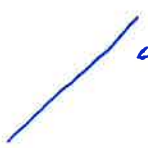


Name: KEY

**Section 3.1 – Polynomial Basics**

1. Discuss the end behaviour of the Polynomials given below considering their leading terms and degree  
Draw a rough sketch of the general behaviour

$f(x) = 2x - 3x^2$ <p><math>-3x^2 + 2x</math>          neg leading term      even degree          Starts down/ends down  </p>	$f(x) = -2x + x^2 + 3x^3$ <p><math>3x^3 + x^2 - 2x</math>          Positive leading term      odd degree   ← some behaviour          starts down/ends up</p>
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2. Find the roots ( $x$  – intercepts) and their multiplicities

multiplicity 1 unless stated otherwise

$x^3 - 4x^2 + 4x$ $x(x^2 - 4x + 4)$ $x(x-2)(x-2)$ <p><math>x=0</math>  <math>x=2</math> multiplicity 2</p>	$x^4 - 9x^2$ $x^2(x^2 - 9)$ $x^2(x+3)(x-3)$ <p><math>x=0</math> multiplicity 2  <math>x=3</math>  <math>x=-3</math></p>
$5x(x^2 - 7x + 6)$ $5x(x-6)(x-1)$ <p><math>x=0</math>  <math>x=6</math>  <math>x=1</math></p>	$x^2(x^2 - 1) - 3x(x^2 - 1) - 4(x^2 - 1)$ $(x^2 - 1)(x^2 - 3x - 4)$ $(x-1)(x+1)(x-4)(x+1)$ <p><math>x=1</math>  <math>x=4</math>  <math>x=-1</math> multiplicity 2</p>