**30.** $\dfrac{2}{x+3} - \dfrac{5}{x+1} = \dfrac{3x+5}{x^2+4x+3}$

$(x+1)(x+3)$ $(x+3)(x+1)$ $(x+3)(x+1)$

Solve

$x \neq -3$

$x \neq -1$

$2(x+1) - 5(x+3) = 3x+5$

$2x+2 - 5x - 15 = 3x+5$

$-3x - 13 = 3x+5$

$-6x = 18$

$x \neq -3$

$\emptyset$

# 11.7 Applications

Day 1

1. Formulas - literal equations
2. Average Cost

Day 2

3. Motion $r \cdot t = d$
4. Work

# Formulas

$$\frac{2A}{1} = \frac{2}{12} bh \quad \text{solve for } h$$

$$\frac{2A}{b} = \frac{bh}{b}$$

$$\frac{2A}{b} = h$$

$(1+r)\ \frac{P}{1} = \frac{A}{1+r}\ (1+r)$ Solve for r

$\frac{P(1+r)}{P} = \frac{A}{P}$

$1+r = \frac{A}{P}$

$r = \frac{A}{P} - 1$

$P(1+r) = A$

$P + Pr = A$

$\frac{Pr}{P} = \frac{A-P}{P}$

$r = \frac{A-P}{P}$

$$\frac{pqf}{p}\cdot\frac{1}{} + \frac{pqf}{q}\cdot\frac{1}{} = \frac{pqf}{f}\cdot\frac{}{}$$

Solve for f

$$qf + pf = pq$$

$$f(q+p) = pq$$

$$\boxed{f = \frac{pq}{q+p}}$$

$$I = \frac{\mathcal{E}}{R+r}(R+r) \quad \text{Solve for } R$$

$$\frac{I(R+r)}{I} = \frac{\mathcal{E}}{I}$$

$$R + r = \frac{\mathcal{E}}{I}$$

$$\boxed{R = \frac{\mathcal{E}}{I} - r}$$

$$(f_1+f_2)(f)=\frac{f_1f_2(f_1+f_2)}{(f_1+f_2)}$$ Solve for $f_1$

$$f(f_1+f_2)=f_1f_2$$
$$ff_1+ff_2=f_1f_2$$
$$ff_1-f_1f_2=-ff_2$$
$$\frac{f_1(f-f_2)}{f-f_2}=\frac{-ff_2}{f-f_2}$$

$$f_1=\frac{-ff_2}{f-f_2}\frac{(-1)}{(-1)}=\frac{ff_2}{f_2-f}$$

Average

**19.** A company is planning to manufacture mountain bikes. Fixed monthly cost will be \$100,000 and it will cost \$100 to produce each bicycle.

**a.** Write the cost function, $C$, of producing $x$ mountain bikes.

**b.** Write the average cost function, $\overline{C}$, of producing $x$ mountain bikes.

**c.** How many mountain bikes must be produced each month for the company to have an average cost of \$300 per bike?

(a) $C = 100{,}000 + 100x$

(b) $\overline{C} = \dfrac{100{,}000 + 100x}{x}$

(c) $\dfrac{300}{1} = \dfrac{100{,}000 + 100x}{x}$

$300x = 100{,}000 + 100x$

$200x = 100{,}000$

$x = 500$ bikes