Journal Entry:
Write a polynomial function h in standard form that has 3 and -5 as zeros of multiplicity 2. How would you classify the polynomial? What can you tell about the graph of the function by looking at the polynomial form of it?

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Section 5-3
Solving Polynomial Equations

Students will be able to:
-solve polynomial equations by factoring
-solve polynomial equations by graphing

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If (x - a) is a factor of a polynomial, then the polynomial has value 0 when x = a. If a is a real number, then the graph of the polynomial has (a, 0) as an x-intercept.

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To solve a polynomial equation by factoring:

1. Write the equation in the form P(x) = 0
2. Factor P(x).
3. Use the Zero Product Property to find the roots.

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What are the real and/or imaginary roots?

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

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

$x^5 - 5x^4 + 6x^3 = 0$

$x^3(x^2 - 5x + 6) = 0$

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

$x = 0, 3, 2$

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What are the real and/or imaginary roots?

$(x^2 - 1)(x^2 + 4) = 0$

$(x-1)(x+1)(x^2+4) = 0$

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

$x^2 + 4 = 0$
$-4 \quad -4$
$\sqrt{x^2} = \sqrt{-4}$
$x = \pm\sqrt{-4}$
$x = \pm 2i$

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Factoring by grouping:

Solve: $2x^3 - 2x^2 + 3x - 3 = 0$

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

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

$x = 1, \pm i\sqrt{\frac{3}{2}}$ $2x^2 + 3 = 0$, $-3 \quad -3$, $\frac{2x^2}{2} = \frac{-3}{2}$, $\sqrt{x^2} = \sqrt{\frac{-3}{2}}$, $x = \pm i\sqrt{\frac{3}{2}}$

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Factoring Sum or Difference of Cubes:

Solve by factoring:
$(x^3 + 27) = 0$

$a = x$
$b = 3$

$(x+3)(x^2 - 3x + 9) = 0$

$x = -3$

$x = \frac{+3 \pm \sqrt{9-36}}{2}$

$= \frac{3 \pm \sqrt{-27}}{2} = \frac{3 \pm 3i\sqrt{3}}{2}$

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A graphing calculator can also find the solutions, zeros, of a polynomial function.

Solve by graphing $x^4 = 16$

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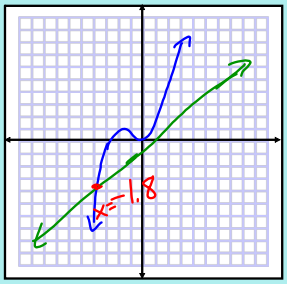
Solve by graphing (real solutions):

$x^3 + x^2 = x - 1$

$x = -1.8$



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What are three consecutive integers whose product is 480 more than their sum?

$x, x+1, x+2$ 7, 8, 9

$x(x+1)(x+2) = 480 + 3x + 3$

$x(x+1)(x+2) = 3x + 483$

$(x^2 + x)$

$x^3 + 2x^2 + x^2 + 2x = 3x + 483$

$x^3 + 3x^2 - x - 483 = 0$

$x = 7$

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Hwk: pg. 301 - 302
#10 - 50 (4th), 52 - 56 evens

(40 - 50 use factoring)

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