HW 5 – 5 Answers

1. $2a(x - 2)(x^2 + 2x + 4)$
2. $x(x + 2)(x - 2)(x - 1)(x + 1)$
3. $(x - 6)(x - 1)$
4. $(x^{3m} - 5)(x^{3m} - 5)$
5. $\{\pm 1, \pm i\}$
6. $\{0, \pm 2, \pm 2i\}$
7. $\{\pm 1\}$
8. $\{0, \pm i\sqrt{6}, \pm\sqrt{3}\}$

1. $2ax^3 - 16a$

$2a(x^3 - 8)$

$= 2a(x - 2)(x^2 + 2x + 4)$

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

$x(x^4 - 5x^2 + 4)$

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

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

3. $(x - 3)^2 - (x - 3) - 6$

$x - 3 = u$

$u^2 - u - 6$

$(u - 3)(u + 2)$

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

$(x - 6)(x - 1)$

4. $x^{6m} - 10x^{3m} + 25$

$(x^{3m} - 5)(x^{3m} - 5)$

Solve each of the following (factor completely first):

5. $x^4 - 1 = 0$

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

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

$x = \pm 1 \qquad x = \pm i$

$\{\pm 1, \pm i\}$

6. $x^6 - 16x^2 = 0$

$x^2(x^4 - 16) = 0$

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

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

$x^2 = 0 \quad x = 4 \quad x^2 = -4$

$x = 0 \quad x = \pm 2 \quad x = \pm 2i$

$\{0, \pm 2, \pm 2i\}$

7. $x^4 - 2x^2 + 1 = 0$

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

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

$x^2 = 1 \qquad x^2 = 1$

$x = \pm 1 \qquad x = \pm 1$

$\{\pm 1\}$

8. $x^5 + 3x^3 - 18x = 0$

$x(x^4 + 3x^2 - 18) = 0$

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

$x = 0 \quad x^2 = -6 \quad x^2 = 3$

$x = \pm i\sqrt{6} \quad x = \pm\sqrt{3}$

$\{0, \pm i\sqrt{6}, \pm\sqrt{3}\}$

Activity:

Your group has been given a set of cards. Each card has writing on 1 - 4 sides. Some of the sides are questions, others are answers. Your job is to reassemble the puzzle by matching the questions to the answers. You should work as a team. Each working on different questions. Helping where needed.