

Unit 4: Polynomial Equations and Inequalities

4.1 Solving Polynomial Equations PART 1

Today's Entertainment: p. 204 #1, 2, 3, 5, 6

*For #2 you do not have to verify using technology.

Also for #2d one of the roots is -3 (not 3)

p. 204 #2

2. Solve each of the following equations by factoring. Verify your solutions using graphing technology.

a) $3x^3 = 27x$

b) $4x^4 = 24x^2 + 108$

c) $3x^4 + 5x^3 - 12x^2 - 20x = 0$

$$3x^3 - 27x = 0$$

$$4x^4 - 24x^2 - 108 = 0$$

$$x^3(3x+5) - 4x(3x+5) = 0$$

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

$$4(x^4 - 6x^2 - 27) = 0$$

$$(x^3 - 4x)(3x + 5) = 0$$

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

$$4(x^2 - 9)(x^2 + 3) = 0$$

$$x(x^2 - 4)(3x + 5) = 0$$

$$\downarrow$$

$$x=0, x=3, \text{ or } x=-3$$

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

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

$$\therefore x=3, x=-3$$

$$\downarrow$$

$$x^2 = -3$$

$$\therefore x=0, \pm 2, \frac{5}{3}$$

NO Real Solution

p. 204

6. State the zeros of the following functions.

b) $f(x) = (x^3 + 1)(x - 17)$

$$= (x+1)(x^2 - x + 1)(x-17)$$

if $f(x) = 0$

$\therefore x = -1, 17$

$$x^3 + 1 = 0$$

$$x^3 = -1$$

$$x = \sqrt[3]{-1}$$

$$x = -1$$

$$\rightarrow b^2 - 4ac$$

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

$$= 1 - 4$$

$$= -3$$

$$\therefore b^2 - 4ac < 0$$

$$\therefore \text{no real roots}$$

$$\begin{aligned} x^2 - 3x - 4 &= (x-4)(x+1) \\ x^{10} - 3x^5 - 4 &= (x^5 - 4)(x^5 + 1) \end{aligned}$$

$$x^4 - 3x^3 - 4$$

$$\begin{aligned} x^{60} - 3x^{30} - 4 &= (x^{30} - 4)(x^{30} + 1) \end{aligned}$$