Solving Formulas and Variation

Goal: To solve formulas for a specified variable and to solve variation applications.

Two Principles to Think About When Solving Egns.

- The Reversibility Principle

 Any op con be undone by applying reverse op (inverse op).
- The Balance Principle

 Any op applied to one side must also
 be applied to the other side.
 - (B) solve for the specified variable

$$(W = \frac{D}{d}; W)$$

$$W = \frac{D}{d} \cdot W$$

$$R_{r,r_{2}} = \frac{1}{r_{1}} + \frac{1}{r_{2}}; R$$

$$R_{r,r_{2}} = \frac{1}{R_{r,r_{2}}} + \frac{1}{R_{r,r_{2}}} + \frac{1}{R_{r,r_{2}}} + \frac{1}{R_{r,r_{2}}}$$

$$\frac{r_1 r_2}{r_1 r_2} = \frac{R r_2}{R \cdot (r_2 + r_1)} \rightarrow \left(\frac{r_1 r_2}{r_1 + r_2} \right)$$

ER =
$$e(R+r)$$

ER = $eR+er$
 eR

$$ER-eR:er$$

$$R(E-e):er$$

$$F-e$$

$$R:er$$

$$F-e$$

$$\frac{x^{h}}{b^{h}} + \frac{y^{h}}{a^{h}} = / ; a^{h}$$

$$a^{2}b^{2}(\frac{x^{2}}{b^{2}} + \frac{y^{2}}{a^{2}}) = 1 \cdot a^{2}b^{2}$$

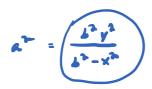
$$a^{2}b^{2}(\frac{x^{2}}{b^{2}} + \frac{y^{2}}{a^{2}}) = a^{2}b^{2}$$

$$-a^{2}x^{2}$$

$$b^{2}y^{2} = a^{2}b^{2} - a^{2}x^{2}$$

$$(b^{2}-x^{2})$$

$$(b^{2}-x^{2})$$



Guidelines for Solving a Rational Equation for a Specified Variable

Note that the following steps are only applied if necessary:

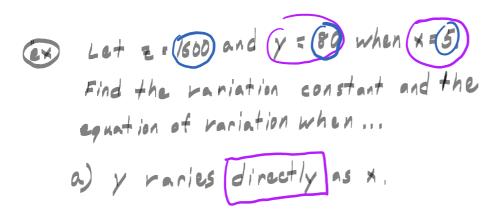
- 1. Clear the denominators by multiplying through by the LCD.
- -> 2. Distribute to get rid of parentheses.
- → 3. Get every term with the specified variable on one side of the equal sign, everything else on the other side.
- → 4. Factor out the specified variable.
- 5. Multiply or divide as needed in order to solve for the specified variable.

Variation

Three Key Phrases:

constant of variation

- 1."y varies **directly** to x means y = kx, where k is a constant.
- 2. 'y varies inversely to x means y = k/x, where k is a constant.
- 3. z varies **jointly** to x and y means z = kxy, where k is a constant.



$$y = kx$$
 $y = 16x$
 $y = 16x$

$$y = \frac{\kappa}{x}$$

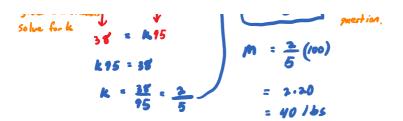
$$80 = \frac{\kappa}{5}$$

p. 417

$$m = \frac{2}{5}$$

$$m = \frac{1}{5}$$

$$m =$$



80. *Intensity of a signal.* The intensity I of a television signal varies inversely as the square of the distance d from the transmitter. If the intensity is 25 W/m^2 at a distance of 2 km, what is the intensity 6.25 km from the transmitter?

$$y = \frac{k}{x}$$

$$I = \frac{k}{d^{2}}$$

$$25 : \frac{k}{x^{2}}$$

$$I = \frac{100}{d^{2}}$$

$$I = \frac{100}{4}$$