Similarities – Similar Triangles

Homework Section 7.3 Name_____

#1) Write down the definition of similar polygons.

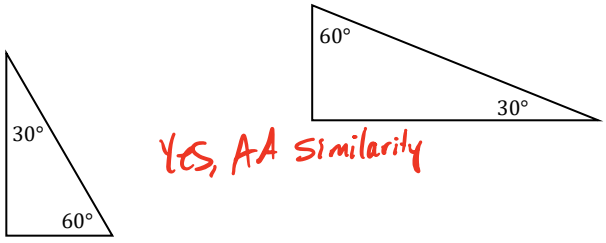
Two polygons are similar if corresponding angles are congruent and corresponding sides are proportional.

#2) Write down the definition of congruent polygons.

Two polygons are congruent if corresponding angles and corresponding sides are congruent.

Determine whether each pair of triangles is similar using the given information. If similar, explain.

#3)



Yes, AA Similarity

#4)

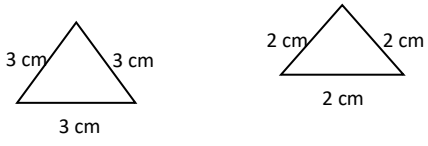


$\frac{10.5}{7} = \frac{12}{8} \neq \frac{16.5}{12}$

$1.5 = 1.5 \neq 1.375$

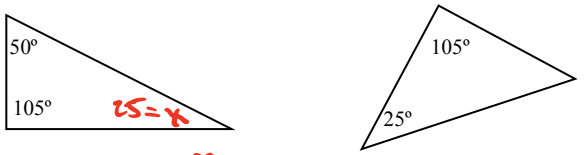
No, corresponding sides are not proportional.

#5)



$\frac{3}{2} = \frac{3}{2} = \frac{3}{2}$ Yes corresponding sides are proportional.

#6)



$50 + 105 + x = 180$

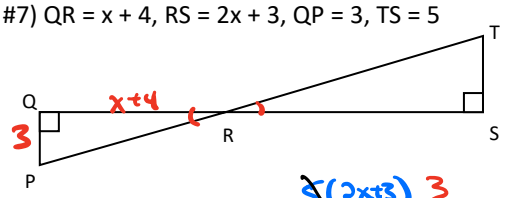
$155 + x = 180$

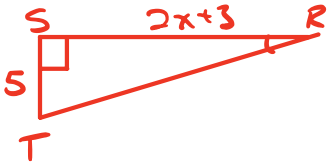
$x = 25$

Yes, AA Similarity

Find the value of x.

#7) QR = x + 4, RS = 2x + 3, QP = 3, TS = 5





$\frac{3}{5} = \frac{x+4}{2x+3}$

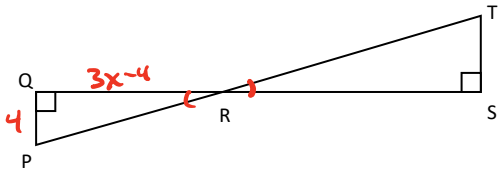
$3(2x+3) = 5(x+4)$

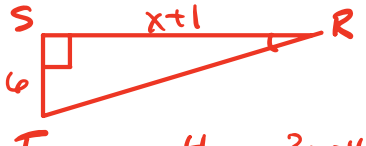
$6x + 9 = 5x + 20$

$x + 9 = 20$

$x = 11$

#8) QR = 3x – 4, RS = x + 1, QP = 4, TS = 6





$\frac{4}{6} = \frac{3x-4}{x+1}$

$\frac{2}{3} = \frac{3x-4}{x+1}$

$2(x+1) = 3(3x-4)$

$2x + 2 = 9x - 12$

$2 = 7x - 12$

$14 = 7x$

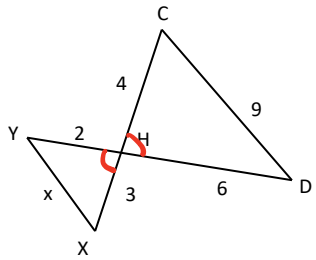
$2 = x$

Similarities – Similar Triangles

Homework Section 7.3 Name_____

Determine if each pair of triangles is similar. If similar, state the reason and find the missing measures.

#9)



$\frac{2}{4} = \frac{3}{6}$

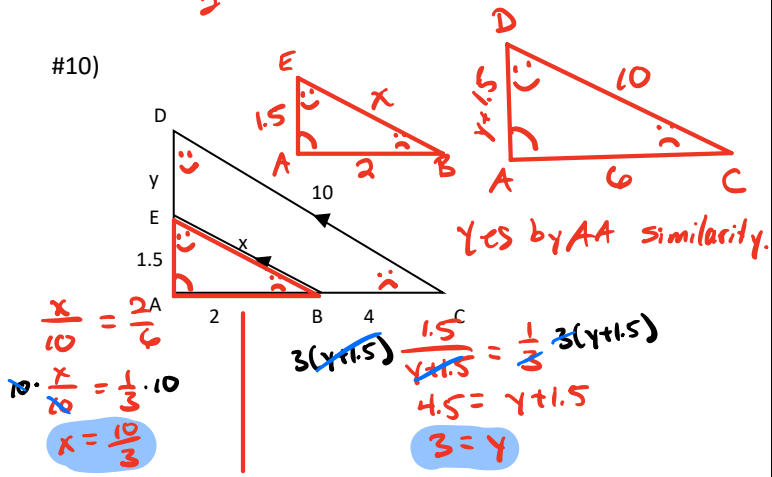
Yes by SAS similarity

$\frac{2}{4} = \frac{x}{9}$

$9 \cdot \frac{1}{2} = \frac{x}{4} \cdot 9$

$\frac{9}{2} = x$

#10)



Yes by AA similarity.

$\frac{x}{10} = \frac{2}{6}$

$10 \cdot \frac{x}{10} = \frac{1}{3} \cdot 10$

$x = \frac{10}{3}$

$\frac{1.5}{y+1.5} = \frac{1}{3}$

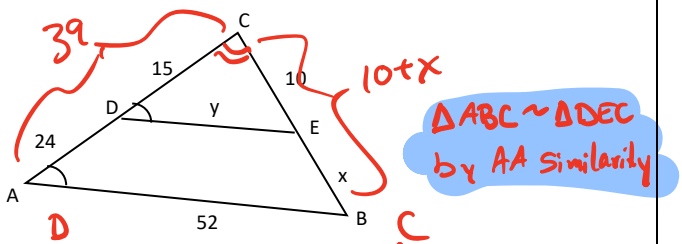
$3(y+1.5)$

$4.5 = y + 1.5$

$3 = y$

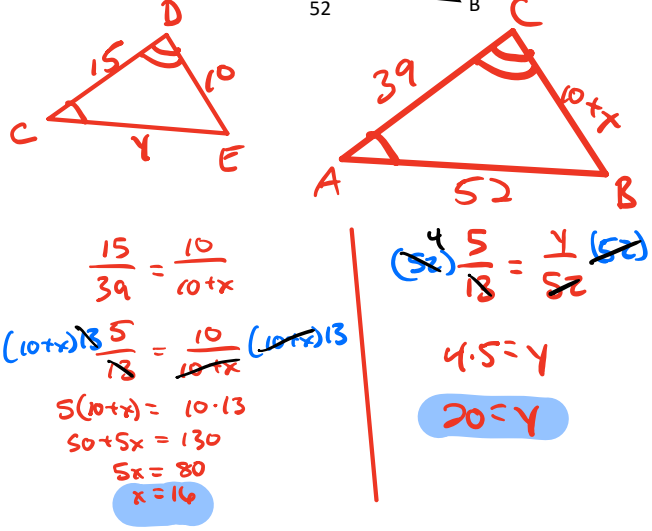
Identify the similar triangles in each figure. Explain why they are similar and find the missing measures of x and y.

#11)



39, 10+x

ΔABC ~ ΔDEC by AA Similarity



$\frac{15}{39} = \frac{10}{10+x}$

$(10+x)13 \cdot \frac{5}{13} = \frac{10}{10+x} \cdot (10+x)13$

$5(10+x) = 10 \cdot 13$

$50 + 5x = 130$

$5x = 80$

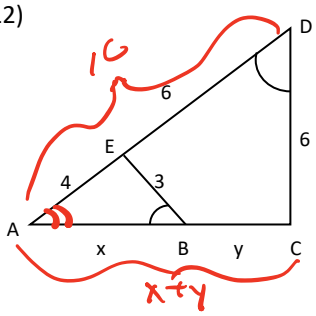
$x = 16$

$\frac{5}{13} = \frac{y}{52}$

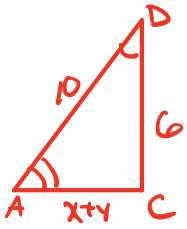
$4.5 = y$

$20 = y$

#12)







ΔABE ~ ΔADC by AA similarity

$\frac{x}{10} = \frac{3}{6}$

$10 \cdot \frac{x}{10} = \frac{1}{2} \cdot 10$

$x = 5$

$\frac{1}{3} = \frac{4}{5+y}$

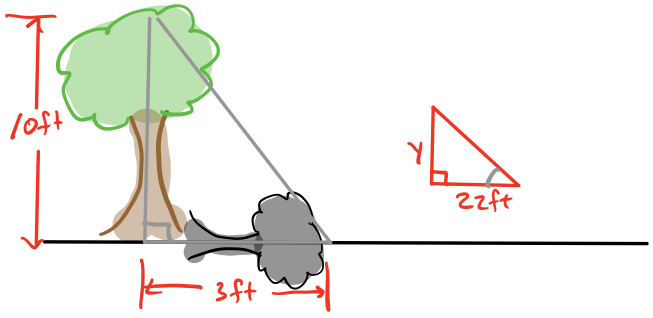
$3(5+y)$

$5 + y = 8$

$y = 3$

Draw a picture, make a proportion and answer the question.

#13) A 10 foot tree casts a 3 foot shadow. How tall is a tree that casts a 22 foot shadow at the same time of day? Round to one decimal place.



$\frac{10}{y} = \frac{3}{22}$

$220 = 3y$

$\frac{220}{3} = y$

$73.3 \text{ ft} \approx y$

The shadow is about 73.3 feet.

#3) Yes by AA similarity

#4) No (corresponding sides are not proportional)

#5) Yes by SSS similarity #6) Yes by AA similarity

#7) x = 11 #8) x = 2

#9) Yes, SAS similarity. x = 4.5 or $\frac{9}{2}$

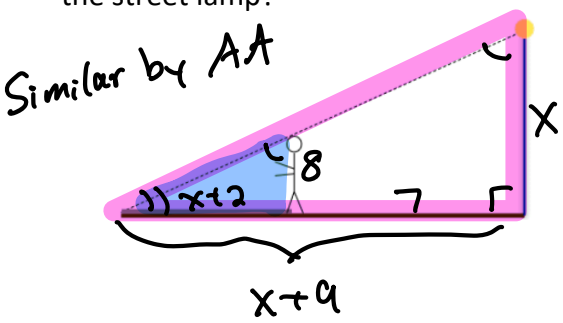
#10) Yes, AA similarity. $\left(\frac{10}{3}, 3\right)$

#11) ΔABC is similar to ΔDEC, by AA Similarity, (16, 20)

#12) ΔABE is similar to ΔADC, by AA Similarity, (5, 3)

#13) 73.3'

#14) A streetlight, known for its towering ego, stands x feet tall and casts a shadow of an 8 foot tall Bigfoot. Bigfoot's shadow is (x+2) feet long. If Bigfoot is 7 feet from the base of the streetlight, how tall is the street lamp?



$$8x\,\frac{x+2}{8} = \frac{x+9}{x}\,8x$$

$$x^2 + 2x = 8x + 72$$

$$x^2 - 6x - 72 = 0$$

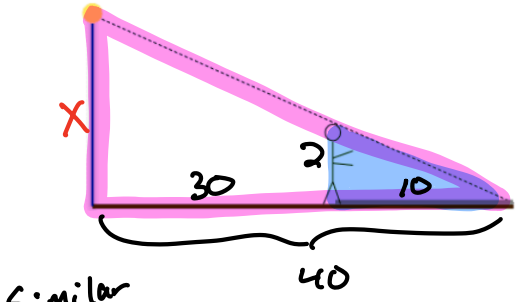
$$(x-12)(x+6) = 0$$

$x - 12 = 0$ | $x + 6 = 0$

$x = 12$ | $x = -6$ ← makes no sense. ~~10~~

The Streetlight is 12 feet tall

#15) A powerful light source casts a shadow of infant Danny DeVito that is 10 baby feet long. Infant Danny DeVito, who is 2 feet tall, is 30 baby feet from the base of the light source. How tall is the light source in baby feet?



Similar by AA

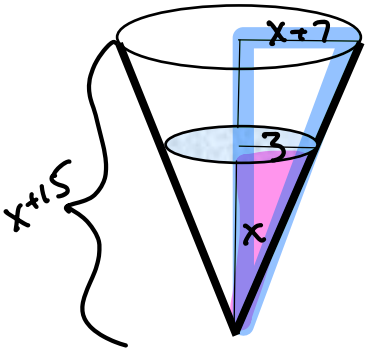
$$\frac{x}{40} = \frac{2}{10}$$

$$x = \frac{2}{10} \cdot 40^{4}$$

$$x = 8$$

The light source is 8 baby feet tall

#16) A paradoxasaur, a legendary creature known for existing when you believe it doesn't but never existing if you believe it does, is holding a cone-shaped cup filled with water. The cup has a radius of (x + 7) cm and a height of (x + 15) cm. As the paradoxasaur sips the water, the radius of the water shrinks to 3 cm and the height decreases to x cm. What would be the height and radius of the cup?



Similar by AA

$$x(x+15)\frac{x+7}{x+15} = \frac{3}{x}x(x+15)$$

$$x^2+7x = 3x+45$$

$$x^2+4x-45=0$$

$$(x-5)(x+9)=0$$

$x-5=0$ | $x+9=0$

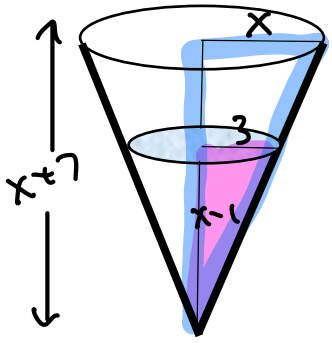
$x=5$ | $x=-9$ ← makes no sense.

height $= x+15 = 20$

radius $= x+7 = 12$

The height of cup is 20cm and radius is 12 cm

#17) George, a creature of questionable intelligence, is holding an empty cone-shaped cup. The cup has a radius of x cm and a height of (x + 7) cm. As George fills the cup with recycled water from his mouth, the radius of the water increases to 3 cm and the height increases to (x – 1) cm. What would be the height and radius of the cup?



Similar by AA

$$(x-1)(x+7)\frac{3}{x-1} = \frac{x}{x+7}(x-1)(x+7)$$

$$3x+21 = x^2-x$$

$$0 = x^2-4x-21$$

$$0=(x-7)(x+3)$$

$x-7=0$ | $x+3=0$

$x=7$ | $x=-3$

The height of the cup is 14 cm and the radius is 7

#3) Yes by AA similarity #4) No (corresponding sides are not proportional)
#5) Yes by SSS similarity #6) Yes by AA similarity #7) x = 11 #8) x = 2
#9) Yes, SAS similarity. x = 4.5 or $\frac{9}{2}$ #10) Yes, AA similarity. $\left(\frac{10}{3}, 3\right)$
#11) ΔABC is similar to ΔDEC, by AA Similarity, (16, 20)
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