121 S 1.6 #s 12, 24, 26, 40, 44, 112

s 5-14 Solve each eq'n by factoring.

(12) $12x^2 - 17x + 6 = 0$

$(12)(6) = 72$ = magic #

$-17 = -1 - 16$ $\quad (-1)(-16) = 16$

$= -2 - 15$ $\quad (-2)(-15) = 30$

$= -3 - 14$ $\quad (-3)(-14) = 42$

$= -4 - 13$ $\quad (-4)(-13) = 52$

$= -5 - 12$ $\quad (-5)(-12) = 60$

$= -6 - 11$ $\quad (-6)(-11) = 66$

$= -7 - 10$ $\quad (-7)(-10) = 70$

$= -8 - 9$ $\quad (-8)(-9) = 72$ MAGIC!

Other method:

$(12)(6) = (2)(2)(3)(3)(2)$

$2 \cdot 2 \cdot 2 = 8$

$3 \cdot 3 = 9$

$-8 - 9 = -17$ ✓

$12x^2 - 8x - 9x + 6 = 0$

etc.

So, $12x^2 - 8x - 9x + 6$

$= 4x(3x-2) - 3(3x-2)$

$= (3x-2)(4x-3)$

$\Rightarrow 3x-2=0$ OR $4x-3=0$

$3x = 2$ $\qquad 4x = 3$

$x = \frac{2}{3}$ $\qquad x = \frac{3}{4}$

$x \in \{\frac{2}{3}, \frac{3}{4}\}$

BETTER/MORE GENERAL THAN "imaginary"

#s 15-28 Find all real (or nonreal) solns to each equation. Use Square Root Property.

(24) $(3x-1)^2 = \frac{1}{4}$

$3x - 1 = \pm\sqrt{\frac{1}{4}} = \pm\frac{1}{2}$

$3x = 1 \pm \frac{1}{2}$

$x = \frac{1 \pm \frac{1}{2}}{3}$

$\frac{\frac{3}{2}}{3} = \frac{3}{6} = \frac{1}{2}$

$\frac{\frac{1}{2}}{3} = \frac{1}{6}$

$x = \frac{1}{6}$ OR $\frac{1}{2}$

$x \in \{\frac{1}{6}, \frac{1}{2}\}$

121 § 1.6 #s 26, 40, 44, 112

(26) $(x-3)^2 = -20$

$x-3 = \pm\sqrt{-20} = \pm i\sqrt{20} = \pm 2i\sqrt{5}$

$x = 3 \pm 2i\sqrt{5}$

$x \in \boxed{\{3 \pm 2i\sqrt{5}\}}$

$2|20$
$2|10$
5
$\sqrt{20} = \sqrt{2\cdot 2\cdot 5} = 2\sqrt{5}$

#s 35-44 Find real or nonreal solutions by completing the square.

(40) $t^2 - 5t + 2 = 0$

$t^2 - 5t = -2$

$t^2 - 5t + \left(\frac{5}{2}\right)^2 = -2 + \left(\frac{5}{2}\right)^2$

$\left(t - \frac{5}{2}\right)^2 = -2 + \frac{25}{4} = -\frac{8}{4} + \frac{25}{4} = \frac{17}{4}$

$t - \frac{5}{2} = \pm\sqrt{\frac{17}{4}} = \pm\frac{\sqrt{17}}{\sqrt{4}} = \pm\frac{\sqrt{17}}{2}$

$t = \frac{5}{2} \pm \frac{\sqrt{17}}{2}$ $\quad t \in \left\{\frac{5 \pm \sqrt{17}}{2}\right\}$

(44) $5x^2 + 4x + 3 = 0$

$x^2 + \frac{4}{5}x + \frac{3}{5} = 0$

$x^2 + \frac{4}{5}x = -\frac{3}{5}$

$x^2 + \frac{4}{5}x + \left(\frac{2}{5}\right)^2 = -\frac{3}{5} + \left(\frac{2}{5}\right)^2$

$\left(x + \frac{2}{5}\right)^2 = -\frac{15}{25} + \frac{4}{25} = \frac{-11}{25}$

$x + \frac{2}{5} = \pm\sqrt{-\frac{11}{25}}$

$x + \frac{2}{5} = \pm\frac{i\sqrt{11}}{5}$

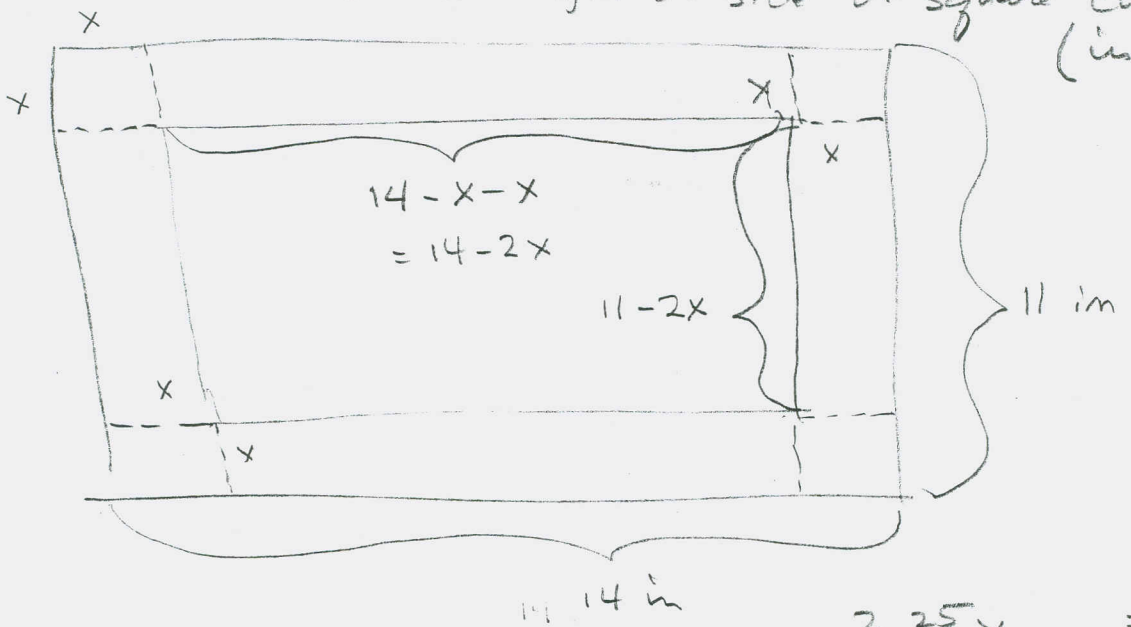
$x = -\frac{2}{5} \pm i\frac{\sqrt{11}}{5}$

$x \in \boxed{\left\{\frac{-2 \pm i\sqrt{11}}{5}\right\}}$

121 §1.6 #112

(112) She's cutting the corners out of a piece of cardboard & folding to make a box. She has 11 in. by 14 in. cardboard She wants the area of the bottom to be 80 in^2. What size squares should she cut?

Let x = length of side of square cutout (in inches)



Area of bottom

$= (11-2x)(14-2x) = 80$

$154 - 22x - 28x + 4x^2 = 80$

$4x^2 - 50x + 154 = 80$

$4x^2 - 50x + 74 = 0$

$x^2 - \frac{50}{4}x + \frac{74}{4} = 0$

$x^2 - \frac{25}{2}x + \frac{37}{2} = 0$

$x^2 - \frac{25}{2}x = -\frac{37}{2}$

$x^2 - \frac{25}{2}x + \left(\frac{25}{4}\right)^2 = -\frac{37}{2} + \frac{625}{16}$

$\left(x - \frac{25}{4}\right)^2 = \frac{-296}{16} + \frac{625}{16}$

$\left(x - \frac{25}{4}\right)^2 = \frac{329}{16}$

$x - \frac{25}{4} = \pm\frac{\sqrt{329}}{4}$

$x = \frac{25 \pm \sqrt{329}}{4}$

$x \approx 10.786$ NO

$x \approx 1.7154107 12$

$x \approx 1.72$ inches