7-2 Properties of Proportions

Jan 4

Alg 1 std.

Cross-multiplication Property If $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$.

$\frac{1}{3} = \frac{2}{6}$ $\quad 6 = 6$

examples: solve for x.

1. $\frac{x-7}{4} = \frac{5}{-2}$

$-2x + 14 = 20$

$-2x = 6$

$x = -3$

$\frac{-10}{4} = \frac{5}{-2}$ ✓

2. $\frac{(x-1)}{(x+2)} = \frac{10}{(3x-2)}$ $\quad x = 6, -1$

$(x-1)(3x-2) = 10(x+2)$

$3x^2 - 2x - 3x + 2 = 10x + 20$

$\div 3 \quad 3x^2 - 15x - 18 = 0$

$x^2 - 5x - 6 = 0$

$(x-6)(x+1) = 0$

more properties of proportions:

If $\frac{a}{b} = \frac{c}{d}$, then $\frac{a}{c} = \frac{b}{d}$, $\frac{b}{a} = \frac{d}{c}$ (flip), and $\frac{d}{b} = \frac{c}{a}$.

$ad = bc$

ex. 3 If $5x = 3y$, then $\frac{x}{y} = \frac{3}{5}$, $\frac{5}{y} = \frac{3}{x}$, $\frac{5}{3} = \frac{y}{x}$

If $\frac{a}{b} = \frac{c}{d}$, then $\frac{a+b}{b} = \frac{c+d}{d}$.

$\frac{a}{b} + 1 = \frac{c}{d} + 1$

$\frac{a}{b} + \frac{b}{b} = \frac{c}{d} + \frac{d}{d}$

$\frac{a+b}{b} = \frac{c+d}{d}$

ex. 4 If $\frac{x}{y} = \frac{7}{5}$, then $\frac{x+y}{y} = \frac{7+5}{5} = \frac{12}{5}$

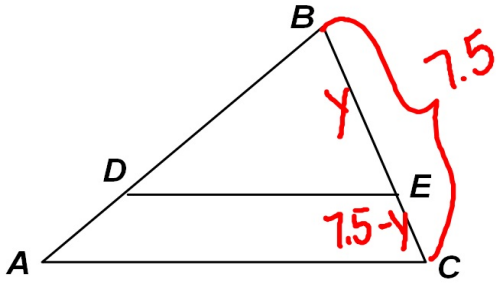
If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \ldots,$

then $\frac{a+c+e+\ldots}{b+d+f+\ldots} = \frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \ldots$

$\frac{1}{2} = \frac{2}{4} = \frac{8}{16}$

$\frac{1+2+8}{2+4+16} = \frac{11}{22} = \frac{1}{2}$

ex. 5 Given : $\frac{AD}{DB} = \frac{CE}{EB}$



	AD	DB	AB	CE	EB	CB
a)	3	9	12	2	6	8
b)	2	8	10	1.5	6	7.5

a) $\frac{AD}{DB} = \frac{CE}{EB}$

$\frac{3}{x} = \frac{2}{6}\frac{1}{3}$

b) $\frac{AD}{DB} = \frac{CE}{EB}$

$\frac{1}{4}\frac{2}{8} = \frac{7.5-Y}{Y}$

$Y = 30 - 4Y$