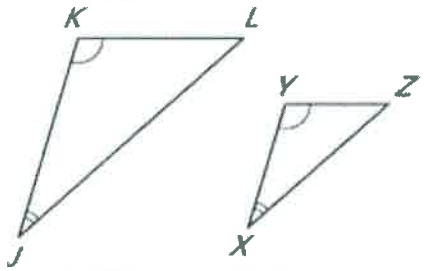
Geometry H
6.4 Notes : AA~ Basics

Name: Key
Date: _____ Period: _____

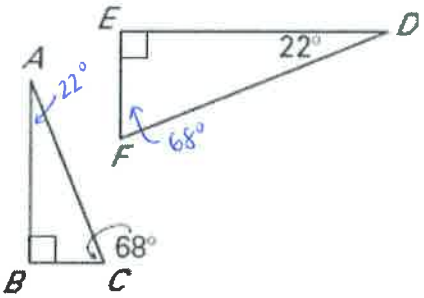
LEARNING TARGETS

- I can determine if triangles are similar using AA~
- I can use AA~ to set up and solve proportions.
- I can use AA~ to solve indirect measurement problems in the real world.

Angle-Angle Similarity (AA~)	If two angles of one triangle are congruent to two angles of a second triangle, then the triangles are similar.	 $\triangle JKL \sim \triangle XYZ$

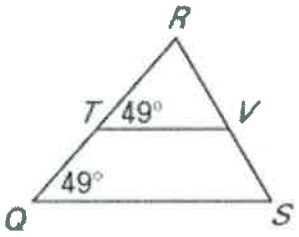
1. Determine if the following triangles are similar by AA~. If they are, write a similarity statement. If they are not, explain.

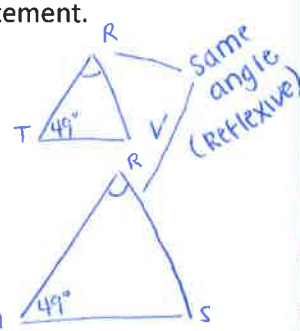
a)



Yes, since $\angle B \cong \angle E$, $\angle A \cong \angle D$ and $\angle C \cong \angle F$, $\triangle ABC \sim \triangle DEF$ by AA~

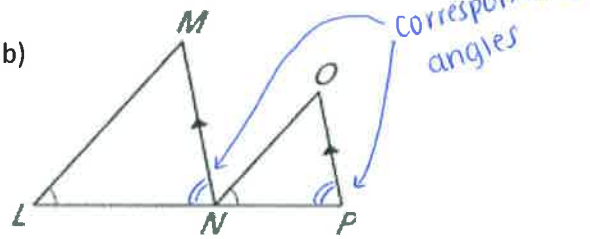
b)





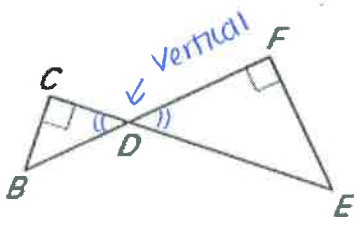
Yes, since $\angle RTV \cong \angle RQS$ and $\angle R \cong \angle R$, $\triangle RTV \sim \triangle RQS$ by AA~

b)



Yes, since $\angle MLN \cong \angle ONP$ and $\angle MNL \cong \angle OPN$, $\triangle MLN \sim \triangle ONP$ by AA~

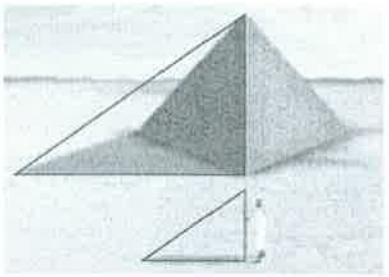
d)



Yes, since $\angle C \cong \angle F$ and $\angle CDB \cong \angle FDE$, $\triangle CBD \sim \triangle FED$ by AA~

Indirect Measurement (History)

Thales is known as the first Greek scientist, engineer, and mathematician. Legend says that he was the first to determine the height of the pyramids in Egypt by examining the shadows made by the Sun. He considered three points: the top of the objects, the lengths of the shadows, and the bases.



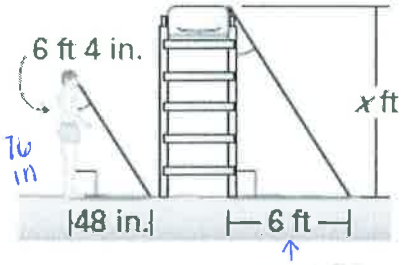
Indirect measurement allows you to use properties of similar polygons to find distances or lengths that are difficult to measure directly. The type of indirect measurement Thales used is called shadow reckoning. He measured his height and the length of his shadow then compared it with the length of the shadow cast by the pyramid.

$$\frac{\text{Thales' shadow}}{\text{pyramid's shadow}} = \frac{\text{Thales' height}}{\text{pyramid height}}$$

Practice Examples

Convert to one unit ↑

2. A lifeguard is standing beside the lifeguard chair on a beach. The lifeguard is 6 feet 4 inches tall and casts a shadow that is 48 inches long. The chair casts a shadow that is 6 feet long. How tall is the chair in feet and inches to the nearest inch?



Lifeguard: 6 ft = 72 in
+ 4 in
76 in

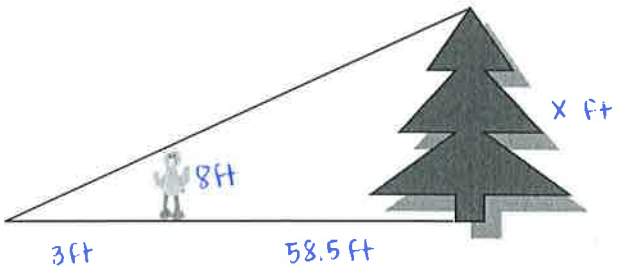
6 × 12 = 72 in

$\frac{\text{Lifeguard}}{\text{chair}}$: $\frac{76\text{ in}}{x}$ (heights) = $\frac{48\text{ in}}{72\text{ in}}$ (shadows) ⇒ $48x = 5472$

$x = 114$ inches ÷ 12

≈ 9.5 ft or 9'6"

3. Big Bird, who is eight feet tall, wants to find the height of the tree that contains his nest. From the base of the tree, Big Bird walks 58.5 feet along the tree's shadow until his head is in a position where the tip of his shadow exactly overlaps the end of the treetop's shadow. Big Bird is now 3 feet from the end of the shadows. How tall is the tree? Label the diagram using the information above to help you solve this problem!



heights ↓ shadows ↓

Big Bird / Tree : $\frac{8}{x} = \frac{3}{61.5}$

$3x = 492$

$x = 164$

The tree is 164 ft tall