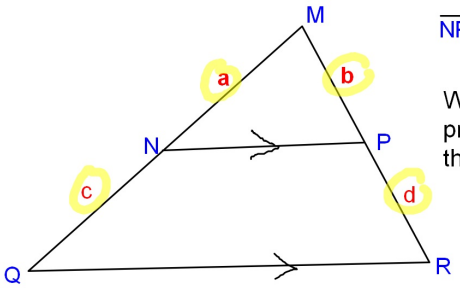
Side-Splitter Theorem

If a line is parallel to one side of a triangle and intersects the other two sides, then it divides those sides proportionally.



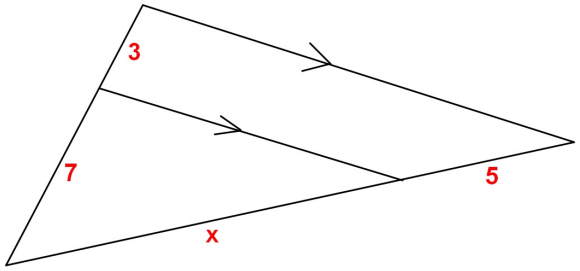
$\overline{NP} \parallel \overline{QR}$

What are the different proportions that can be used in this figure?

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

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

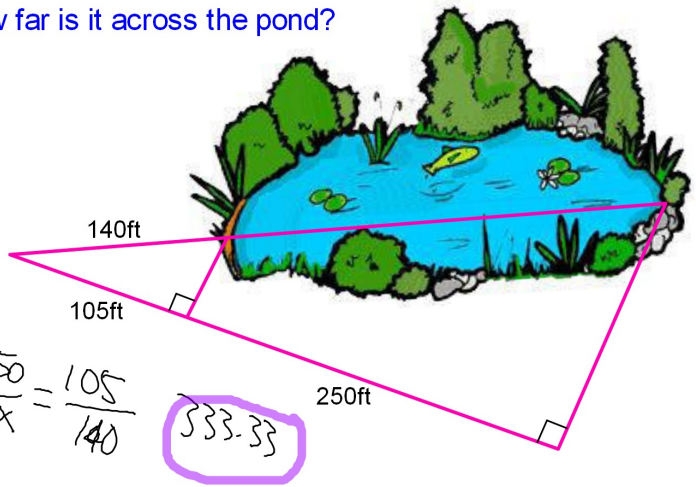
Find the value of x.



$\frac{3}{7} = \frac{5}{x}$ $x = 11.67$

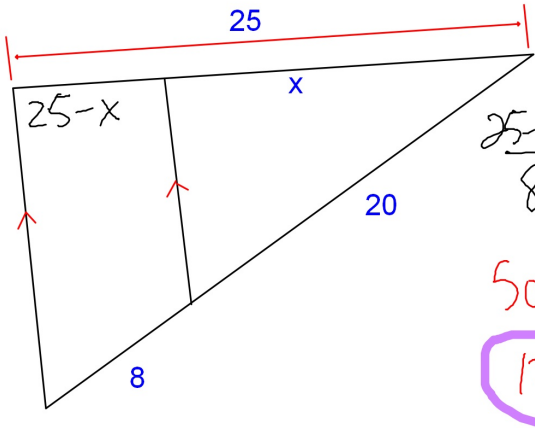
Why are the triangles similar?

How far is it across the pond?



$\frac{250}{x} = \frac{105}{140}$ 333.33

Find the value of x.



$\frac{25-x}{8} = \frac{x}{20}$

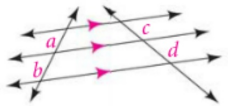
$500 - 20x = 8x$

$17.85 = x$

Corollary — **Corollary to Theorem 7-4**

If three parallel lines intersect two transversals, then the segments intercepted on the transversals are proportional.

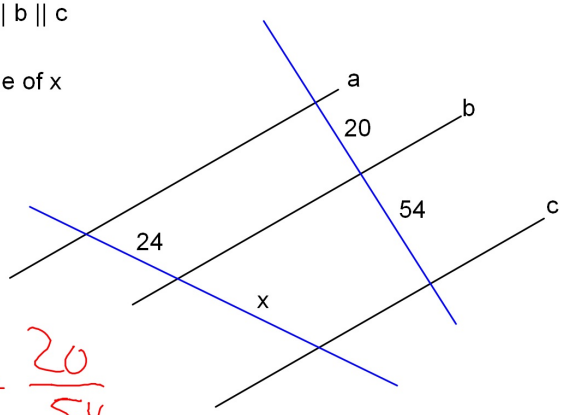
$$\frac{a}{b} = \frac{c}{d}$$



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

Given: a || b || c

Find the value of x

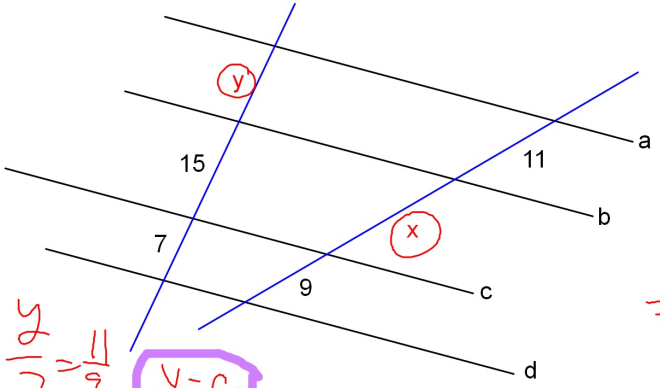


$\frac{24}{x} = \frac{20}{54}$

$x = 64.8$

Given: a || b || c || d

Find the value of x and y



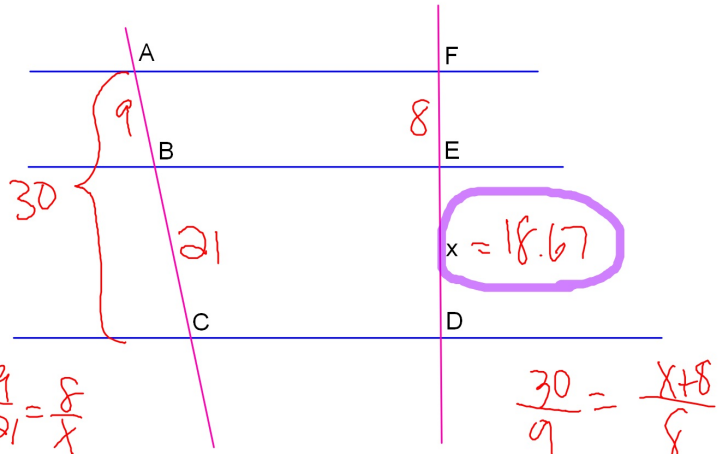
$\frac{y}{7} = \frac{11}{9}$

$y = 6.5$

$\frac{15}{7} = \frac{x}{9}$

$x = 19.3$

Find the value of x. AB = 9 EF = 8 AC = 30



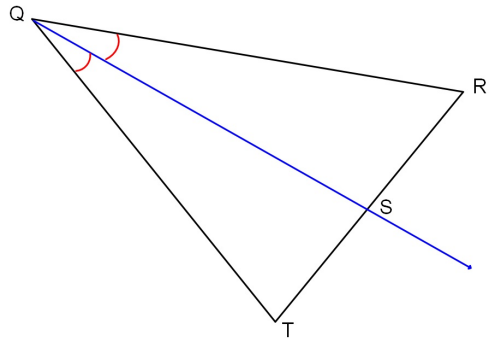
$\frac{9}{21} = \frac{8}{x}$

$\frac{30}{9} = \frac{x+8}{8}$

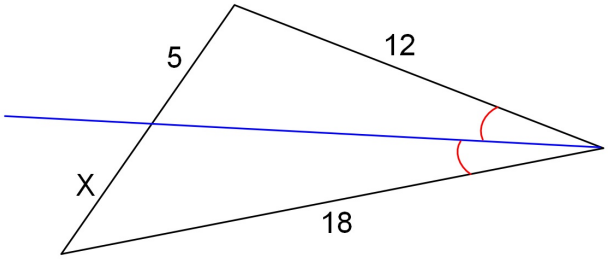
Theorem 7-5 **Triangle-Angle-Bisector Theorem**

If a ray bisects an angle of a triangle, then it divides the opposite side into two segments that are proportional to the other two sides of the triangle.

$$\frac{ST}{SR} = \frac{QT}{QR}$$



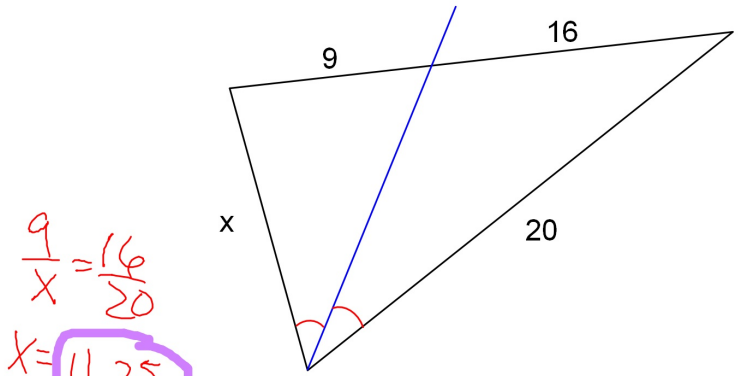
Find the value of x.



$\frac{5}{x} = \frac{12}{18}$

$x = 7.5$

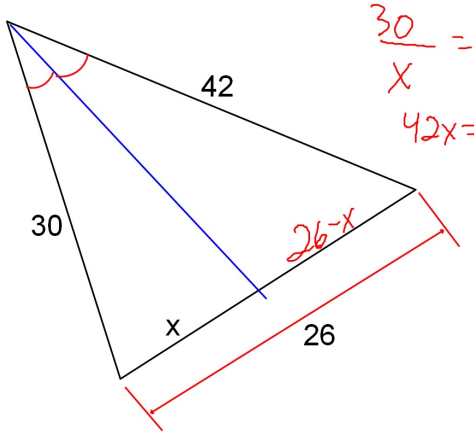
Find the value of x.



$\frac{9}{x} = \frac{16}{20}$

$x = 11.25$

Find the value of x.



$\frac{30}{x} = \frac{42}{26-x}$

$42x = 780 - 30x$

$x = 10.83$