$$\frac{70 \text{ Km}}{\text{hr}} \cdot \frac{1000\text{m}}{1 \text{ Km}} \cdot \frac{100\text{cm}}{1 \text{ m}} \cdot \frac{1 \text{ in}}{2.54 \text{ cm}} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}}$$

$$\approx 43.49598346 \frac{\text{mi}}{\text{hr}}$$

```
70*1000*100/2.54
/12/5280
         43.49598346
```

$$\frac{70 \text{ Km}}{\text{hr}} \cdot \frac{1000\text{m}}{1 \text{ Km}} \cdot \frac{100\text{cm}}{1 \text{ m}} \cdot \frac{1 \text{ in}}{2.54 \text{ cm}} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}}$$

$$189x^2 - 138x - 80$$

$$(189)(-80) = -15120$$

Magic Number

$-138 = -139 + 1$ -139 ✳

$\quad = -148 + 10$ -1480 ✳

$\quad = -158 + 20$ -7160 ✳

$\quad = -200 + 62$ -13600 ✳

$\quad = -250 + 112$ -28000 ✳

$\quad = -225 + 87$ -19575

$\quad = -210 + 72$ -15120 Yes!

$$189x^2 - 210x + 72x - 80$$

$$= 21x(9x - 10) + 8(9x - 10)$$

$$(9x - 10)(21x + 8)$$

$$\begin{array}{r} 210 \\ -138 \\ \hline 72 \end{array}$$

$$\begin{array}{r} 250 \\ -138 \\ \hline 112 \end{array}$$

$$\begin{array}{r} 225 \\ -138 \\ \hline 87 \end{array}$$

$3 | 189$ $2 | 210$
$3 | 63$ $3 | 105$
$3 | 21$ $5 | 35$
$\quad 7$ 7

$GCF = 3 \cdot 7$

$3 | 189$
$7 | 63$
$\quad 9$

2

$189x^2 - 138x - 80$

$a = 189, \ b = -138, \ c = -80 \implies$

$b^2 - 4ac = (-138)^2 - 4(189)(-80) = 79524$

$\implies \sqrt{b^2 - 4ac} = \sqrt{2^2 \cdot 3^2 \cdot 47^2} =$

$\sqrt{2^2} \ \sqrt{3^2} \ \sqrt{47^2}$

$= 2 \cdot 3 \cdot 47 = 282$

$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \dfrac{138 \pm 282}{2(189)}$

$= \dfrac{138 \pm 282}{378} \nearrow \ \dfrac{10}{9}$
$\searrow \ -\dfrac{8}{21}$

$\left(x - \dfrac{10}{9}\right)\left(x - \left(-\dfrac{8}{21}\right)\right)$ 78

$\implies 189x^2 - 138x - 80 = \boxed{189\left(x - \dfrac{10}{9}\right)\left(x + \dfrac{8}{21}\right)}$

FACTOR THEOREM

$= \boxed{9\left(x - \dfrac{10}{9}\right)(21)\left(x + \dfrac{8}{21}\right)}$

$= \boxed{(9x - 10)(21x + 8)}$

→ Making the connection between zeros and binomial factors.

```
/12/5280
         43.49598346
(-138)²-4*189*-8
0
              79524
Ans^.5
                282
■
```

2 | 79524
2 | 39762
3 | 19881
3 | 6627
47 | 2209
        47

9 | 189
    21

$$\frac{\left(6^{-1} \cdot 7^2\right)^{-5}}{\left(21^3 - 16^2\right)^{-1}} = \frac{\left(\left(2 \cdot 3\right)^{-1} \cdot 7^2\right)^{-5}}{\left(\left(3 \cdot 7\right)^3 \cdot \left(2^4\right)^2\right)^{-1}}$$

$$= \frac{\left(2^{-1} \cdot 3^{-1} \cdot 7^2\right)^{-5}}{\left(3^3 \cdot 7^3 \cdot 2^8\right)^{-1}} = \frac{2^5 \cdot 3^5 \cdot 7^{-10}}{3^{-3} \cdot 7^{-3} \cdot 2^{-8}}$$

coup de grace

$$= 2^{5-(-8)} \, 3^{5-(-3)} \, 7^{-10-(-3)}$$

$$= 2^{13} \, 3^8 \, 7^{-7} = \frac{2^{13} \cdot 3^8}{7^7}$$

$\S$2.1 #s 1-53 oDD

$\S$2.2 #s 1-23, 29-67, 79, 81, 83

$\S$2.1 Linear & Quadratic Equations.

Not much new. Discuss managing fracs & decimals.

2 ways to do fracs
---
① Manage fractions — More generally useful

② Clear fractions — Quicker, but will Kill you, later.

② How can it hurt me?
When facing rational expressions with inequalities.

Manage 'em:

$$\frac{2}{3}x - \frac{25}{21} = \frac{9}{5}$$

$$\frac{2x}{3} \cdot \frac{5 \cdot 7}{5 \cdot 7} - \frac{25}{3 \cdot 7} \cdot \frac{5}{5} = \frac{9}{5} \cdot \frac{3 \cdot 7}{3 \cdot 7}$$

$$\frac{70x - 125}{LCD} = \frac{189}{LCD}$$

$$\Longrightarrow \quad 70x - 125 = 189$$
$$\underline{+125 = 125}$$
$$70x = 314$$

$$x = \frac{314}{70}$$

LCD:

$$3 \quad 3 \overline{\big(21}$$
$$\qquad 7$$

$$LCD = 3 \cdot 5 \cdot 7$$

$$5$$

FoR A " < " oR " > "
situation, we couldn't
make the following
move:

$$\frac{7}{30} - \frac{5}{42}$$

$$<, \; >$$
$$\overline{70} \quad \overline{70}$$

$$\frac{70x}{70} = \frac{314}{70}$$

6

Decimals

$$.03(2x-5) - .002 = 9.87$$

$$1000\left(.03(2x-5) - .002 = 9.87\right)$$

$$30(2x-5) - 2 = 9870$$
$$60x - 150 - 2 = 9870$$
$$60x - 152 = 9870$$
$$60x = 10022$$
$$x = \frac{10022}{60} = \frac{5011}{30}$$

Jake

$$\begin{array}{r} 9870 \\ + \ .152 \\ \hline 10022 \end{array}$$

Solve $P = 2L + 2W$ for W
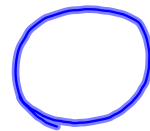
$-2L = -2L$

$$P - 2L = 2W$$

$$\overline{2} \qquad \overline{2}$$

$$\frac{P - 2L}{2} = W$$

Solve for h

$$S = \frac{1}{3}\pi r^2 h + \pi r^2 \quad *$$

Bonus: Solve for r

$$\frac{3S}{3} = \frac{\pi r^2 h}{3} + \frac{3\pi r^2}{3} \quad \Longrightarrow$$

$$3S = \pi r^2 h + 3\pi r^2 \quad *$$
$$-3\pi r^2 = \qquad -3\pi r^2$$
_____
$$3S - 3\pi r^2 = \pi r^2 h \qquad *$$

$$\frac{3S - 3\pi r^2}{\pi r^2} = \frac{\pi r^2 h}{\pi r^2} \quad \text{optional step.}$$

$$\frac{3S - 3\pi r^2}{\pi r^2} = h \qquad *$$

PEMDAS

MDAS to evaluate

(SA)DM to solve

Solve for y

$$3\underset{3}{\big(}9$$

$$LCD = 7 \cdot 3 \cdot 3$$

$$\frac{x}{7} + \frac{y}{9} = 1$$

✓ $\quad \frac{x}{7} \cdot \frac{3 \cdot 3}{3 \cdot 3} + \frac{y}{3 \cdot 3} \cdot \frac{7}{7} = \frac{1}{1} \cdot \frac{7 \cdot 3 \cdot 3}{7 \cdot 3 \cdot 3}$

$$\frac{9x + 7y}{LCD} = \frac{63}{LCD}$$

$$9x + 7y = 63$$

$$7y = 63 - 9x$$

$$y = \frac{63 - 9x}{7} = \frac{63}{7} - \frac{9x}{7} = 9 - \frac{9x}{7}$$

$$y = -\frac{9}{7}x + 9$$

$$\frac{2}{x^2-5x+6} = \frac{1}{x^2-4x+3}$$

$$LCD = (x-3)(x-2)(x-1)$$

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

$$\frac{2}{(x-3)(x-2)} \cdot \frac{(x-1)}{(x-1)} = \frac{1}{(x-3)(x-1)} \cdot \frac{(x-2)}{(x-2)}$$

$$\frac{2(x-1)}{LCD} = \frac{1(x-2)}{LCD} \implies$$

We can <u>ditch</u> the LCD in an equation BUT.

$$2x-2 = x-2$$

$$x = 0$$

$$\frac{2}{(x-3)(x-2)} < \frac{1}{(x-3)(x-1)}$$ is a whole different deal. Can't throw away the LCD.

$\S 2.2 \# 84$

$$D = r \cdot t$$

$t = 3$ hrs to trave 39 mi against the wind. wind is 4 mph
What's rate on windless day?

	D	rate	t
against the wind	39	r-4	3

Let r = rate of speed w/o wind (in mph)

$D = $ Rate $\cdot$ time
$39 = (r-4)(3) = 3r - 12$

$51 = 3r$

$17 = r$

12