# Curriculum Outcome

G4 Solve problems that involve angle relationships between parallel, perpendicular and transversal lines.

G5 Demonstrate an understanding of angles, including acute, right, obtuse, straight and reflex, by: drawing, replicating and constructing, bisecting, and solving problems.

Student Friendly:

Angle Properties involving Parallel Lines and Transversal
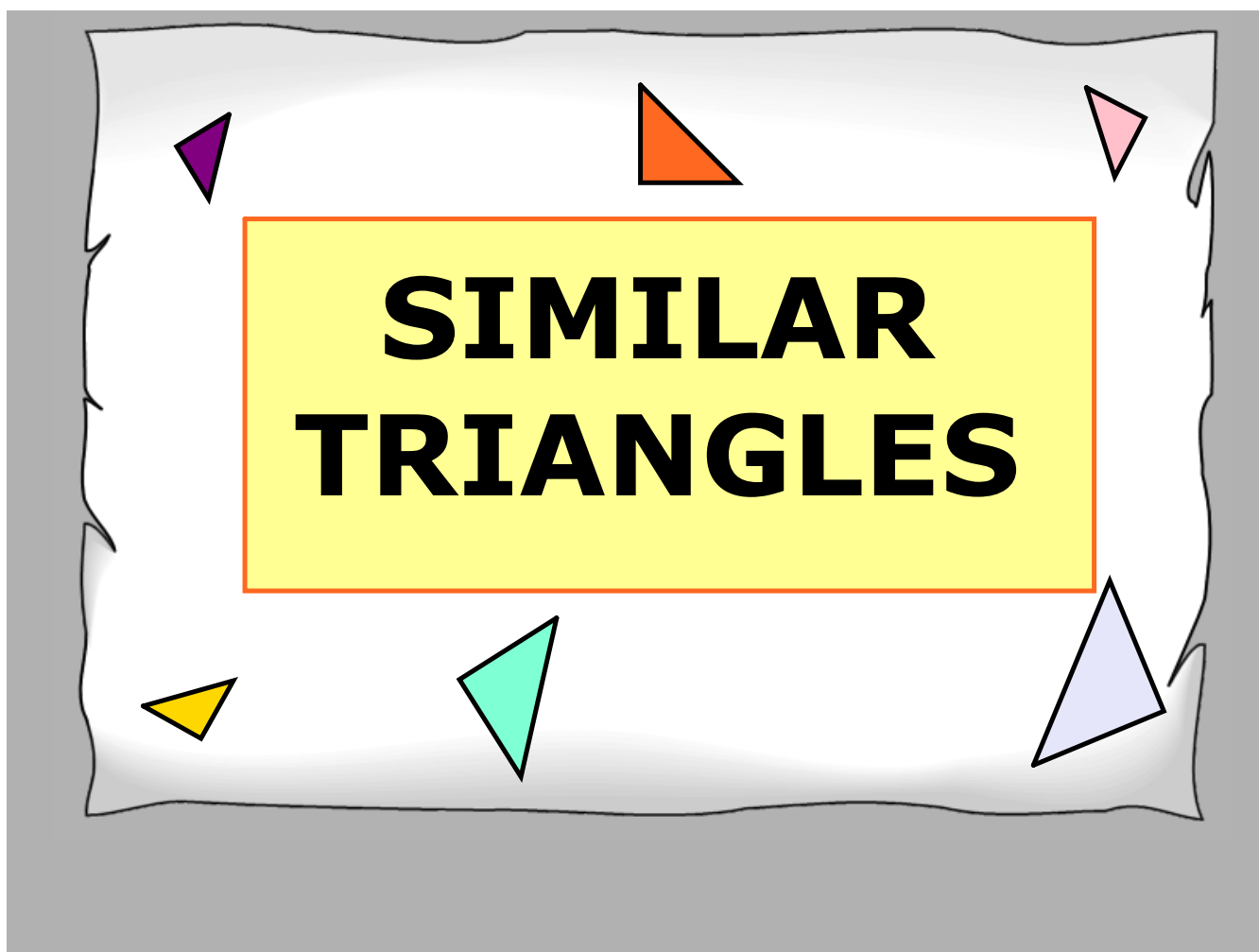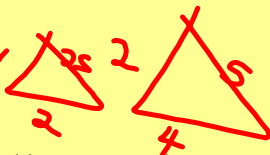
SIMILAR TRIANGLES

Similar Triangles

Triangles are said to be similar if they have the following properties...

Property 1

Corresponding pairs of angles are equal

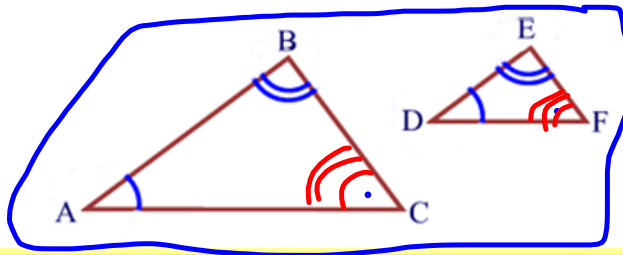Property 2

$\frac{1}{2} \quad \frac{2}{4} \quad \frac{2.5}{5}$

Corresponding pairs of sides are proportional

There are three accepted methods of proving triangles similar:

AA A   If two angles of one triangle are equal to two angles of and another triangle the triangles are similar.
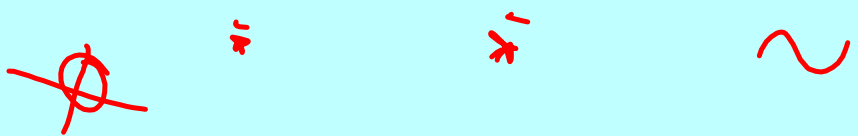
Theorem: If two angles of one triangle are congruent to two angles of another triangle, the triangles are similar.

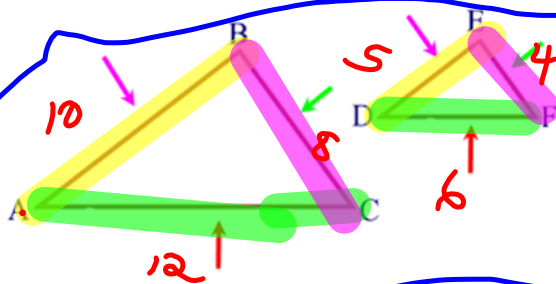If: $\angle A \cong \angle D$

$\angle B \cong \angle E$

Then: $\triangle ABC \sim \triangle DEF$

SSS
for similarity

The three side in the two triangles are in proportion.

Theorem: If the three sets of corresponding sides of two triangles are in proportion, the triangles are similar.

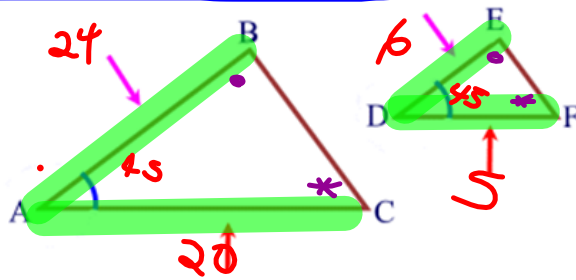If: $\dfrac{AB}{DE} = \dfrac{AC}{DF} = \dfrac{BC}{EF}$

Then: $\triangle ABC \sim \triangle DEF$

$\dfrac{10}{5} \quad \dfrac{12}{6} \quad \dfrac{8}{4}$

SAS
for
similarity

Two sides in each triangle are proportionate and the angle between the two sides are equal in each triangle.

Theorem: If an angle of one triangle is congruent to the corresponding angle of another triangle and the lengths of the sides including these angles are in proportion, the triangles are similar.
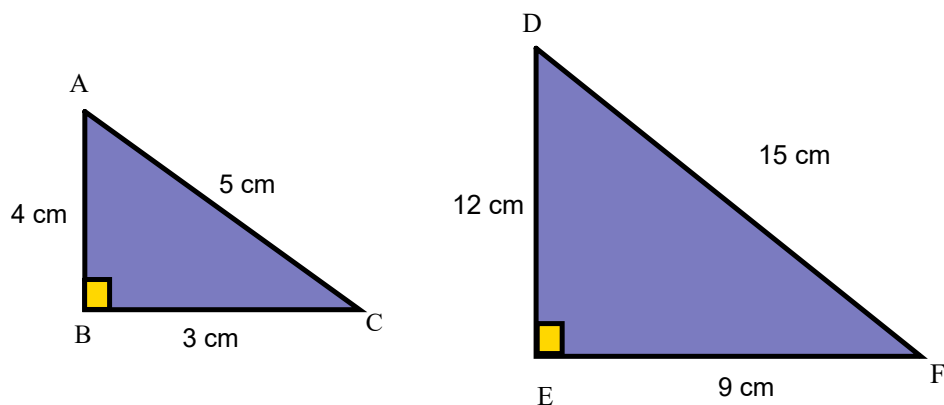
24

6

45

45

20

5

If: $\angle A \cong \angle D$

$$\frac{AB}{DE} = \frac{AC}{DF}$$

Then: $\triangle ABC \sim \triangle DEF$

$\frac{24}{6}$ $\frac{20}{5}$

Prove Similarity

A
B
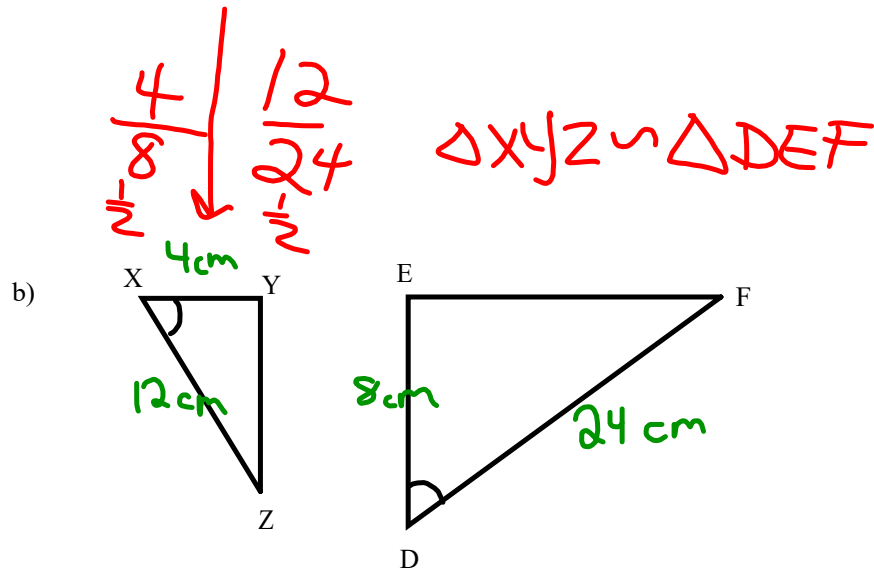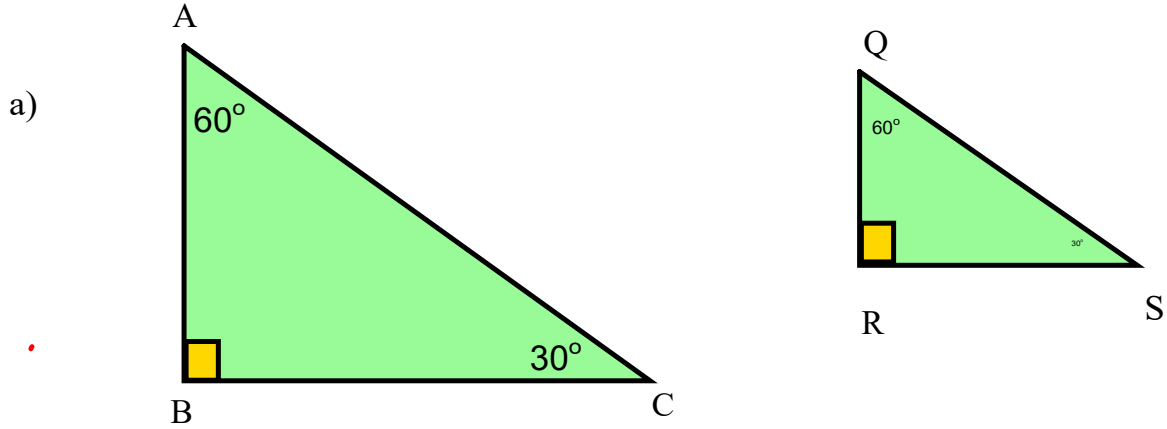C
D
E
F

4 cm
5 cm
3 cm
12 cm
15 cm
9 cm

1

$$\frac{AC}{DF} = \frac{AB}{DE} = \frac{BC}{EF}$$

$$\frac{5}{15} = \frac{4}{12} = \frac{3}{9}$$

$$\frac{1}{3} = \frac{1}{3} = \frac{1}{3}$$

Prove Similarity

a)

A

60°

30°

B   C

Q

60°

30°

R   S

$$\frac{4}{8} = \frac{1}{2} \qquad \frac{12}{24} = \frac{1}{2}$$

4cm

△XYZ ∽ △DEF

b)

X   Y

12cm

Z

E   F

8cm   24 cm

D

Remember

Triangles are said to be similar if they have the following properties...

Property 1

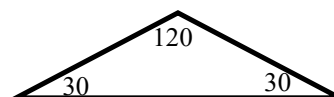Corresponding pairs of angles are equal

Property 2
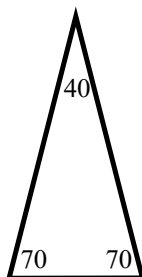
Corresponding pairs of sides are proportional
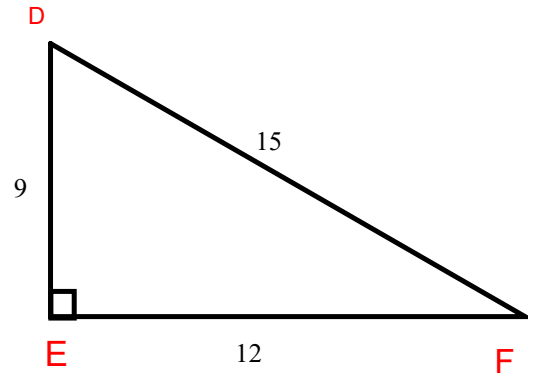
Are the triangles similar? Why or Why not?
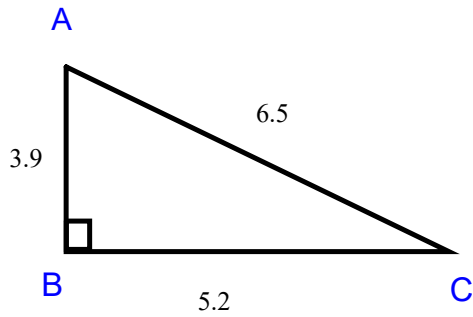
a)

b)

c)

A

6.5

3.9

B

5.2

C

D

15

9

E   12   F
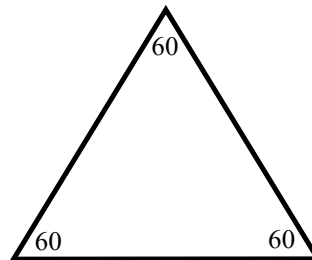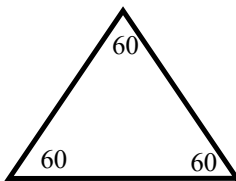
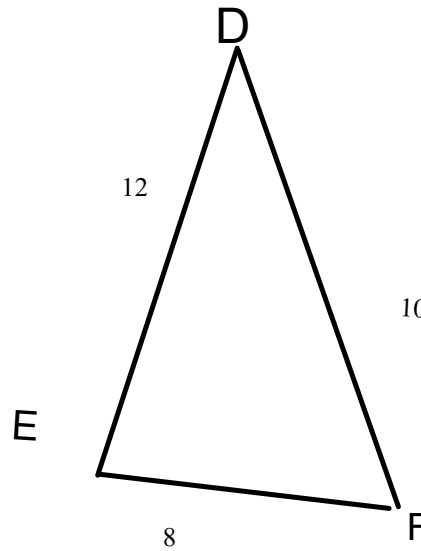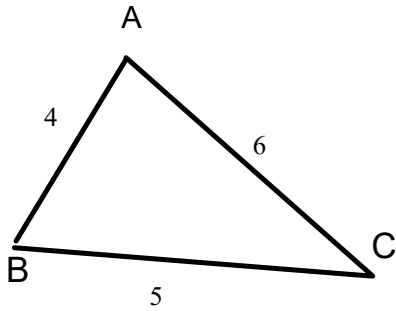$$\frac{AB}{DE} \quad \frac{BC}{EF} \quad \frac{AC}{DE}$$

$$\frac{39}{9} \quad \frac{5.2}{12} \quad \frac{6.5}{15}$$

$$0.43 \quad 0.43 \quad 0.43$$

$$\therefore \triangle ABC \sim \triangle DEF \ (SSS)$$

$$\triangle ABC \sim \triangle DEF \ (SSS)$$

.

d)

A

4

6

B

5

C

D

12

10

E

8

F

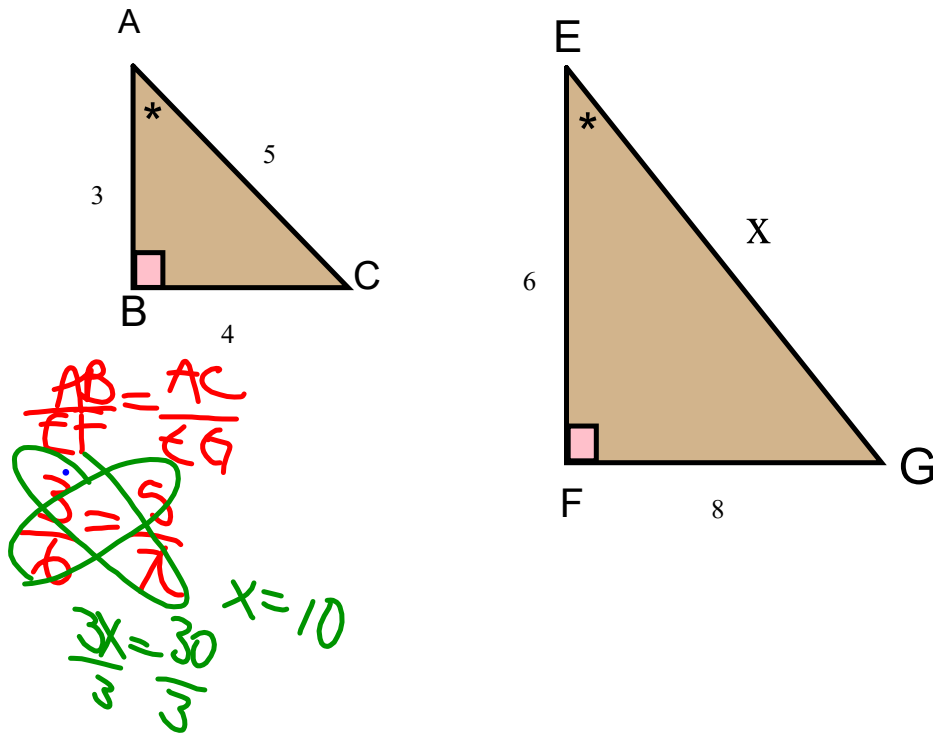$$\frac{AB}{EF} = \frac{AC}{ED} = \frac{BC}{FD}$$
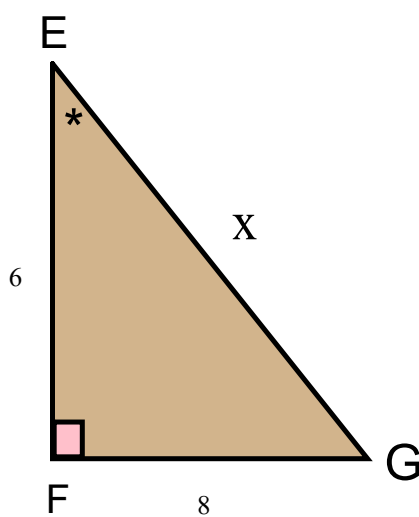
$$\frac{4}{8} = \frac{6}{12} = \frac{5}{10}$$

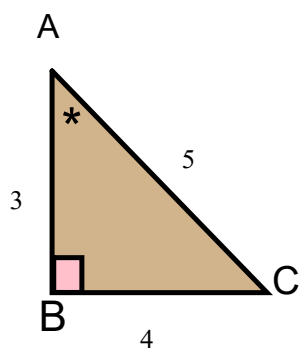$$0.5 = 0.5 = 0.5$$

$$\triangle ABC \sim \triangle EFD$$

$$(SSS$$

Using Similar Triangles to find the unknown sides of a triangle

A

*

5

3

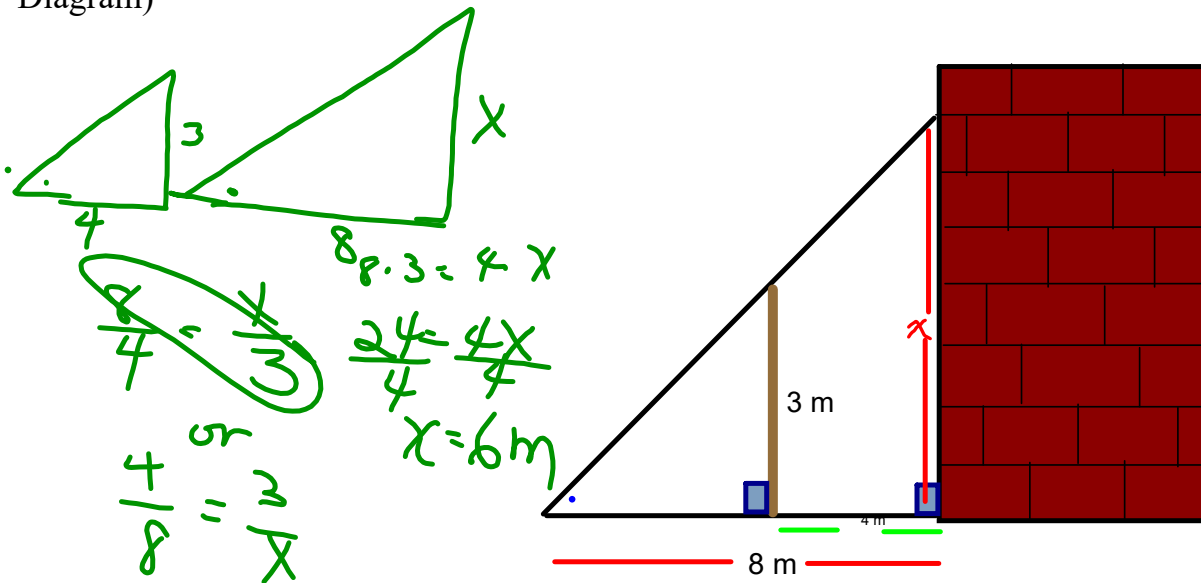B □ C

4

E

*

X

6

F □ G

8

$$\frac{AB}{EF} = \frac{AC}{EG}$$

$$\frac{3}{6} = \frac{5}{x}$$

$$\frac{3x}{3} = \frac{30}{3} \qquad x = 10$$

Using Similar Triangles to find the unknown sides of a triangle

A
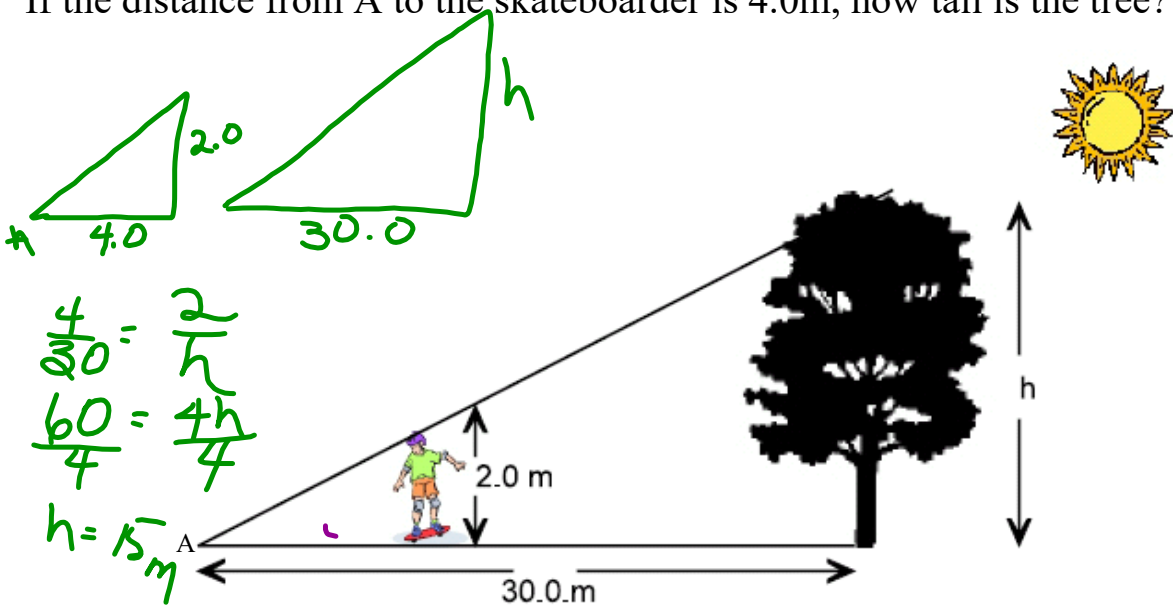
*

5

3

B

4
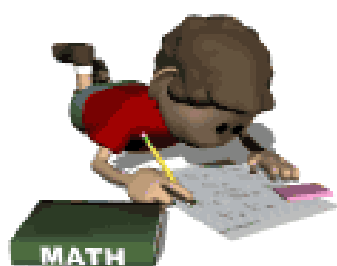
C

E

*

X

6

F

8

G

Problem:

A ladder is placed with its foot 8m from a wall. The ladder touches the top of a 3m fence that is 4m from the base of the wall. How high up does the ladder reach? (Draw Diagram)

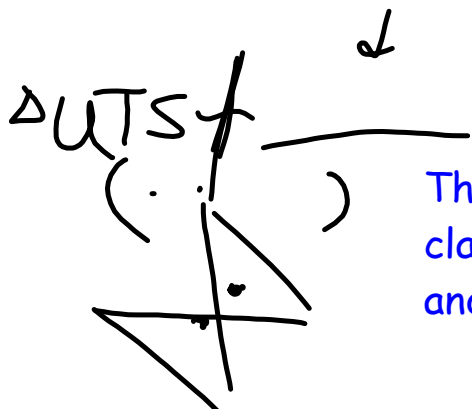$$8 \cdot 3 = 4x$$

$$\frac{24}{4} = \frac{4x}{4}$$

$$x = 6m$$

$$\frac{8}{4} = \frac{x}{3}$$

or

$$\frac{4}{8} = \frac{3}{x}$$

3 m

8 m

4 m
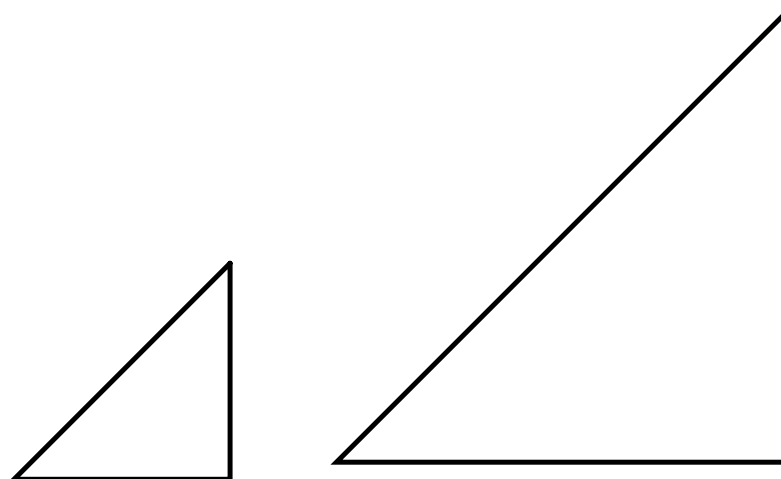
Problems...

If the distance from A to the skateboarder is 4.0m, how tall is the tree?

$$\frac{4}{30} = \frac{2}{h}$$

$$\frac{60}{4} = \frac{4h}{4}$$

$$h = 15\,m$$
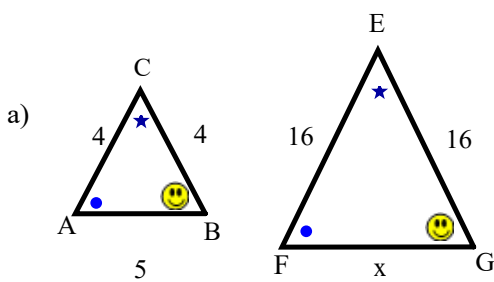

2.0 m

30.0 m

h

In class assignmnet
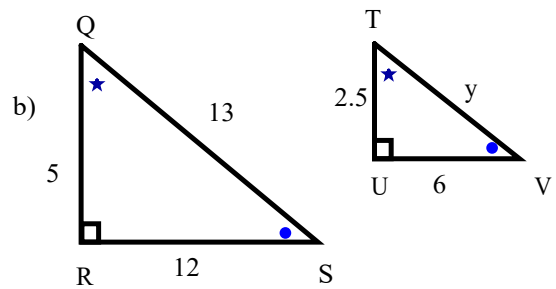
Similar Triangle Worksheet

ΔUTS

This assignment was completed in class and then students started another assignment.
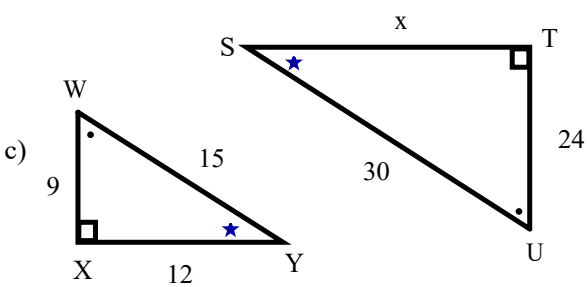
In class Assignmnet

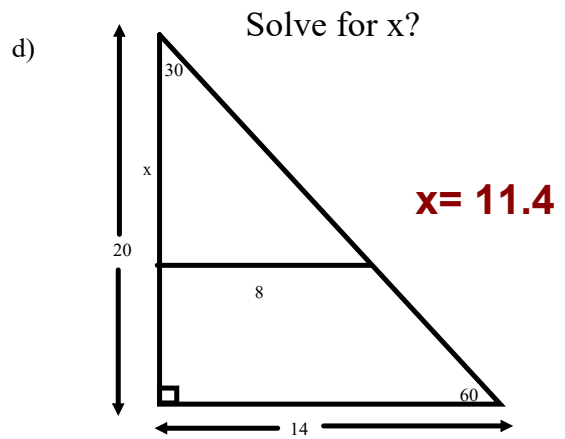Exercise: Find the Unknown Side of the Similar Triangles

a)

x= 20

b)

y= 6.5

c)

x= 18

d)

Solve for x?

x= 11.4

Solve the following proportions.

In class Assignmnet

a) $\dfrac{x}{3} = \dfrac{10}{5}$ b) $\dfrac{7}{x} = \dfrac{2}{3}$ c) $\dfrac{3}{4} = \dfrac{x}{8}$ d) $\dfrac{6}{5} = \dfrac{8}{y}$

e) $\dfrac{4}{5} = \dfrac{12}{z}$ f) $\dfrac{9}{2} = \dfrac{x}{4}$ g) $\dfrac{x}{15} = \dfrac{3}{5}$ h) $\dfrac{5}{1} = \dfrac{x}{3}$

i) $\dfrac{3}{x} = \dfrac{18}{24}$ j) $\dfrac{4}{3} = \dfrac{8}{x}$ k) $\dfrac{x}{2} = \dfrac{10}{5}$ l) $\dfrac{6}{x} = \dfrac{10}{25}$

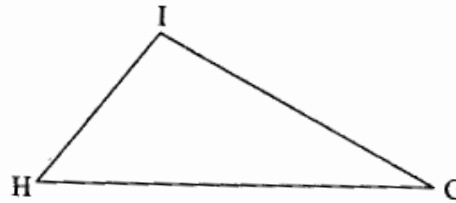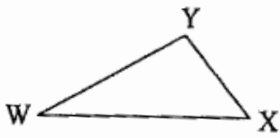m) $\dfrac{8}{x} = \dfrac{6}{3}$ n) $\dfrac{5}{3} = \dfrac{45}{x}$ o) $\dfrac{2.5}{x} = \dfrac{2}{7}$ p) $\dfrac{x}{12.5} = \dfrac{.8}{4}$

MATHEMATICS 10
SIMILAR TRIANGLE WORKSHEET

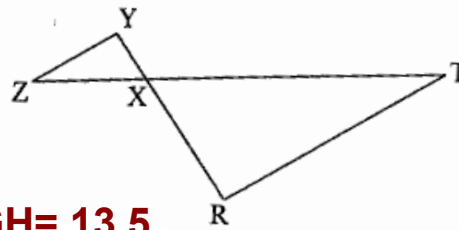1) $\triangle WXY \sim \triangle GHI$. If $WY = 8$, $WX = 9$, and $GI = 12$, find GH.

2) $\triangle XYZ \sim \triangle XRT$.
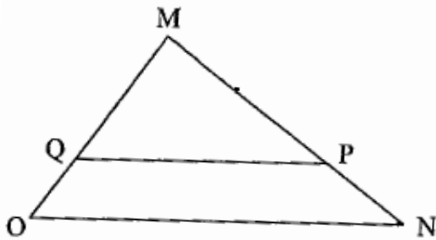
Find RT

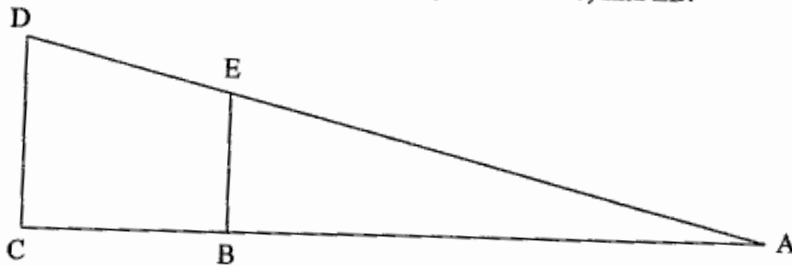If $xy = 4$ $xR = 8$
$yz = 4$

GH= 13.5

3) $\triangle MNO \sim \triangle MPQ$. If $QP = 7$, $MQ = 6$, and $MO = 8$, find ON and OQ.
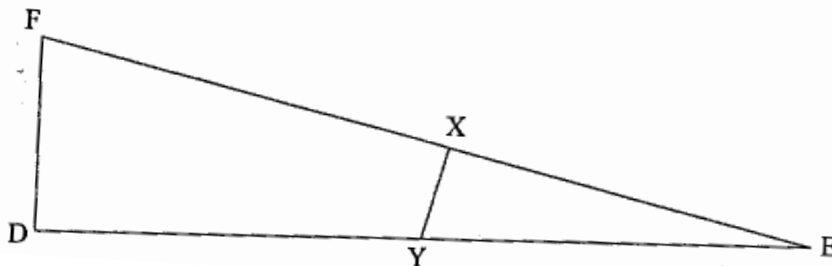
ON= 9.3   **OQ= 2**

4) $\triangle ABE \sim \triangle ACD$. If $AE = 8$, $AD = 18$, and $DC = 10$, find EB.

EB= 4.44

5) $\triangle EXY \sim \triangle EDF$. If $EX = 4$, $XY = 3$, $YE = 5$, and $FD = 8$, Find DE.
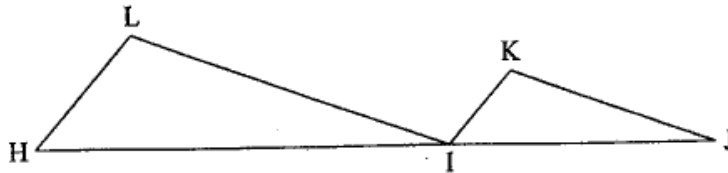
DE= 10.67

6) △ABC ~ △DEF in such a way that the ratio of AB : DE is 2 : 5.

    a) If AB = 10, then find DE. **DE= 25**
    b) If EF = 45, then find BC. **BC= 18**
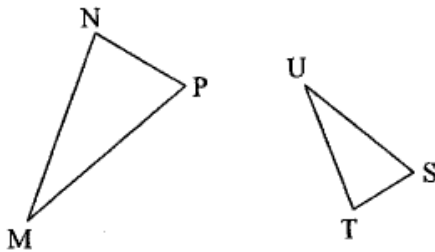   c) If DF = 50, then find AC. **AC= 20**

7) △LHI ~ △KIJ. If LH = 6, LI = 7, HI = 12, and KI = 2, find IJ and KJ.

KJ= 2.33
IJ= 4

8) △STU ~ △PNM. If PN = 32, NM = 16, MP = 24, TU = 2

    Find US and TS

US= 4
TS= 3

9) △TOM ~ △QSR. If TO = 7, MO = 6, QS = 2

    Find QR
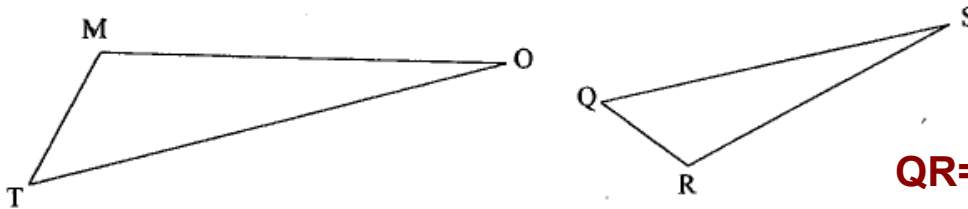
QR= 12

10) △PUW ~ △PKO. If PK = 8, PW = 2, and PO = 3, find PU.
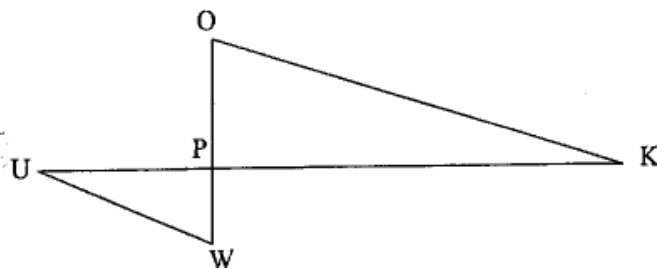
PU= 5.3

12.2 Exercise

Attachments

Similar Triangles.docx