**Proportion**: A proportion is a statement that two or more ratios are equal to each other.

**Ex.**

\[
\frac{2}{3} = \frac{4}{6}
\]

\[
\frac{9}{16} = \frac{3}{4}
\]

*Not a proportion*

**True Proportion**

\[
(2 \times 6) = (3 \times 4)
\]

\[
(9 \times 4) = (16 \times 3)
\]

**An extended proportion**

\[
\frac{1}{2} = \frac{4}{8} = \frac{12}{24}
\]

(1 \times 8) = (2 \times 4)

(1 \times 24) = (2 \times 12)

(4 \times 24) = (8 \times 12)

\[
\frac{1}{2} = \frac{2}{8} = \frac{12}{24}
\]

\[
\frac{1}{2} = \frac{1}{2}
\]
In any true proportion, the product of the means is equal to the product of the extremes. AKA: means, extremes property.
Means-Extremes Property
In any true proportion, the product of the means is equal to the product of the extremes.

Solve for \( x \) using the means-extremes property:

\[
\frac{3}{7} = \frac{x+1}{2x+4}
\]

\[
(7)(x+1) = (3)(2x+4)
\]

\[
7x + 7 = 6x + 12
\]

\[
x + 7 = 12
\]

\[
x = 5
\]

Thus:

\[
\frac{3}{7} = \frac{5+1}{2(5)+4}
\]

\[
\frac{3}{7} = \frac{6}{14}
\]

Reduced:

\[
\frac{3}{7} = \frac{3}{7}
\]

OR

\[
(3)(x+1) = (7)(6)
\]

\[
x = 42
\]
Ex. Write the proportion that this equation comes from.

\[ 7x = 3y \]

\[ \frac{3}{x} = \frac{7}{y} \]
Ex. Solving an extended proportion

\[
\frac{12}{a} = \frac{b}{3} = \frac{4}{5}
\]

\[
\frac{\frac{12}{a}}{\frac{4}{5}} = \frac{\frac{b}{3}}{\frac{4}{5}}
\]

\[
(12)\frac{5}{a} = 4b
\]

\[
\frac{60}{4} = \frac{4b}{4}
\]

\[
15 = a
\]

\[
\frac{\frac{12}{15}}{\frac{3}{5}} = \frac{\frac{4}{5}}{\frac{3}{5}}
\]

Ex. Solve

\[
\frac{1-n}{3} = \frac{4n-1}{2}
\]

\[
2(1-n) = 3(4n-1)
\]

\[
2 - 2n = 12n - 3
\]

\[
2 = 14n - 3
\]

\[
5 = 14n
\]

\[
\frac{5}{14} = n
\]

K cole

Day 9 OTL

h.w. 1-12 all

15-23 odd