7-4 SIMILAR TRIANGLES

To prove polygons are similar we can use two pieces of the definition :

1. corresponding angles are <u>congruent</u>, and
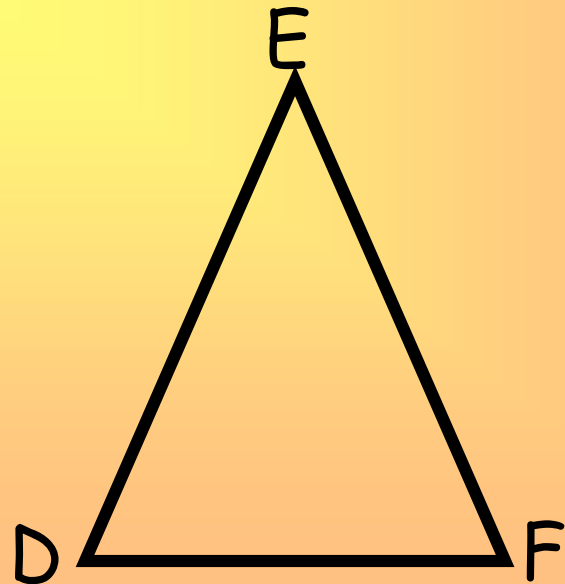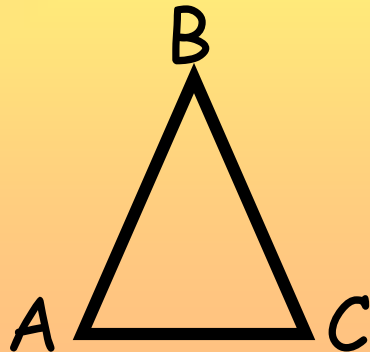
2. corresponding sides have the same <u>ratio</u>/scale factor.

However, when dealing with **triangles**, specifically, there are **simpler methods**.
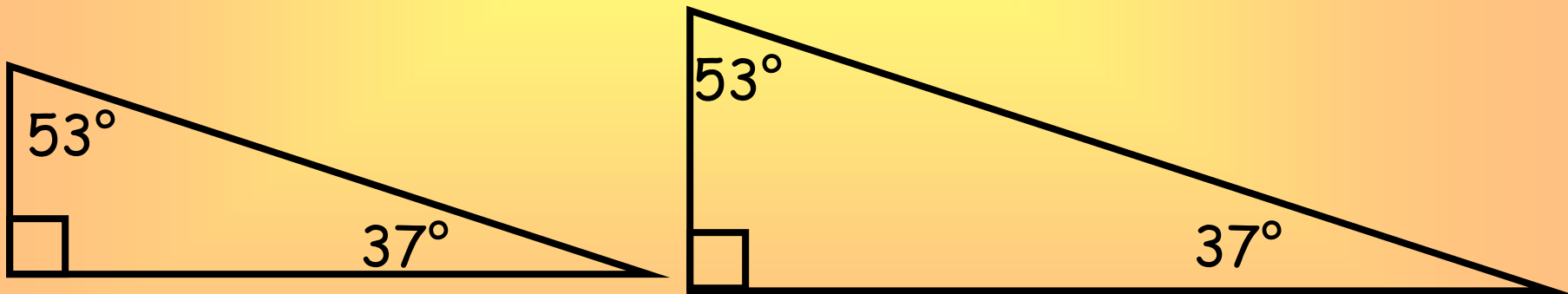
AA Similarity Postulate:
   If two <u>angles</u> of one triangle are congruent to two <u>angles</u> of another triangle, then the two triangles are <u>similar</u>.

Ex. If $\angle$<u>A</u> $\cong$ $\angle$<u>D</u> and $\angle$<u>B</u> $\cong$ $\angle$<u>E</u>, then
   $\triangle$<u>ABC</u> ~ $\triangle$<u>DEF</u>

Ex: One right triangle has an angle with measure 37°. Another right triangle has an angle with measure 53°. Are the two triangles similar? Explain.
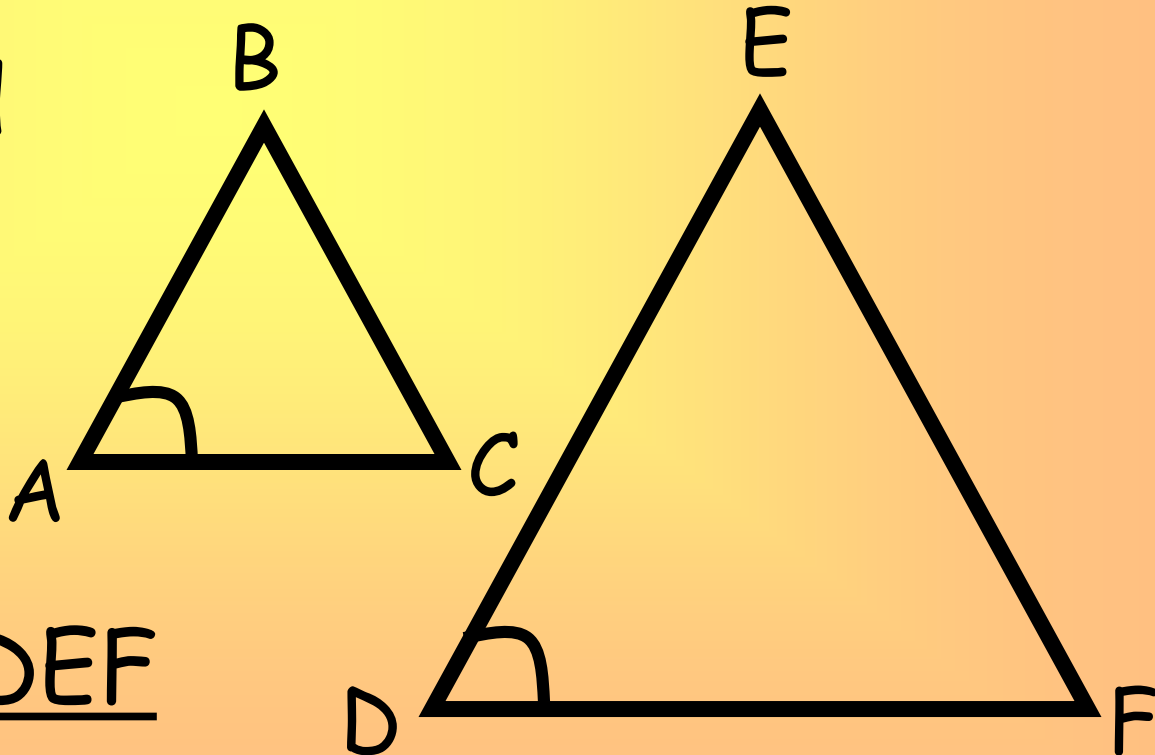
Yes, AA Similarity Postulate.

7-5 THEOREMS FOR SIMILAR TRIANGLES

SAS Similarity Theorem:

If an angle of one triangle is congruent to an angle of another triangle and the <u>sides</u> including those angles are in <u>proportion</u>, then the triangles are <u>similar</u>.
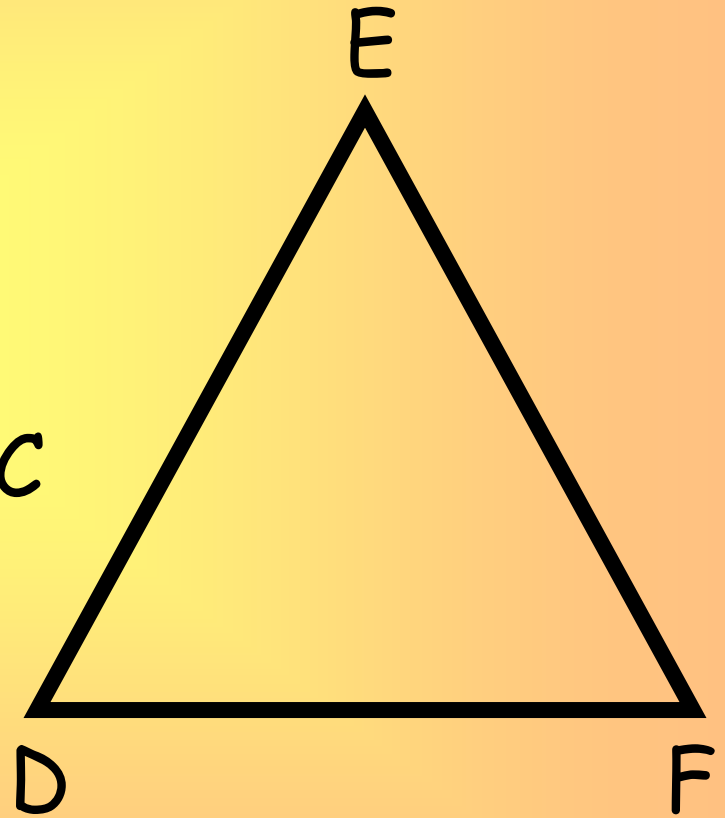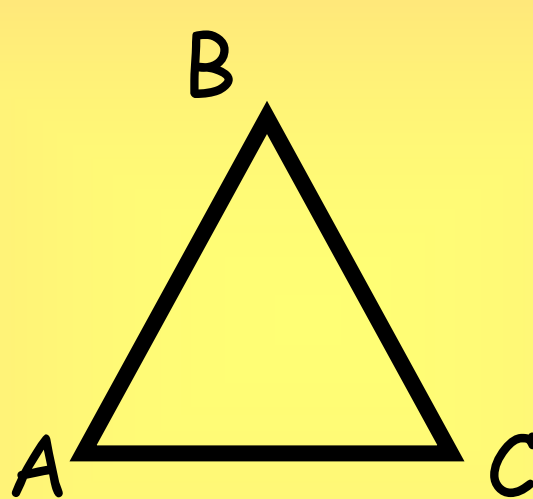
If: $\underline{\angle A \cong \angle D}$ and

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

Then: $\underline{\triangle ABC \sim \triangle DEF}$

SSS Similarity Theorem:

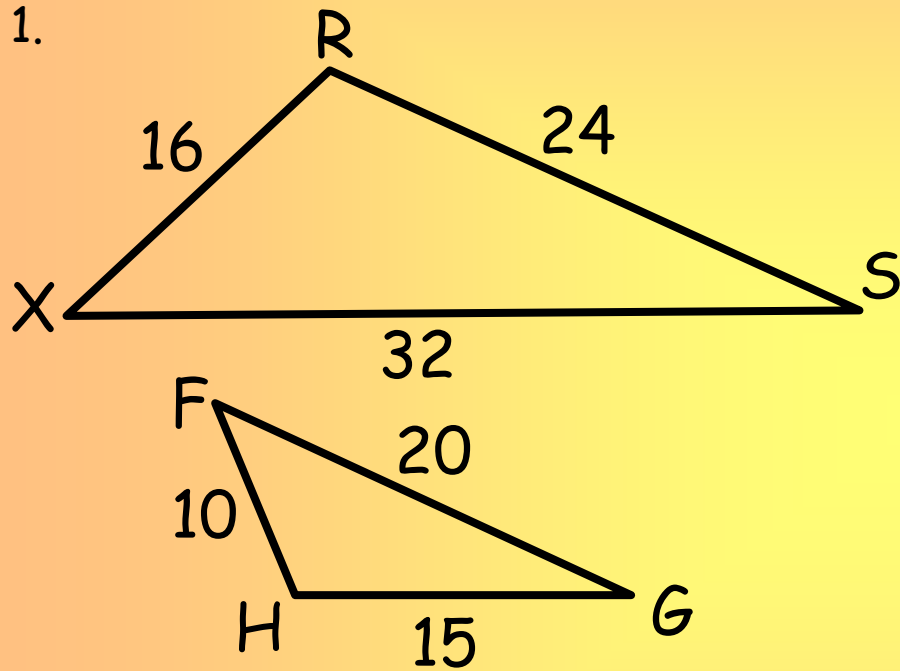If the <u>sides</u> of two triangles are in <u>proportion</u>, then the triangles are <u>similar</u>.
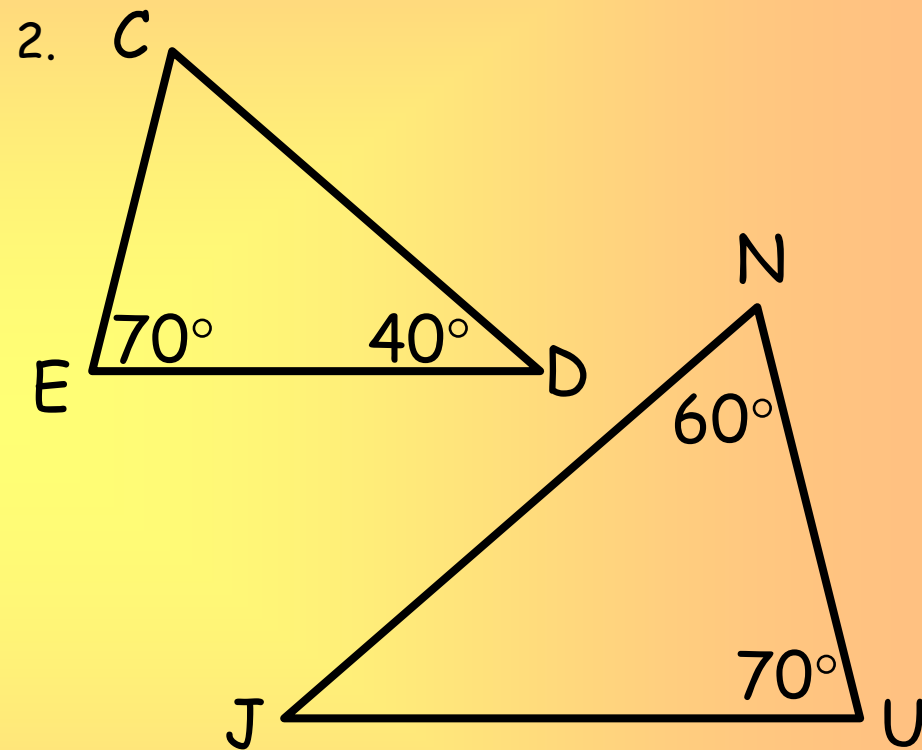
If:

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

Then: <u>△ABC ~ △DEF</u>

Can the two triangles shown be proved similar? If so, state the similarity and tell which postulate or theorem is used.

1.

R

16

24

X

S

32

F

20

10

H

15

G

$$\frac{16}{10} = \frac{8}{5} \quad \frac{24}{15} = \frac{8}{5} \quad \frac{32}{20} = \frac{8}{5}$$
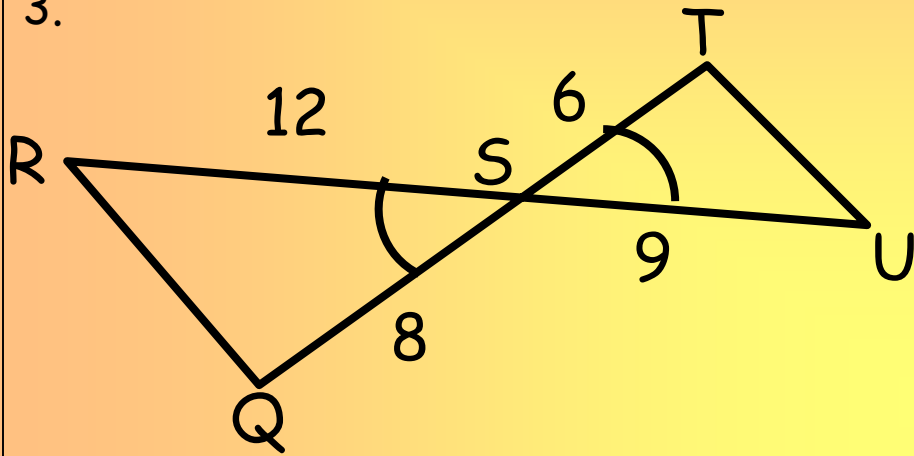
SSS Similarity Thm.
ΔHFG ~ ΔRXS

2.

C

70° 40°

E D

N

60°

70°

J U

Not Similar

Can the two triangles shown be proved similar? If so, state the similarity and tell which postulate or theorem is used.

3.

R 12 S 6 T
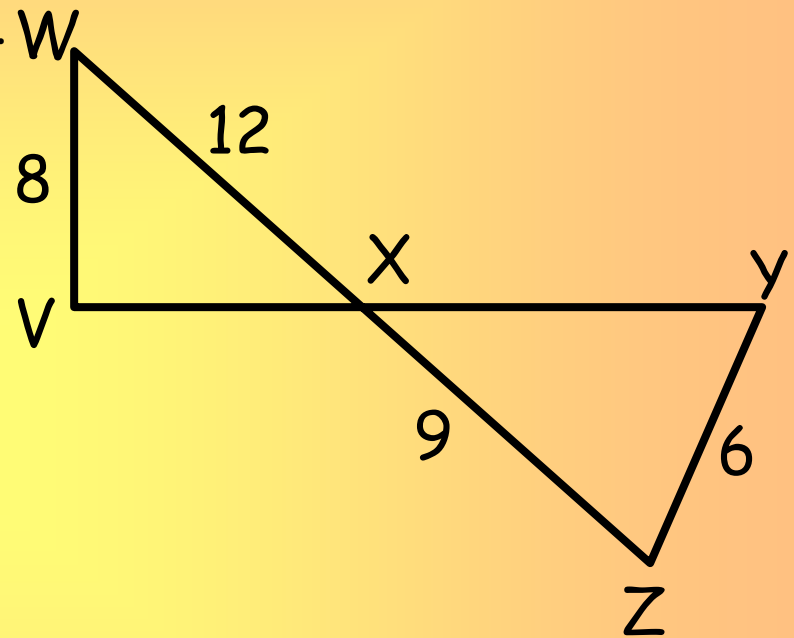
9 U

8

Q

$$\frac{12}{9} = \frac{4}{3} \qquad \frac{8}{6} = \frac{4}{3}$$

SAS Similarity Theorem

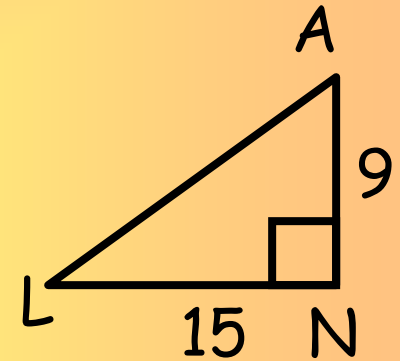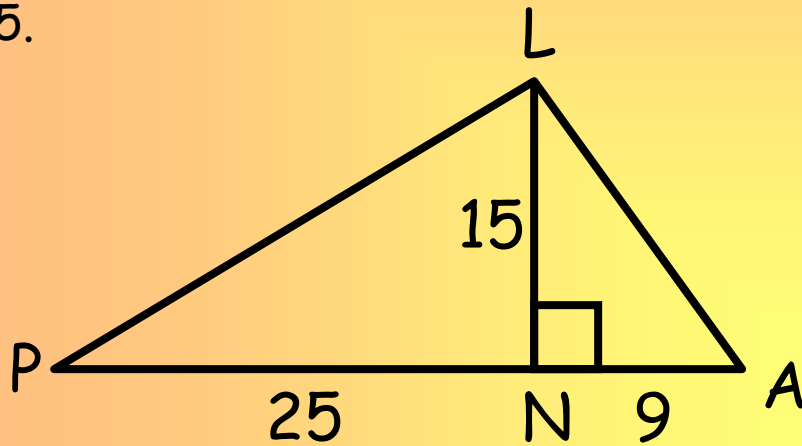$\triangle$RQS ~ $\triangle$UTS
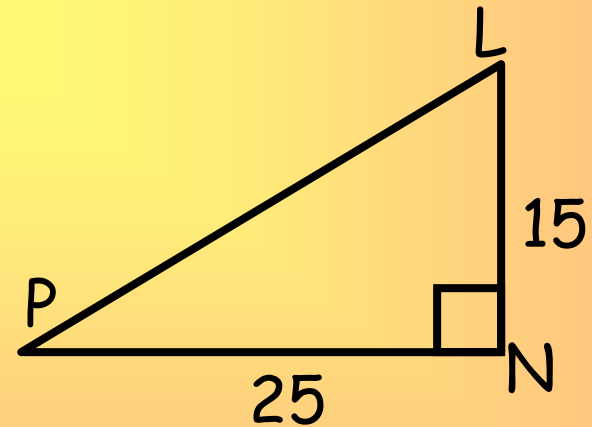
4. W

8 12

V X Y

9

Z 6

No Conclusion

Can the two triangles shown be proved similar? If so, state the similarity and tell which postulate or theorem is used.
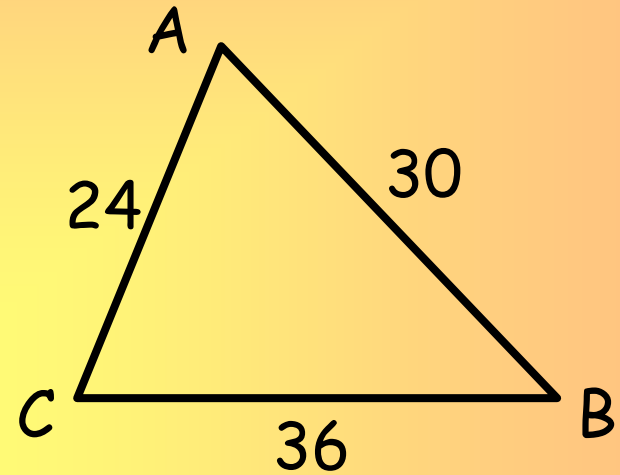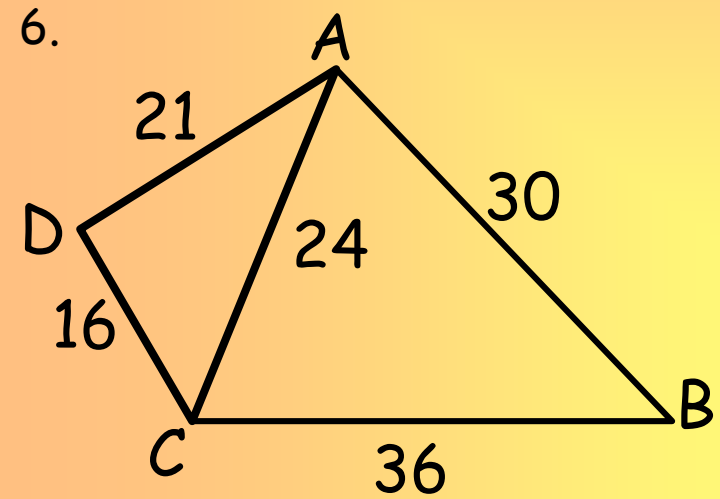
5.

$$\frac{15}{25} = \frac{3}{5} \qquad \frac{9}{15} = \frac{3}{5}$$

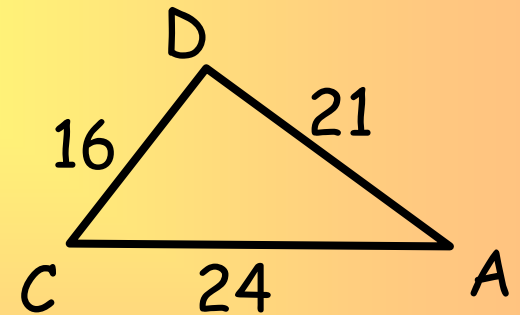$\triangle LNP \sim \triangle ANL$ SAS Similarity Thm.

Can the two triangles shown be proved similar? If so, state the similarity and tell which postulate or theorem is used.
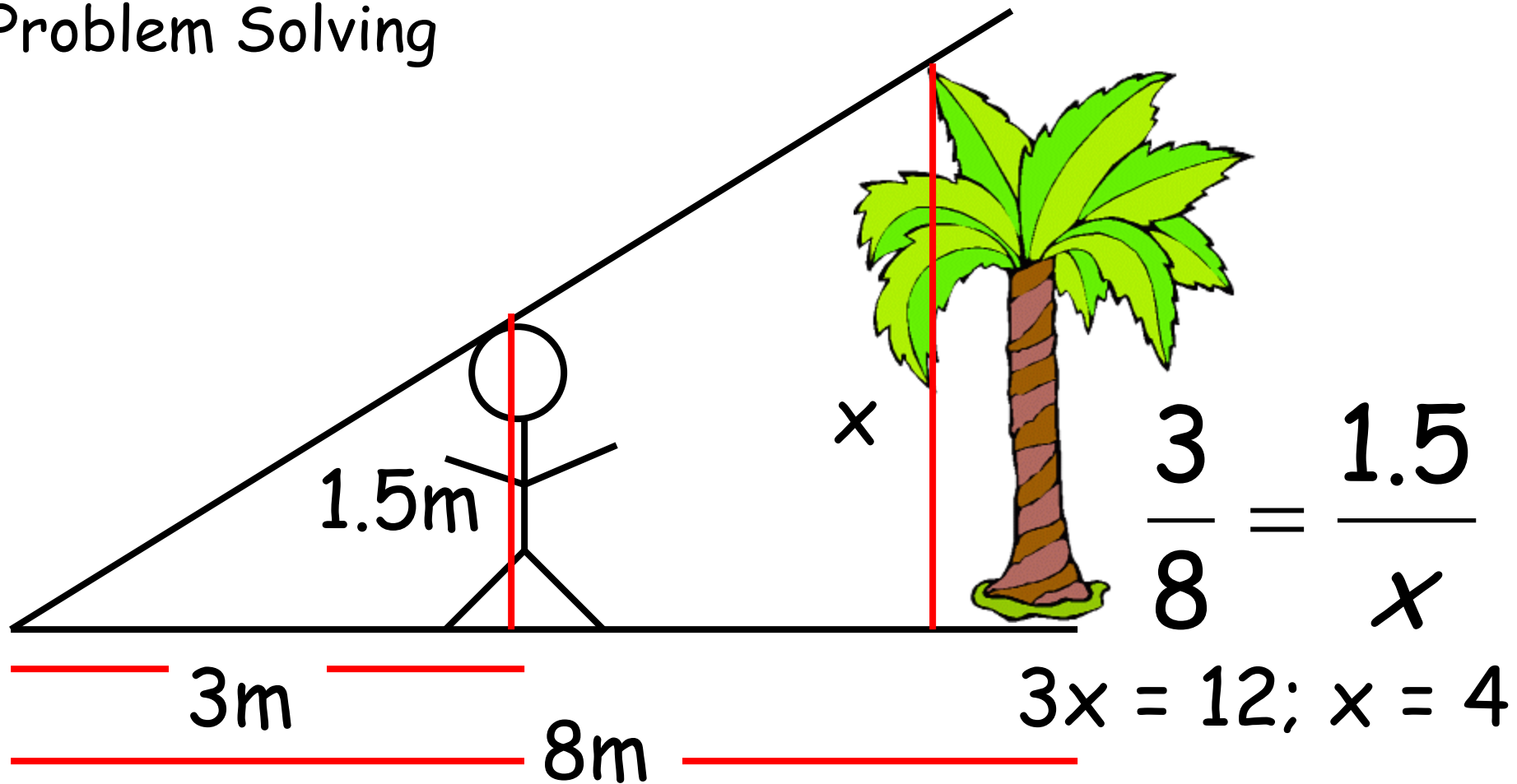
6.

$$\frac{24}{16} = \frac{3}{2}$$

$$\frac{36}{24} = \frac{3}{2}$$

$$\frac{30}{21} = \frac{10}{7}$$

These Triangles are NOT Similar!

Problem Solving

x

$$\frac{3}{8} = \frac{1.5}{x}$$

$3x = 12; \ x = 4$

1.5m

3m

8m

Linda wants to determine the height of this tree. She measured the shadow of the tree as 8m and her own shadow was 3m. She knows that she is 1.5m tall. How tall is the tree? 4m