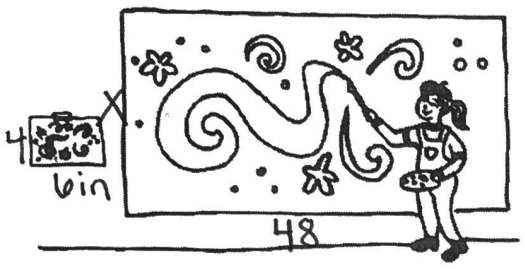
Example 4: A wall mural is being painted from a picture that is 6 inches long and 4 inches wide. The wall mural should be 48 inches long. The picture and wall mural are similar. How wide is the width of the mural? What is the scale factor of the picture to the mural?



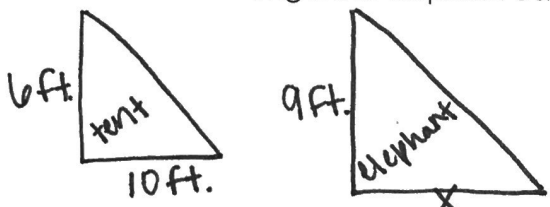
$\frac{4}{x} = \frac{6}{48}$

$\frac{6x}{6} = \frac{192}{6}$

$x = 32$ in.

YOU DO- Shadow Math: Similar Triangles in the Real-world

1. A 6 ft tall circus tent casts a 10 ft long shadow. At the same time of day, a 9 ft tall elephant casts a shadow. How long is the elephant's shadow?

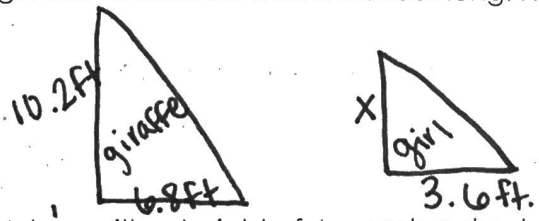


$\frac{6}{9} = \frac{10}{x}$

$\frac{6x}{6} = \frac{90}{6}$

$x = 15$ ft.

2. An giraffe that is 10.2 feet tall casts a shadow that is 6.8 feet long. At the same time of day, a girl cast a shadow that is 3.6 feet long. How tall is the girl?

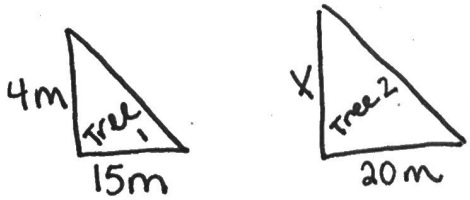


$\frac{10.2}{x} = \frac{6.8}{3.6}$

$\frac{6.8x}{6.8} = \frac{36.72}{6.8}$

$x = 5.4$ ft.

3. A tree with a height of 4m casts a shadow 15 m long on the ground. How high is another tree that casts a shadow which is 20 m long?

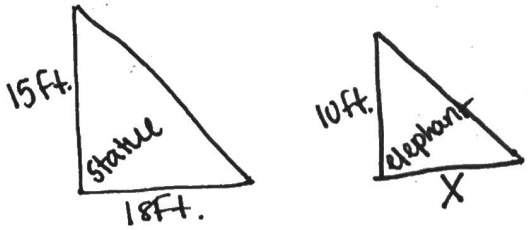


$\frac{4}{x} = \frac{15}{20}$

$\frac{15x}{15} = \frac{80}{15}$

$x = 5.3$ m

4. A 15 ft tall statue standing next to an adult elephant casts an 18 ft shadow. If the adult elephant is 10 ft tall, then how long is its shadow?



$\frac{15}{10} = \frac{18}{x}$

$\frac{15x}{15} = \frac{180}{15}$

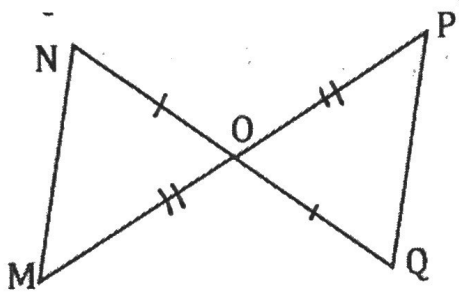
$x = 12$ ft

Proving Theorems about Similarity

Complete the given two-column proofs.

1. Given $\frac{NO}{QO} = \frac{MO}{PO}$

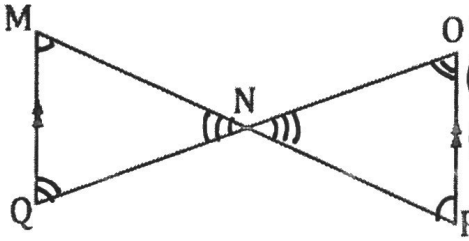
Prove: $\Delta MNO \sim \Delta PQO$



Statements	Reasons
① $\frac{NO}{QO} = \frac{MO}{PO}$	① Given
② $\angle NOM \cong \angle QOP$	② vertical ∠ theorem post.
③ $\Delta MNO \sim \Delta PQO$	③ SAS ~

2. Given: $\overline{MQ} \parallel \overline{OP}$

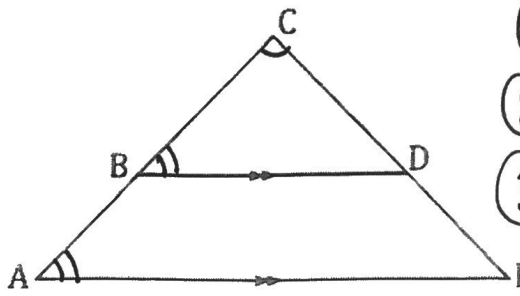
Prove: $\Delta MNQ \sim \Delta PON$ *you could use step 3 or 4*



Statements	Reasons
① $\overline{MQ} \parallel \overline{OP}$	① Given
② $\angle M \cong \angle P$	② Alt. int. ∠'s post.
③ $\angle Q \cong \angle O$	③ Alt. int. ∠'s post.
④ $\angle MNQ \cong \angle PNO$	④ vertical ∠'s theorem
⑤ $\Delta MNQ \sim \Delta PON$	⑤ AA ~

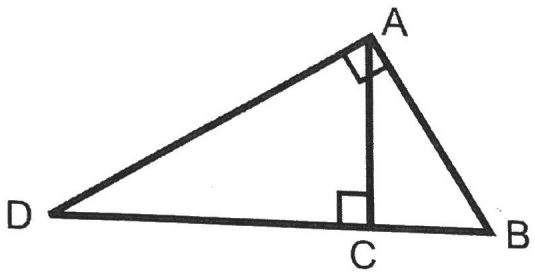
3. Given: $\overline{AE} \parallel \overline{BD}$

Prove: $\Delta ACE \sim \Delta BCD$



Statements	Reasons
① $\overline{AE} \parallel \overline{BD}$	① Given
② $\angle CDB \cong \angle CEA$	② Corresponding ∠'s post.
③ $\angle CBD \cong \angle CAE$	③ Corresponding ∠'s post.
④ $\Delta ACE \sim \Delta BCD$	④ AA ~

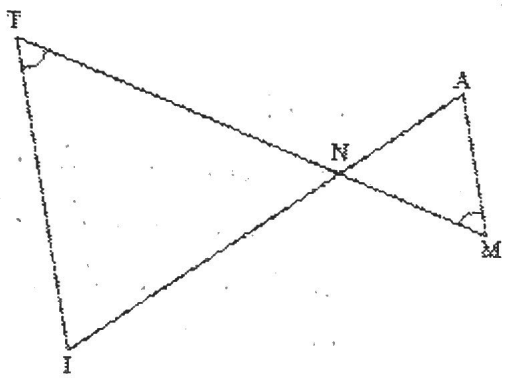
4. Given $\triangle DAB$ and $\triangle DCA$ are right triangles
Prove: $\triangle DAB \sim \triangle DCA$



Statements	Reasons
① △DAB and △DCA RT △s	① Given
② ∠DAB ≅ ∠DCA	② Def. of Rt. △s
③ ∠D ≅ ∠D	③ Reflexive prop.
④ △DAB ~ △DCA	④ AA~

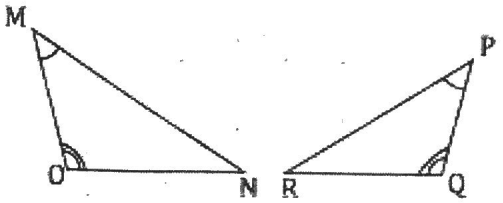
Skills Practice: Proving Similar Triangles

1. Prove: $\triangle NTI \sim \triangle NMA$



2. Given: $\angle M \cong \angle P, \angle O \cong \angle Q$

Prove: $\Delta OMN \sim \Delta QPR$



3. Given: $\frac{GH}{KJ} = \frac{GI}{JL}$, and $\angle G \cong \angle J$

Prove: $\Delta GHI \sim \Delta JKL$