Algebra II

V-2

Direct Variation

Translate each of the following sentences.

y varies directly as *x*.

$y = kx$

c is not used because it is the letter reserved for the constant value of the speed of light.

↑ "konstant" of proportionality, or constant of variation

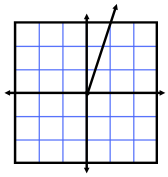
y is directly proportional to *x*.

$y = kx$

In a direct variation, as the input increases,

the output increases.

$y = kx$



$k = m > 3$

Solve.

1) If *y* varies directly as *x*, and $y = 6$ when $x = 15$, find *y* when $x = 25$.

$y = kx$

$\frac{6}{15} = \frac{k(15)}{15}$

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

$y = \frac{2}{5}x$

$y = \frac{2}{5}(25)$

$y = 10$

Express each of these formulas as a variation. Which is the constant of variation (proportionality)?

1) $C = \pi d$ Circumference varies directly as the diameter. ($\pi = k$)

2) $E = m c^2$ Energy is directly proportional to mass. $k = c^2$

3) $A = \pi r^2$. Area varies directly as the square of the radius. ($k = \pi$)

Solve. (pg. 356)

3) A real estate agent made a commission of $5400 on a house that sold at $120,000. At this rate, what commission will the agent make on a house that sells for $145,000.

$C = kP$

$\frac{5400}{120000} = \frac{k \cdot 120000}{120000}$

$\frac{5400}{120000} = k$

$.045 = k$

4.5%

$C = .045(145{,}000)$

$C = \$6525$

9) The stretch in a loaded spring varies directly as the load it supports. A load of 15 kg stretches a certain spring 3.6 cm. What load would stretch the spring 6 cm. (Hooke's Law)

d = stretch, k = constant, m = load

$d = km$

$\frac{3.6}{15} = \frac{k(15)}{15}$

$.24 = k$

$d = .24m$

$\frac{6}{.24} = \frac{.24m}{.24}$

$25 = m$

25 kg

Pg 354
2-12 all

Pg 356
2-16 even