

$$-2 + \sqrt{-8} + 5 - \sqrt{-52}$$

$$= -2 + 2i\sqrt{2} + 5 - 2i\sqrt{13}$$

$$= 3 + (2\sqrt{2} - 2\sqrt{13})i$$

David

$$-5 + \sqrt{-8} + 7 - \sqrt{-56}$$

$$= -5 + 2i\sqrt{2} + 7 - 2i\sqrt{14}$$

$$= 2 + (2\sqrt{2} - 2\sqrt{14})i$$

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$$(a+bi)(a-bi) = a^2 + b^2$$

$$(a-b)(a+b) = a^2 - b^2$$


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$$\begin{array}{r} 2 \overline{) 52} \\ \underline{20} \\ 13 \end{array}$$

2, 3, 5, 7, 11, 13, 17, 19

$$\begin{array}{r} 2 \overline{) 36} \\ \underline{20} \\ 16 \\ \underline{14} \\ 2 \end{array}$$

$$(a+bi)^2 = a^2 + 2abi + b^2i^2$$

$$(4+i)^2 = 16 + 2(4i) + (i)^2$$

$$= 16 + 8i - 1$$

$$= 15 + 8i$$


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$$\frac{256}{175}$$

$$\begin{aligned}
 & (3 + \sqrt{5})(6 - \sqrt{10}) \\
 &= (3 + i\sqrt{5})(6 - i\sqrt{10}) \\
 &= 18 - 3i\sqrt{10} + 6i\sqrt{5} - \sqrt{5}\sqrt{10}i^2 \\
 &= 18 - 3i\sqrt{10} + 6i\sqrt{5} - (5\sqrt{2})(-1) \\
 &= 18 + 5\sqrt{2} + (3\sqrt{10} + 6\sqrt{5})i
 \end{aligned}$$

$$\begin{aligned}
 & \sqrt{50} : \\
 & 2 \sqrt{50} \\
 & \frac{2\sqrt{50}}{5}
 \end{aligned}$$

$$\left(\frac{9+i}{9-i}\right) = a+bi \quad a^2+2ab+b^2 = (a+b)^2$$

$$\left(\frac{9+i}{9-i}\right)\left(\frac{9+i}{9+i}\right) = \frac{81+2(9)(i)+i^2}{81+1} = \frac{80+18i}{82}$$

$$= \frac{40}{41} + \frac{9}{41}i = \frac{40}{41} + \frac{9}{41}i$$

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

$$x^2 - 2x + 1^2 - 1 + 2$$

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

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

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

$$x = 1 \pm i$$

$$\frac{3}{2}x^2 - 4x + 9 = \frac{3}{2}(x^2 - 4x + 2^2) + 9 - 6 = \frac{3}{2}(x-2)^2 + 3 = 0$$

$$(6)\left(\frac{3}{2}\right) = 4$$

$$\left(\frac{3}{2}\right)(4) = 6$$

$$a = \frac{3}{2}, b = -4, c = 9$$

$$\Rightarrow \frac{3}{2}(x-2)^2 = -3$$

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

$$(-3)\left(\frac{2}{3}\right) = -2$$

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

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

$$\text{or, separately } b^2 - 4ac = (-4)^2 - 4\left(\frac{3}{2}\right)(9)$$

$$= 16 - 54 = -38$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{4 \pm \sqrt{-38}}{2\left(\frac{3}{2}\right)} = \frac{4 \pm \sqrt{-38}}{3}$$

$$= \frac{4 \pm i\sqrt{38}}{3} = 2 \pm i\sqrt{2}$$

Root  $\textcircled{a}$   $-1 + i\sqrt{5}$ , passes thru  $(3,0)$

$$f(x) = (x - (-1 + i\sqrt{5})) (x - (-1 - i\sqrt{5})) (x - 3)$$

$$= (x + 1 - i\sqrt{5})(x + 1 + i\sqrt{5})(x - 3)$$

$$= \left[ \begin{array}{ccccccc} x^2 & + & x & + & i\sqrt{5} & x & + & x & + & 1 & + & i\sqrt{5} & - & i\sqrt{5} & x & - & i\sqrt{5} & - & 5i^2 \end{array} \right] (x - 3)$$

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

$$= x^3 + 2x^2 + 6x$$

$$- 3x^2 - 6x - 18$$

$$\hline x^3 - x^2 - 18$$