

Sketching A Polynomial

Example

Sketch $y = x^3 - 3x + 2$

1. Solve for $x=0$ to get the y -intercept $(0, 2)$

$$y = 0^3 - 3 \times 0 + 2 = 2$$

2. Solve for $y=0$ to get the x -intercepts/roots/solutions

$$y = x^3 - 3x + 2 = 0 \quad (1, 0) \quad (-2, 0) \quad (1, 0)$$

$$= (x-1)(x^2+x-2) = 0$$

$$= (x-1)(x+2)(x-1) = 0$$

$$x = 1, x = -2, x = 1$$

1	1	0	-3	2
	↓	1	1	-2
	1	1	-2	<u>0</u>

remainder

$f(1) = 0 \therefore (x-1)$ is a factor of $f(x)$

3. For stationary points $m = \frac{dy}{dx} = 0$

$$\frac{dy}{dx} =$$

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3. For stationary points $m = \frac{dy}{dx} = 0$

$$\frac{dy}{dx} = 3x^2 - 3 = 0$$

$$3x^2 = 3$$

$$x^2 = 1$$

$$x = \pm 1$$

x	-2	-1	0	1	2
$\frac{dy}{dx}$	+	0	-	0	+
Shape	/	-	\	-	/

When $x=1$, $y = (1)^3 - 3(1) + 2 = 0$

When $x=-1$, $y = (-1)^3 - 3(-1) + 2 = 4$

$(1, 0)$ MIN

$(-1, 4)$ MAX

4. Sketch

