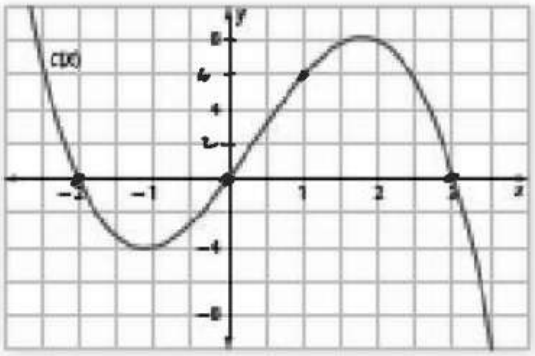
The graph below is a polynomial function *c(x)*.



a. What is the degree of *c(x)*? Explain how you know.

b. Use the information from the graph to write a possible rule for *c(x)*. Express the rule in equivalent factored form and standard polynomial form.

$c(x) = x^3 - x^2 - 6x \quad -x^3 + x^2 + 6x$

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

c. Use you calculator to graph the rule from Part b. If needed adjust the rule to give a better fit.

Looking back at problems 1-3, how can you tell the zeros of a polynomial function when its rule is written as a product of linear factors?

Looking back at problems 1-3, how can you tell the degree of a polynomial function when its rule is written as a product of linear factors?

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

Which properties of a polynomial and its graph are shown best when the rule is written as a product of linear factors? When the rule is written in standard form?

Factored Form
- x-intercepts zeros

Standard Form
- y-intercept

FOIL
First
Outter
Inner
Last

Multiply each set of polynomials. Write them in standard form. Give the degree of the product.

$(2x-3)(4x-1)$

$8x^2 - 2x - 12x + 3$

$8x^2 - 14x + 3$

$2(3x-7)(x+5)$

$2(3x^2 + 15x - 7x - 35)$

$2(3x^2 + 8x - 35)$

$6x^2 + 16x - 70$

$x(x+6)(x-2)$

$x(x^2 - 2x + 6x - 12)$

$x(x^2 + 4x - 12)$

$x^3 + 4x^2 - 12x$

$(x-3)(x+4)(x-5)$

$(x-3)(x^2 - x - 20)$

$x^3 - x^2 - 20x$
$-3x^2 + 3x + 60$

$x^3 - 4x^2 - 17x + 60$

$(3x-1)(x^2+2x-2)$

$3x^3 + 6x^2 - 6x$
$-x^2 - 2x + 2$

$3x^3 + 5x^2 - 8x + 2$

$(x-4)(x^4 - 3x^2 + 2)$

$x^5 - 3x^3 + 2x$
$-4x^4 \quad -3x^2 \quad -8$

$x^5 - 4x^4 - 3x^2 - 3x + 2x - 8$

$(x^6 - 5x^5 + 3x^4 + 7x^3 - 6x^2 + 2x - 8)(x^2 + 7x + 12)$

$x^8 - 5x^7 + 3x^6 + 7x^5 - 6x^4 + 2x^3 - 8x^2$

$7x^7 - 35x^6 + 21x^5 + 49x^4 - 42x^3 + 14x^2 - 56x$

$12x^6 - 60x^5 + 36x^4 + 84x^3 - 72x^2 + 24x - 96$

$x^8 + 2x^7 - 20x^6 - 32x^5 + 79x^4 + 44x^3 - 66x^2 - 32x - 96$

Divide f(x) by d(x) using long division. Write a summary statement in polynomial form and factored form.

$f(x) = x^2 + 5x + 6$ $d(x) = x + 2$