$x^2-5x+6=0$

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

$x=2$ or $x=3$

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

$x=2$ & $x=3$ are solutions to $ax^2+bx+c=0$

Find a, b & c.

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

$= x^2-5x+6$

$x=3\pm\sqrt{2}$ solves the eq'n.

$(x-(3+\sqrt{2}))(x-(3-\sqrt{2}))$

Writing Project #6 doesn't factor over the rationals.

Doesn't have rational roots, so the ac method doesn't work, but there is a Chapter 3 Sledgehammer cheat.

(Quadratic Formula, Reverse-engineer factorization)

42x^2+55x-75

$42x^2+55x-75=0$

$b^2-4ac = 55^2-4(42)(-75)$

$= 3025+12600$

$= 15625$ $\sqrt{15625}=125$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-55\pm125}{2(42)}$ $\frac{-55+125}{84}$ $\frac{-55-125}{84}$

$=\left\{\frac{70}{84}=\frac{35}{42}=\frac{5}{6}\right.$

$\left.\frac{-180}{84}=-\frac{90}{42}=-\frac{45}{21}=-\frac{15}{7}\right.$

6.7

$42\left(x-\frac{5}{6}\right)\left(x+\frac{15}{7}\right)$

$=(6x-5)(7x+15)$

$x^3+3x^2-4x-12$

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

$x^2\cdot a-4a$

$a(x^2-4)$

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

§1.2 # 49 They have 10 laps to do

Ricky's averaging 80 $\frac{mi}{hr}$

Bobby starts 2 laps later

Bobby does 10 laps & needs to catch Ricky. How fast does Bobby have to go?

	r	d	t
Ricky	80	8 mi.	t
Bobby	r	10	t

r = Bobby's speed in $\frac{mi}{hr}$

$d = rt$

$t = t = \frac{d}{r}$

$\frac{8}{80} = \frac{10}{r}$

$r = \frac{10(80)}{8}$

12 mi, 10 mi

84 $\frac{mi}{hr}$ Ricky

$\frac{10}{84} = \frac{12}{r}$

B 12 laps. Ricky has 2-lap head start.

$z^4 - 16 = (z^2-4)(z^2+4)$

$= (z-2)(z+2)(z^2+4) = 0$

$\Rightarrow z \in \{-2, 2\}$ is all the real solutions

"All solns over the reals."

Chapter 3 says Don't stop!

Split it into linear factors!

$= (z-2)(z+2)(z-2i)(z+2i)$

$z \in \{-2, 2, 2i, -2i\}$

$a^3 - b^3 = (a-b)(a^2+ab+b^2)$

$a^3 + b^3 = (a+b)(a^2-ab+b^2)$

$a^3 - 17 = 0$

$a^3 = 17$

$a = \sqrt[3]{17}$

Two ways:

$x^3 - 27 = (x-3)(x^2+3x+9) = 0$

$x^3 = 27$

$\sqrt[3]{x^3} = \sqrt[3]{27}$

$x = 3$

$\Rightarrow x = 3$ or $x^2+3x+9 = 0$

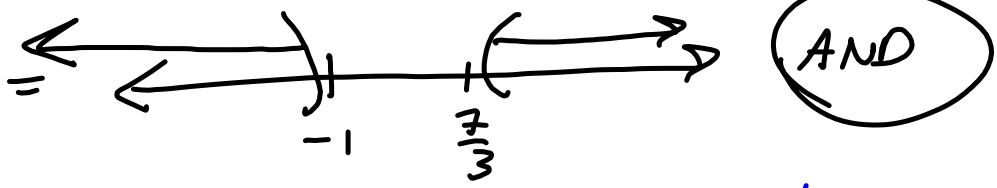
No real solutions.

$|3x-2| < -5$ Nevah! $\emptyset$

$3x-2 < -5$ AND $3x-2 > 5$

$3x < -3$ $3x > 7$

$\{x \mid x < -1$ and $x > \frac{7}{3}\}$



$= \emptyset$ No overlap!

$|3x-2| > -5$ Always!

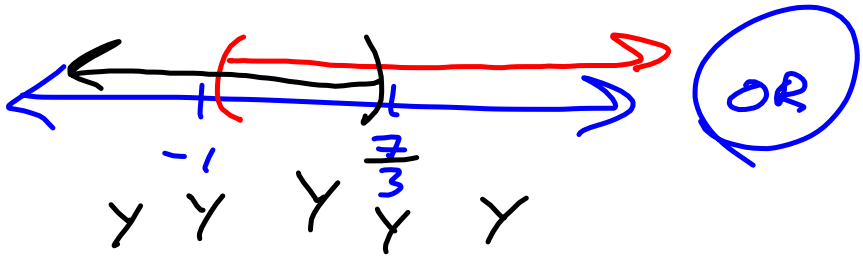
$x \in \mathbb{R} = (-\infty, \infty) = \{x \mid x \in \mathbb{R}\}$

$3x-2 > -5$ OR $3x-2 < 5$

$3x > -3$ $3x < 7$

$\{x \mid x > -1$ OR $x < \frac{7}{3}\}$

$=$



$= (-\infty, \infty)$

$$\sqrt{a+b} \stackrel{?}{=} \sqrt{a} + \sqrt{b}$$

$$5 = \sqrt{25} = \sqrt{9+16} = \sqrt{9} + \sqrt{16} = 3+4 = 7$$