ISOLATING A VARIABLE

TEXAN GLOBAL SCHOOL
Global Online Learning

REFLEXIVE: $a = a$

SYMMETRIC: $a = b \iff b = a$

TRANSITIVE: $If\ a = b \land b = c \implies a = c$

ADDITIVE: $If\ a = b \Rightarrow a + c = b + c$

Using the additive inverse: $a + (-c) = b + (-c) \Rightarrow a - c = b - c$

MULTIPLICATIVE: $If\ a = b, c \neq 0 \Rightarrow a \cdot c = b \cdot c$

Using the multiplicative inverse: $a \cdot \left(\frac{1}{c}\right) = b \cdot \left(\frac{1}{c}\right) \Rightarrow \frac{a}{c} = \frac{b}{c}\ ; c \neq 0$

EXAMPLE: NEWTON´S LAW OF UNIVERSAL GRAVITATION. Isolating "m_2":

$$F = G\frac{m_1 m_2}{d^2}$$

SOLUTION: 1) Applying multiplicative property to cancel "d^2":

$$(F)(d^2) = \left(G\frac{m_1 m_2}{d^2}\right)(d^2)$$

$$Fd^2 = G\frac{m_1 m_2 d^2}{d^2}$$

$$Fd^2 = G\frac{m_1 m_2 \cancel{d^2}}{\cancel{d^2}} \quad 1$$

$$Fd^2 = Gm_1 m_2$$

2) Applying multiplicative property to cancel "Gm_1":

$$(Fd^2)\left(\frac{1}{Gm_1}\right) = (Gm_1 m_2)\left(\frac{1}{Gm_1}\right)$$

$$\frac{Fd^2}{Gm_1} = \left(\frac{Gm_1 m_2}{Gm_1}\right)$$

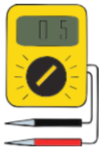
$$\frac{Fd^2}{Gm_1} = \left(\frac{\cancel{Gm_1} m_2}{\cancel{Gm_1}}\right) \quad 1$$

$$\frac{Fd^2}{Gm_1} = m_2$$

3) Applying symmetric property:

$$m_2 = \frac{Fd^2}{Gm_1}$$

EXAMPLE: OHM'S LAW - Voltage "V" is directly proportional to the product of the resistance "R" with the current "I." Isolating "R":



$$V = RI$$

SOLUTION: 1) Applying multiplicative property to cancel "I":

$$(V)\left(\frac{1}{I}\right) = (RI)\left(\frac{1}{I}\right)$$

$$\frac{V}{I} = \frac{R \cdot \cancel{I}}{\cancel{I}} \quad 1$$

$$\frac{V}{I} = R$$

2) Applying symmetric property:

$$R = \frac{V}{I}$$

EXAMPLE: The speed "S" is directly proportional to the ratio of the distance "d" with time "t." Isolating "d":

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

SOLUTION: 1) Applying multiplicative property to cancel "t":

$$(S)(t) = \left(\frac{d}{t}\right)(t)$$

$$S \cdot t = \left(\frac{d \cdot \cancel{t}}{\cancel{t}}\right) \quad 1$$

$$S \cdot t = d$$

2) Applying symmetric property:

$$d = S \cdot t$$

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