Solving Polynomial Equations

Obj: Factor a polynomial completely.

Obj: Solve polynomial equations by factoring.

Obj: Solve polynomial equations using quadratic techniques.

Quadratic Techniques

- ☆ Factor, then use zero product property
- Graphing Calculator (x-intercepts)
- ☆ Square root property
- Complete the square
- ☆ Quadratic formula

Solve.

2. $x^4 - 29x^2 + 100 = 0$

$(x^2-25)(x^2-4)=0$

$x^2-25=0$ $\quad x^2-4=0$

$x^2=25$ $\quad x^2=4$

$x=\pm\sqrt{25}$ $\quad x=\pm\sqrt{4}$

$x=\pm5$ $\quad x=\pm2$

$\{5,-5,-2,2\}$

3. $x^4 - 7x^2 - 18 = 0$

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

$+2x^2$

$-9x^2$

$x^2+2=0$ $\quad x^2-9=0$

$x^2=-2$ $\quad x^2=9$

$x=\pm\sqrt{-2}$ $\quad x=\pm\sqrt{9}$

$x=\pm i\sqrt{2}$ $\quad x=\pm3$

$\{i\sqrt{2},-i\sqrt{2},3,-3\}$

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4. $5x^3 + 40 = 0$

$5(x^3 + 8) = 0$

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

$5 \neq 0$ $\quad x + 2 = 0$, $-2 \ -2$, $x = -2$

quad. form

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

$a = 1 \quad b = -2 \quad c = 4$

$b^2 - 4ac = -12$

$4 - 4(4)$

$4 - 16$

$x = \frac{2 \pm \sqrt{-12}}{2}$

$x = \frac{2 \pm 2i\sqrt{3}}{2}$

$x = 1 \pm i\sqrt{3}$

$\{-2, 1 + i\sqrt{3}, 1 - i\sqrt{3}\}$

Add to notes

5. $20x^4 - 45x^2 = 0$

$5x^2(4x^2 - 9) = 0$

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

$5x^2 = 0$

$x^2 = 0$

$x = \pm\sqrt{0}$

$x = 0$

$2x + 3 = 0$

$2x = -3$

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

$2x - 3 = 0$

$2x = 3$

$x = \frac{3}{2}$

$\{0, -\frac{3}{2}, \frac{3}{2}\}$

$4x^2 - 9 = 0$

$4x^2 = 9$

$x^2 = \frac{9}{4}$