

1. The number of states that joined the United States between 1776 and 1849 is twice the number of states that joined between 1850 and 1900. If 30 states joined the United States between 1776 and 1849 and  $x$  states joined between 1850 and 1900, which of the following equations is true?

A)  $30x = 2$

B)  $2x = 30$

C)  $\frac{x}{2} = 30$

D)  $x + 30 = 2$

$$\begin{aligned} 2x &= 30 \\ \underline{x} &= 15 \end{aligned}$$

2.  $\begin{pmatrix} 2x - 3y = -14 \\ 3x - 2y = -6 \end{pmatrix} \begin{matrix} 3 \\ -2 \end{matrix}$

If  $(x, y)$  is a solution to the system of equations above, what is the value of  $x - y$ ?

A) -20

B) -8

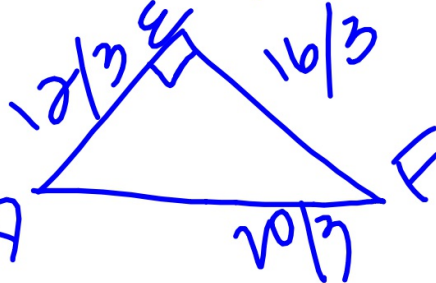
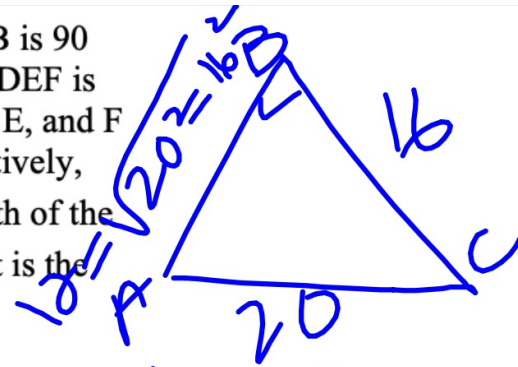
C) -4

D) 8

$$\begin{aligned} &+ \begin{matrix} 6x - 2y = -42 \\ -6x + 4y = 12 \end{matrix} \\ \hline &-5y = -30 \\ &y = 6 \\ &x = 2 \\ &2 - 6 = -4 \end{aligned}$$

3. In triangle, ABC the measure of angle B is 90 degrees,  $BC = 16$ , and  $AC = 20$ . Triangle DEF is similar to triangle ABC, where vertices D, E, and F correspond to vertices A, B, and C, respectively, and each side of triangle DEF is  $\frac{1}{3}$  the length of the corresponding side of triangle ABC. What is the value of  $\sin F$ ?

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$$\sin F = \frac{\frac{12}{3}}{\frac{20}{3}}$$

$$\sin F = \frac{12}{20} = \frac{3}{5}$$

4.  $\sqrt{x-a} = x-4$

If  $a = 2$ , what is the solution set of the equation above?

A) {3, 6}

~~B) {2}~~

C) {3}

D) {6}

$$(\sqrt{x-2})^2 = (x-4)^2$$

$$x-2 = x^2 - 8x + 16$$

$$0 = x^2 - 9x + 18$$

$$(x-6)(x-3) = 0 \quad | \quad 18$$

$$x = 6, 3 \quad \begin{array}{r} -6 \\ -3 \\ \hline 9 \end{array}$$

5.  $x = 2y + 5$  *linear*  
 $y = (2x - 3)(x + 9)$  *quad*

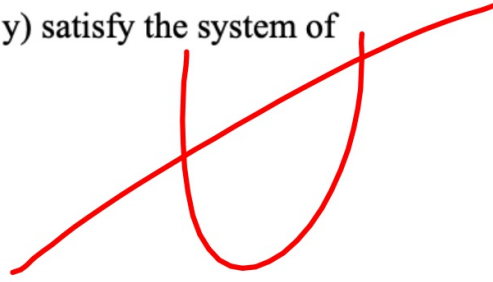
How many ordered pairs  $(x, y)$  satisfy the system of equations shown above?

A) 0

B) 1

**C) 2**

D) Infinitely many



1. Solve each proportion for the variables.

a)  $\frac{32}{15} = \frac{x}{24}$

$x = 51.2$

b)  $\frac{x}{20} = \frac{21}{16} = \frac{9}{y}$

$x = 26.25$   
 $y = 6.8$

c)  $\frac{x+1}{9} = \frac{x}{12}$

$x = -4$

2. Use this proportion to fill in the blanks below:  $\frac{e}{f} = \frac{8}{11}$

a)  $\frac{e}{8} = \frac{?}{?}$   $\frac{f}{11}$

b)  $\frac{11}{8} = \frac{?}{?}$   $\frac{f}{e}$

c)  $\frac{19}{11} = \frac{?}{?}$   $\frac{e+f}{f}$

d)  $11e$   $8f$

3. There are 12 boys in a class of 25 students. Write the ratio of girls to boys in that class as a fraction.

$$\frac{13}{12}$$

4. The scale on a map is 3in = 200mi.

a) Two cities are 750 miles apart. How far apart are the cities on the map?

b) A river is 5 inches long on the map. How long is the river in real life?

$$\frac{X \text{ in}}{750 \text{ mi}} = \frac{3 \text{ in}}{200 \text{ mi}} = \frac{5 \text{ in}}{X \text{ mi}}$$

$$X = 11.25 \text{ in}$$

$$3X = 1000$$

$$X = 333.\bar{3} \text{ mi}$$

7. The two triangles at the right are similar.

a) Write a similarity statement.

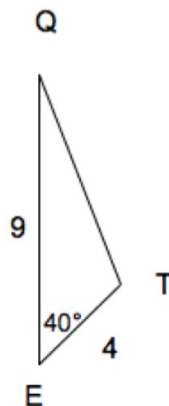
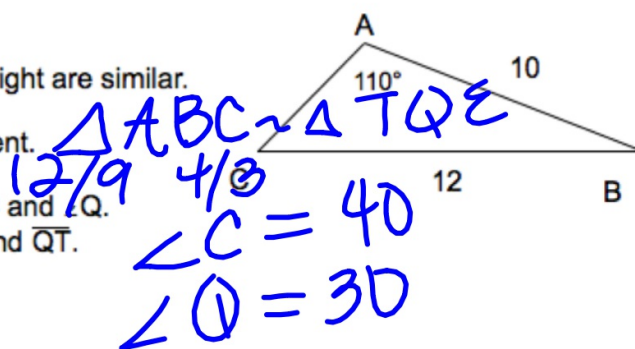
b) Find the similarity ratio.

c) Find the measures of  $\angle C$  and  $\angle Q$ .

d) Find the lengths of  $\overline{AC}$  and  $\overline{QT}$ .

$$AC = 5.3$$

$$QT = 7.5$$

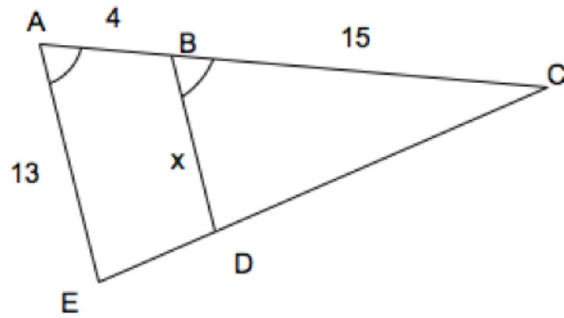


8. This figure has two similar triangles. Find the value of x.

$$\frac{x}{13} = \frac{15}{19}$$

$$19x = 195$$

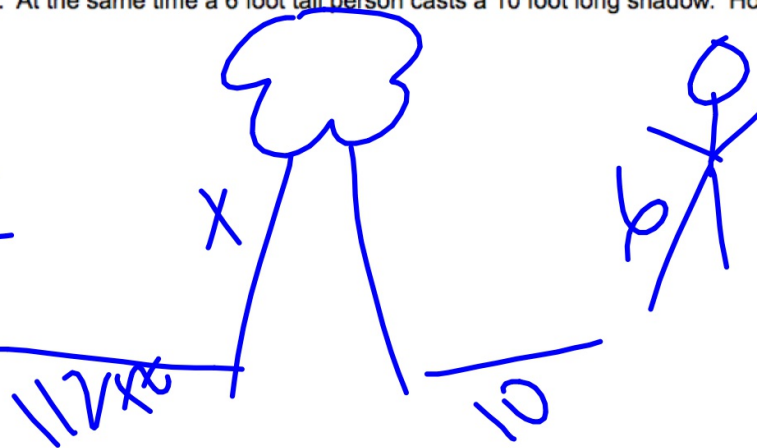
$$x = 10.2$$



9. A tree casts a 112 foot long shadow. At the same time a 6 foot tall person casts a 10 foot long shadow. How tall is the tree?

$$\frac{6}{x} = \frac{10}{112}$$

$$x = 67.2 \text{ ft}$$

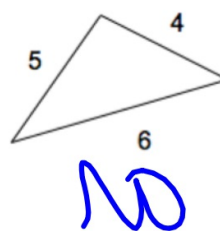


10. Is each pair of triangles similar? If yes, state why (AA, SAS, SSS).

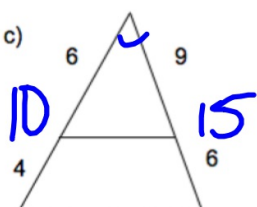
a)



b)



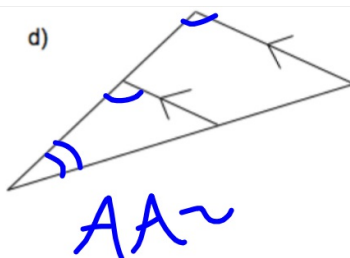
c)



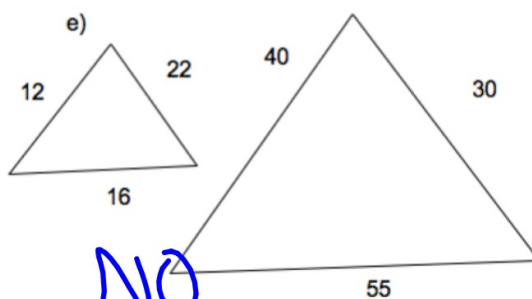
$$\frac{6}{10} = \frac{9}{15}$$

SAS~

d)



e)





For 12 to 17, find the value of the variables in each figure.

12.

$$\frac{8}{x} = \frac{x}{14}$$

$$x^2 = 112 \rightarrow 10.7$$

$$= 4\sqrt{7}$$



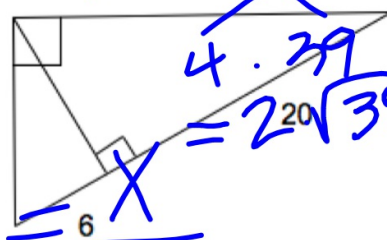
12.

$$\frac{6}{x} = \frac{x}{26}$$

$$x^2 = 156$$

$$4 \cdot 39$$

$$= 2\sqrt{39}$$

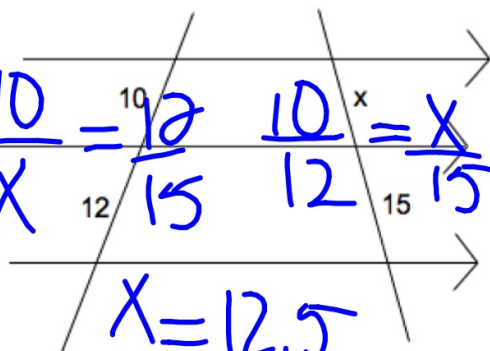


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$$\frac{10}{x} = \frac{12}{15}$$

$$\frac{10}{12} = \frac{x}{15}$$

$$x = 12.5$$



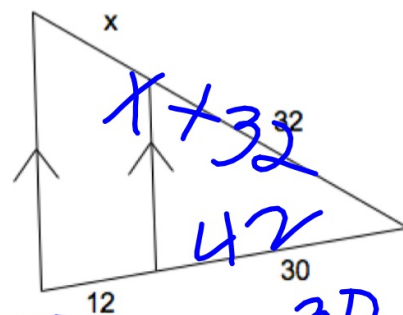
15

$$x + 32$$

$$42$$

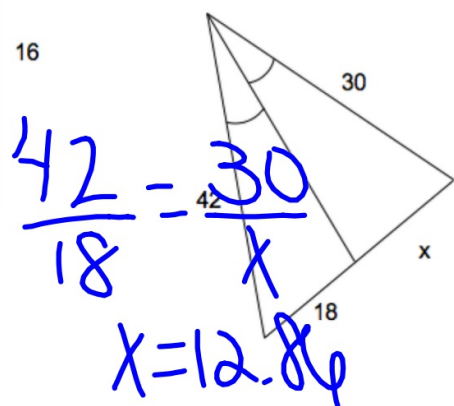
$$\frac{32}{32+x} = \frac{30}{42}$$

$$x = 12.8$$





16



17

