

$a=2$ $b=5$ $c=-12$

x-intercepts ($y=0$)

$$x = \frac{-5 \pm \sqrt{25 + 96}}{4}$$

$$x = \frac{-5 \pm \sqrt{121}}{4}$$

$$x = \frac{-5 \pm 11}{4}$$

$$x = \frac{-5+11}{4} \quad x = \frac{-5-11}{4}$$

Find the zeros algebraically

a) $f(x) = 2x^2 + 5x - 12$

$$0 = 2x^2 + 5x - 12$$

$$0 = (2x - 3)(x + 4)$$

$$2x - 3 = 0 \quad x + 4 = 0$$

$$x = \frac{3}{2} \quad x = -4$$

b) $f(x) = x^3 - x^2 - 6x$

$$0 = x(x^2 - x - 6)$$

$$0 = x(x+2)(x-3)$$

$$x = 0 \quad x = -2 \quad x = 3$$

c) $f(x) = x^3 - 25x$

$$0 = x(x^2 - 25) \quad 0 = x(x+5)(x-5)$$

$$x = 0 \quad x = -5 \quad x = 5$$

State the degree and list the zeros of the polynomial function. State the multiplicity of each zero and whether the graph crosses the x-axis at the corresponding x-intercept. Graph the function on your calculator to verify your answer.

a) $f(x) = x^3(x+2)^2$

$$f(x) = x(x+2)(x+2)$$

$x=0 \rightarrow$ graph crosses x-axis (power odd)

$x=-2 \rightarrow$ graph touches x-axis (power even)

EOM: x^5 multiplicity

b) $f(x) = (x+3)^3(x-1)^2$

Deg: 5

Zeros: $x = -3$ | $x = 1$
mult: three | two

$x = -3$ crosses x-axis
 $x = 1$ touches x-axis

Degree = 3

Zeros: $x=0, x=-2$

Multiplicity: one, two

End Behavior: x^4

Deg: 4 $x \rightarrow \pm\infty \quad y \rightarrow \infty$

Zeros: $x=0$ | $x=4$

Mult: three | one

Cross | Cross

c) $f(x) = x^3(x-4)$



d) $f(x) = 3x(x-2)^3(x-1)^2$

End Behavior = x^6

Degree = 6

Zeros: $x=0$ | $x=2$ | $x=1$

Mult: one | three | two
Cross | Cross | touch

y-intercept ($x=0$)

$$f(0) = 0^3(0-4)$$

$$f(0) = 0$$

(0,0)

x	y
1	-3
2	-16
3	-27

y-int = 0

