

Math Worksheet: Graph Polynomial (1)

a) Show that $x = 2$ is a zero of $f(x)$ and determine its multiplicity.

$$f(x) = x^3 - x^2 - 8x + 12$$

Divide $f(x)$ by $x - 2$

$x - 2$	$x^2 + x - 6$
	$x^3 - x^2 - 8x + 12$
	$x^3 - 2x^2$
	<hr/>
	$x^2 - 8x + 12$
	$x^2 - 2x$
	<hr/>
	$-6x + 12$
	$-6x + 12$
	<hr/>
	0

Divide the quotient by $x - 2$

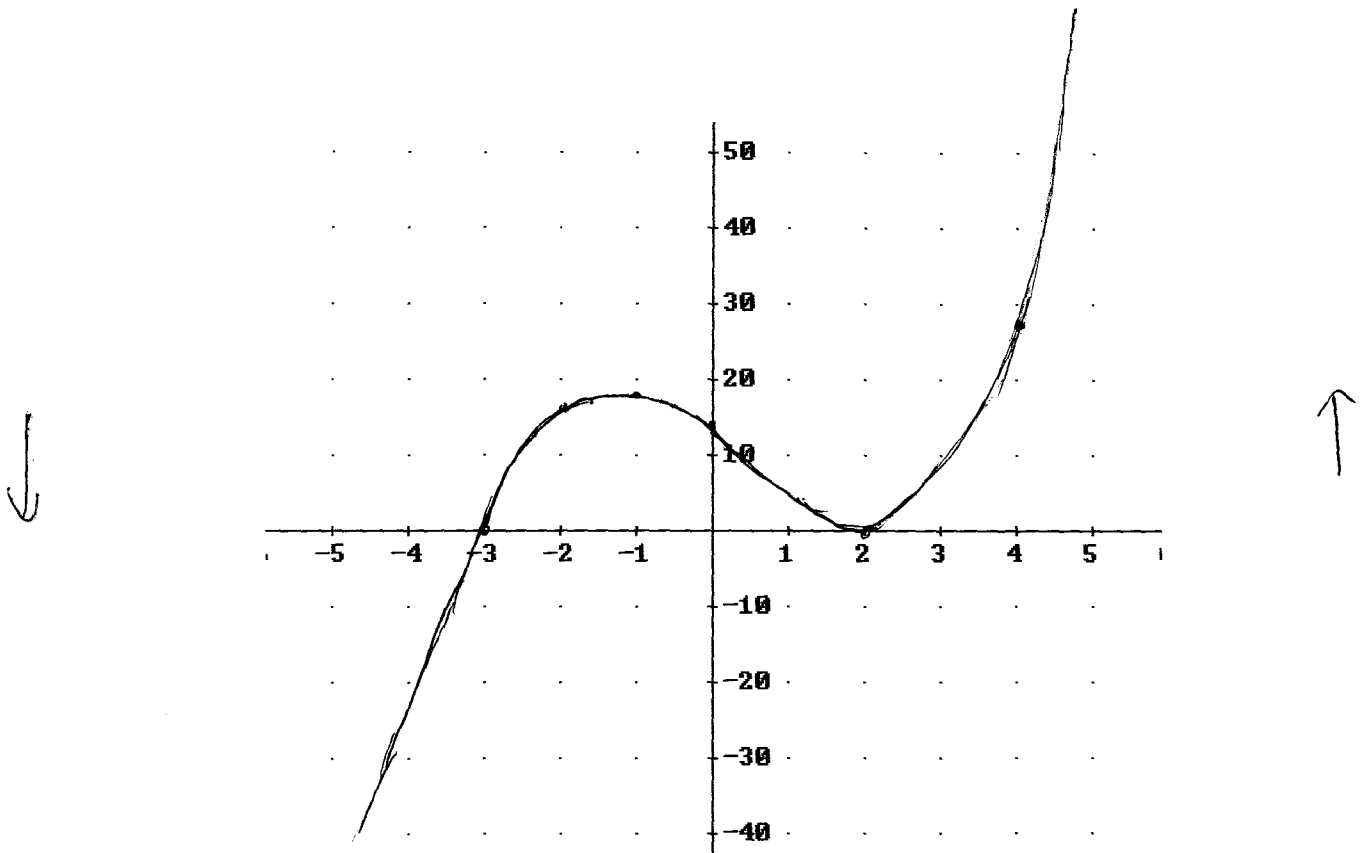
$x - 2$	$x + 3$
	<hr/>
	$x^2 + x - 6$
	$x^2 - 2x$
	<hr/>
	$3x - 6$
	$3x - 6$
	<hr/>
	0

b) Factor $f(x)$ completely and find all zeros.

$$\begin{aligned} f(x) &= (x - 2)(x^2 + x - 6) \\ &= (x - 2)(x - 2)(x + 3) \end{aligned}$$

Zeros are : $x = 2$ with multiplicity 2.
 $x = -3$ " " " 1.

c) Sketch the graph of $f(x)$ and label the x and y intercepts.



More points

x	f(x)
0	12
-1	18
-2	16
4	26

degree = 3

leading coefficient = 1, > 0

hence $f(x) \rightarrow +\infty$
as $x \rightarrow +\infty$

$f(x) \rightarrow -\infty$
as $x \rightarrow -\infty$

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Note: at $x=2$, the graph touches but does not cut the x-axis.
 $\therefore x=2$ is a zero of multiplicity 2.