

2.4

13. 
$$\begin{array}{r|rrrrr} 3 & 1 & 0 & -11 & 0 & 18 \\ & & 3 & 9 & -6 & -18 \\ \hline -3 & 1 & 3 & -2 & -6 & 0 \\ & & -3 & 0 & 6 & \\ \hline & 1 & 0 & -2 & 0 & \end{array}$$

$$x^2 - 2$$

$$x^2 - 2 = 0$$

$$\sqrt{x^2} = \sqrt{2}$$

$$x = \pm\sqrt{2}$$

$$f(x) = x^4 - 11x^2 + 18$$

$$\begin{array}{c} + \quad - \quad + \\ \underbrace{\quad} \quad \underbrace{\quad} \\ 1 \quad 2 \end{array} \text{ Changes in Sign}$$

$$f(x) \quad 2 \text{ or } 0 \quad \text{Positive Real Roots} \quad \begin{array}{l} 3 \\ \sqrt{2} \end{array}$$

$$f(-x) = x^4 - 11x^2 + 18 \quad 2 \text{ or } 0 \quad \text{Negative Real Roots} \quad \begin{array}{l} -3 \\ -\sqrt{2} \end{array}$$

Sum of Zeros  $-\frac{B}{A}$

$$f(x) = x^4 + 0x^3 - 11x^2 + 0x + 18$$

$$-\frac{0}{1} = 0$$

$$3 + (-3) + \sqrt{2} + (-\sqrt{2}) = 0$$

25.

$$f(x) = x^4 - 10x^2 - 11$$

[3,4]

3.3

## 2.5 Complex Number

$$\begin{array}{c} a + bi \\ \text{Real} \quad \text{Imaginary} \end{array}$$

Imaginary Number  $i$

$$i = \sqrt{-1}$$

$$\sqrt{-9}$$

$$\sqrt{9 \cdot -1}$$

$$\sqrt{9} \cdot \sqrt{-1}$$

$$3i$$

$$(2 + 5i) + (3 - 6i)$$

$$5 - i$$

$$(7 - 3i) + (-2 + 4i)$$

$$5 + i$$

$$(8 + 2i) - (3 + 2i)$$

$$5 + 0i$$

$$5$$

$$(4 - 5i) - (-7 - 2i)$$

$$11 - 3i$$

$$i \cdot i \quad i^2 = -1$$

$$(3 + 2i)(4 + 5i)$$

$$12 + 15i + 8i + 10i^2$$

$$i^2 = -1$$

$$12 + 23i + 10(-1)$$

$$2 + 23i$$

$$(2 + 3i)^2$$

$$(2 + 3i)(2 + 3i)$$

$$4 + 6i + 6i + 9i^2$$

$$i^2 = -1$$

$$4 + 6i + 6i + 9(-1)$$

$$4 + 12i - 9$$

$$-5 + 12i$$

Conjugate

Switch  
Middle Sign

$$2 + 7i$$

$$2 - 7i$$

$$3 - 8i$$

$$3 + 8i$$

$$-4 - 2i$$

$$-4 + 2i$$

$$\overbrace{(-4 - 2i)(-4 + 2i)}$$

$$16 - 8i + 8i - 4i^2$$

$$i^2 = -1$$

$$20$$

$$\frac{(2+3i)}{(4-5i)} \cdot \frac{(4+5i)}{(4+5i)}$$

$$\frac{8 + 10i + 12i + 15i^2}{16 + 20i - 20i - 25i^2} \quad i^2 = -1$$

$$\frac{-7 + 22i}{41}$$

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$$\frac{4 + 10i}{2}$$

$$2 + 5i$$

Reduce

