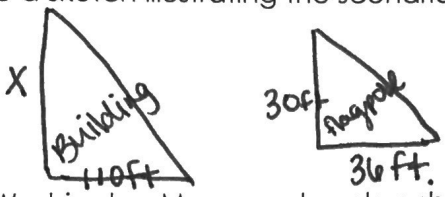
## Skills Practice- Shadow Math: Similar Triangles in the Real-world

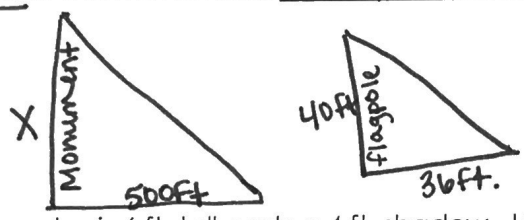
1. A building casts a 110 ft. shadow at the same time that a 30 ft. flagpole casts as 36 ft. shadow. Make a sketch illustrating the scenario and then find the height of the building.




$\frac{X}{30} = \frac{110}{36}$ $\frac{36}{36}X = \frac{3,300}{36}$

$X = 91.67$ ft.

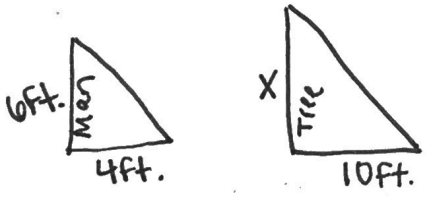
2. The Washington Monument casts a shadow that is about 500 feet long, a 40-foot flagpole nearby casts a shadow that is about 36 feet long. Make a sketch and find the approximate height of the monument. Round your answer to the nearest foot.




$\frac{X}{40} = \frac{500}{36}$ $\frac{36X}{36} = \frac{20,000}{36}$

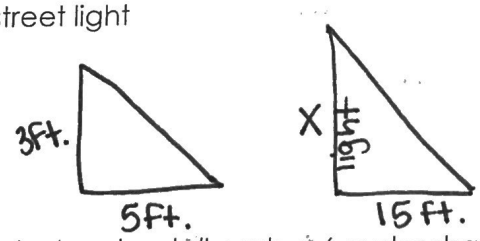
$X = 556$ ft.

3. A man who is 6 ft. tall casts a 4 ft. shadow. How tall is a nearby tree that casts a 10 ft. shadow? Make a sketch and calculate the approximate height of the tree.



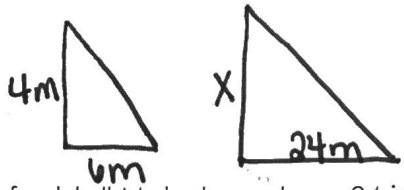

$\frac{6}{X} = \frac{4}{10}$ $\frac{4X}{4} = \frac{60}{4}$ $X = 15$ ft.

4. A yard stick casts a 5-foot shadow. How tall is a street light that casts a 15-foot shadow at the same time? Create a sketch representing the problem, and then find the approximate height of the street light



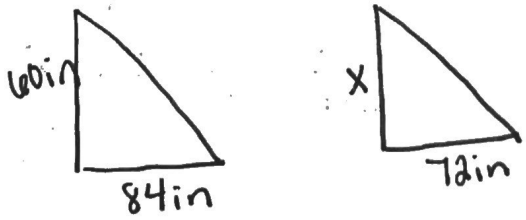

$\frac{3}{X} = \frac{5}{15}$ $\frac{5X}{5} = \frac{45}{5}$ $X = 9$ ft.

5. A flagpole 4 meters tall casts a 6-meter shadow. At the same time of day, a nearby building casts a 24-meter shadow. How tall is the building?




$\frac{4}{X} = \frac{6}{24}$ $\frac{6X}{6} = \frac{96}{9}$ $X = 10.67$ m

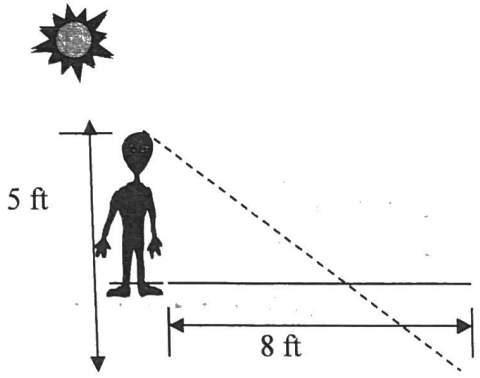
6. Five-foot-tall Melody casts an 84-inch shadow. How tall is her friend if, at the same time of day his shadow is 1 foot shorter than hers?

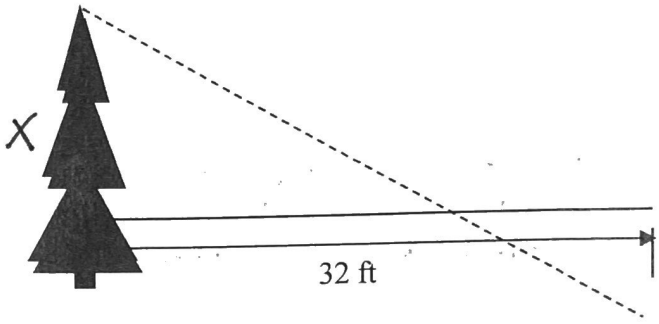



$\frac{60}{X} = \frac{84}{72}$ $\frac{84X}{84} = \frac{4320}{84}$

$X = 51.4$ in

**7.** Lance the alien is 5 feet tall. His shadow is 8 feet long.




At the same time of day, a tree's shadow is 32 feet long. What is the height of the tree?

$\frac{5}{X} = \frac{8}{32}$ $\frac{8X}{8} = \frac{160}{8}$

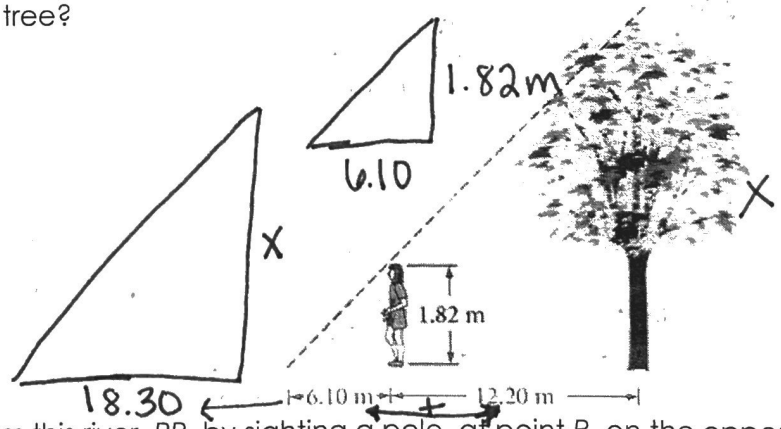
**X = 20ft.**

**8.** Juanita, who is 1.82 meters tall, wants to find the height of a tree in her backyard. From the tree's base, she walks 12.20 meters along the tree's shadow to a position where the end of her shadow exactly overlaps the end of the tree's shadow. She is now 6.10 meters from the end of the shadows. How tall is the tree?

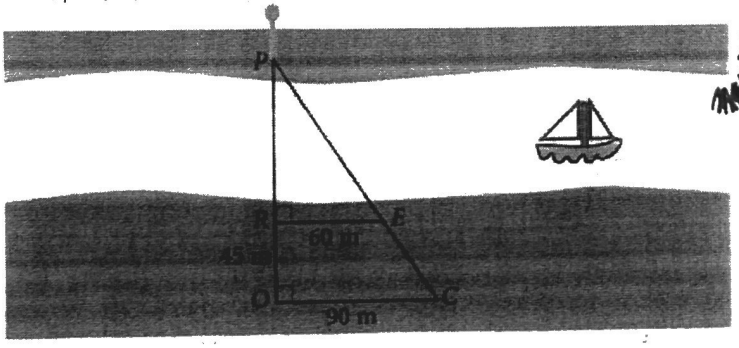
$\frac{6.10}{18.30} = \frac{1.82}{X}$

$\frac{33.3}{6.10} = \frac{6.10X}{6.10}$

**X = 5.5m**




**9.** Calculate the distance across this river, $PR$, by sighting a pole, at point $P$, on the opposite bank. Points $R$ and $O$ are collinear with point $P$. Point $C$ is chosen so that $\overline{OC} \perp \overline{PO}$. Lastly, point $E$ is chosen so that $P$, $E$, and $C$ are collinear and $\overline{RE} \perp \overline{PO}$. Also explain why $\triangle PRE \sim \triangle POC$.





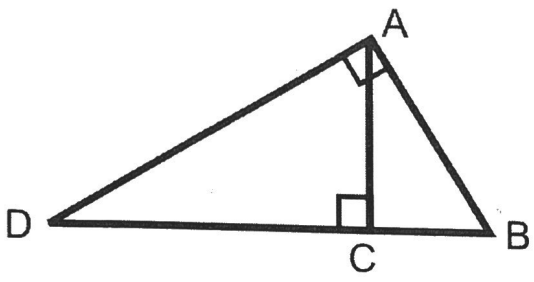
AA~

$\frac{X}{X+45} = \frac{60}{90}$ $90X = 60X + 2700$

$30X = 2700$

**X = 90m**

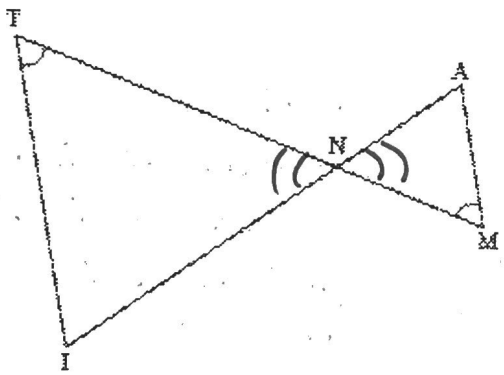
**4.** Given $\triangle DAB$ and $\triangle DCA$ are right triangles
Prove: $\triangle DAB \sim \triangle DCA$




| 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

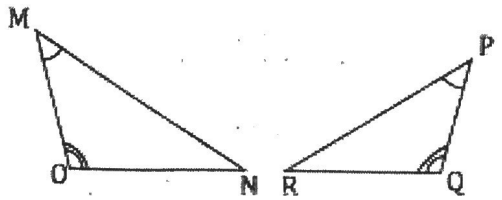
**1. Prove:** $\triangle NTI \sim \triangle NMA$




| S | R |
|---|---|
| 1. ∠T ≅ ∠M | 1. Given |
| 2. ∠TNI ≅ ∠MNA | 2. Vertical △ Thm. |
| 3. △NTI ~ △NMA | 3. AA~ |

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

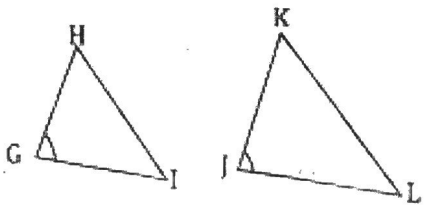
**Prove:** $\Delta OMN \sim \Delta QPR$




| S | R |
|---|---|
| 1. ∠M ≅ ∠P | Given |
| 2. ∠O ≅ ∠Q | |
| 3. △OMN ~ △QPR | 3. AA~ |

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

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




| S | R |
|---|---|
| 1. $\frac{GH}{KJ} = \frac{GI}{JL}$ | Given |
| 2. ∠G ≅ ∠J | |
| 3. △GHI ~ △JKL | 3. SAS~ |