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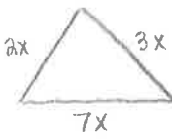
Complete each of the following. Round to the nearest hundredth, as necessary. Circle final answers.

1. Find  $x$ .  $\frac{3}{10} = \frac{5x+1}{18x-6}$

$3(18x-6) = 10(5x+1)$  (2)  
 $54x-18 = 50x+10$  (1)  
 $4x = 28$   
 $x = 7$  (1)

4

2. The ratios of the three sides of a triangle are 2:3:7. The perimeter of the triangle is 102 inches. Find the length of each side of the triangle.



$2x + 3x + 7x = 102$  (2)  
 $12x = 102$   
 $x = 8.5$  (1)

$2x = 17$  (1)     $3x = 25.5$  (1)     $7x = 59.5$  (1)

6

3. The ratio of angle's complement to its supplement is 2:9. Find the measure of the angle, the complement, and the supplement.

(2)  $\frac{2}{9} = \frac{90-x}{180-x}$   
 $2(180-x) = 9(90-x)$  (1)  
 $360-2x = 810-9x$  (1)  
 $7x = 450$   
 $x = 64.29$  (1)

Angle: 64.29    Comp: 25.71    Supp: 115.71 7

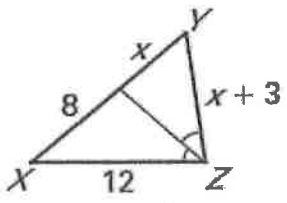
4. For every five students at Newark Catholic, there are 3 who are Ohio State fans. If NC has a total of 400 students, how many students are fans of Ohio State?

(2)  $3x + 2x = 400$     (2)  $\frac{3}{5} = \frac{x}{400}$   
 $5x = 400$      $5x = 1800$   
 $x = 80$      $3(80) = 240$  (1)    (2)  $x = 240$  (1)

Answer: 240 students

4

5. What is the length of  $\overline{YZ}$ ?

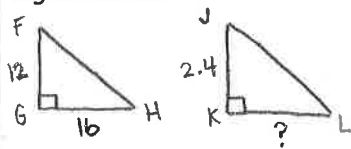


$\frac{x}{x+3} = \frac{8}{12}$  (2)  
 $12x = 8(x+3)$  (1)  
 $12x = 8x + 24$  (1)  
 $4x = 24$      $x = 6$  (1)  
 $YZ = 9$  (1)

A 9     B 10     C 6     D 8

6

6. The lengths of the legs of right  $\triangle FGH$  are 12 meters and 16 meters. The shortest side of  $\triangle JKL$  is 2.4 meters and  $\triangle JKL \sim \triangle FGH$ . How long is the other leg of  $\triangle JKL$ ?



$\frac{12}{2.4} = \frac{16}{x}$  (2)  
 $12x = 38.4$  (1)  
 $x = 3.2$  (1)

Answer: 3.2

4

7. Solve for  $x$  and  $y$  in the given proportions by cross-multiplying. (Hint: You will have to use system of equations)

$\frac{x}{y+1} = \frac{2}{1}$  and  $\frac{x}{3} = \frac{3y-1}{3}$

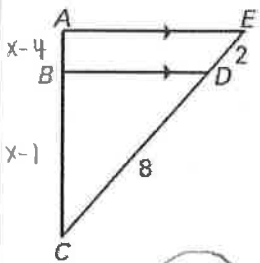
(2)  $x = 2(y+1)$      $3x = 3(3y-1)$  (2)  
 $x = 2y+2$      $3x = 9y-3$  (1)  
 $3(2y+2) = 9y-3$  (1)  
 $6y+6 = 9y-3$   
 $3y = 9$   
 $y = 3$  (1)

$x = 2(3)+2$   
 $x = 8$  (1)

$x = 8$      $y = 3$

10

10. Find  $x$  if  $AB = x - 4$  and  $BC = x - 1$ .



$$\frac{x-4}{a} = \frac{x-1}{b} \quad \textcircled{a}$$

$$2(x-1) = 8(x-4) \quad \textcircled{1}$$

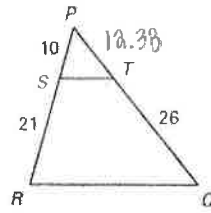
$$2x - 2 = 8x - 32 \quad \textcircled{1}$$

$$6x = 30$$

$$x = 5 \quad \textcircled{1}$$

$$x = \underline{5} \quad 5$$

11. Given:  $\overline{ST} \parallel \overline{RQ}$ . Find PT and PQ.



$$\frac{10}{PT} = \frac{21}{26} \quad \textcircled{a}$$

$$21PT = 260 \quad \textcircled{1}$$

$$PT = 12.38 \quad \textcircled{1}$$

$$PT = \underline{12.38} \quad PQ = \underline{38.38} \quad 5$$

Are the following pairs of triangles similar? If so, justify your answer with AA~, SSS~, or SAS~. If not, state they are not similar.

12. Yes  $\textcircled{a}$   
(AA)

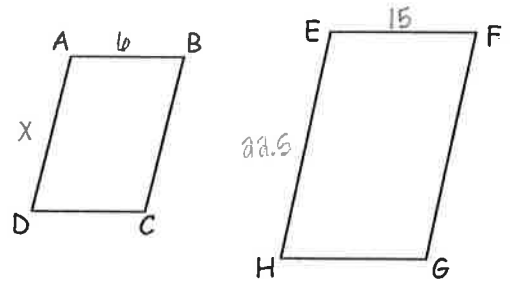
13. Yes  $\textcircled{a}$   
(SAS)

$$\frac{20}{30} = \frac{24}{36} \rightarrow \frac{2}{3} = \frac{2}{3} \quad \checkmark \quad \textcircled{a}$$

14. NO  $\textcircled{a}$   
 $\frac{4}{8} = \frac{5}{12} \neq \frac{6}{12}$

Quad ABCD ~ Quad EFGH. EH = 22.5, AB = 6, and EF = 15. Find the requested information.

15. What is the scale factor from Quad ABCD to Quad EFGH?

$$\textcircled{a} \frac{6}{15} = \left(\frac{2}{5}\right) \quad \textcircled{1}$$


16. Find AD.

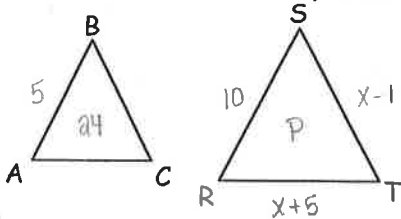
$$\textcircled{a} \frac{6}{15} = \frac{x}{22.5}$$

$$15x = 135 \quad \textcircled{1}$$

$$x = 9 \quad \textcircled{1}$$

$$AD = \underline{9} \quad 4$$

17. Given:  $\triangle ABC \sim \triangle RST$ ,  $AB=5$ ,  $RS=10$ ,  $ST= x-1$ ,  $RT= x+5$ . If the perimeter of  $\triangle ABC$  is 24, then find the value of  $x$ . (Hint: Find the perimeter of  $\triangle RST$  first then set up an equation).



$$\textcircled{a} \frac{5}{10} = \frac{24}{P}$$

$$\textcircled{1} 5P = 240$$

$$P = 48 \quad \textcircled{1}$$

$$\textcircled{a} 10 + x - 1 + x + 5 = 48$$

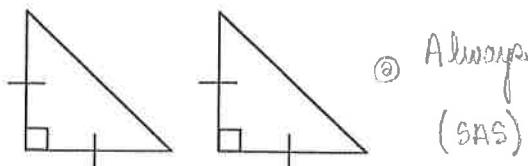
$$2x + 14 = 48$$

$$2x = 34 \quad \textcircled{1} \quad x = 17$$

$$x = \underline{17} \quad 7$$

Decide whether the statement is sometimes, always, or never true. Justify your answer.

18. Two isosceles right triangles are similar.



$\textcircled{a}$  Always  
(SAS)

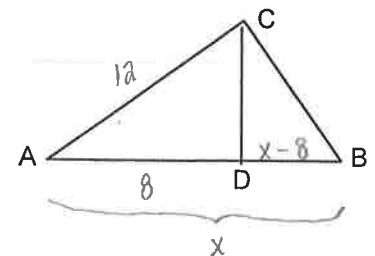
BONUS:

$\triangle ABC \sim \triangle ACD$

$AD = 8$

$AC = 12$

Find AB.



$$\frac{12}{x} = \frac{8}{12}$$

$$8x = 144$$

$$AB = 18 \quad \textcircled{1}$$

$$x = 18$$

