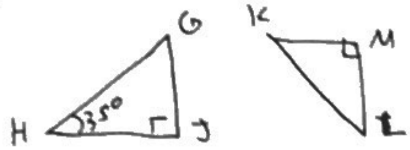
13.2.4 $\triangle GHJ \sim \triangle KLM$



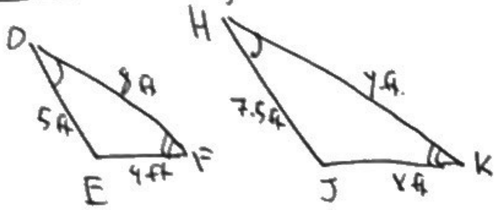
a) $\angle G + 35 + 90 = 180$

$\angle G = 55°$

b) $\angle K = \angle G$ by similarity $= 55°$

c) $\angle L = \angle H$ by similarity $= 35°$

13.2.8 The triangles are similar.



We have $\angle D \cong \angle H$, $\angle F \cong \angle K$, $\angle E \cong \angle J$.

So, $\dfrac{7.5\text{ ft}}{5\text{ ft}} = \dfrac{y\text{ ft}}{8\text{ ft}} = \dfrac{x\text{ ft}}{4\text{ ft}} = 1.5$

Thus $\boxed{y = 8 \cdot 1.5\text{ ft} = 12\text{ ft}}$ $\boxed{x = 4 \cdot 1.5\text{ ft} = 6\text{ ft}}$

13.2.10

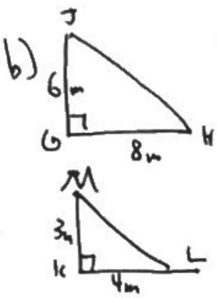
a)

$\angle V = 58° = (90 - 32)$

$\angle Z = 90 - 36 = 54°$.

Since the triangles do not have the same angles, they are not similar.

b)

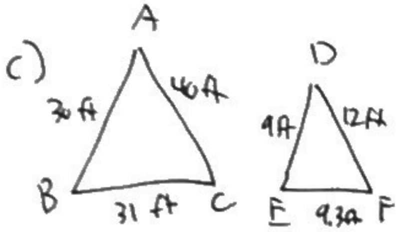


We have $\angle K \cong \angle G = 90°$,

$\dfrac{KM}{GJ} = \dfrac{3}{6} = \dfrac{1}{2}$, and

$\dfrac{KL}{GH} = \dfrac{4}{8} = \dfrac{1}{2}$, so by SAS similarity, $\triangle JGH \sim \triangle MKL$.

c)



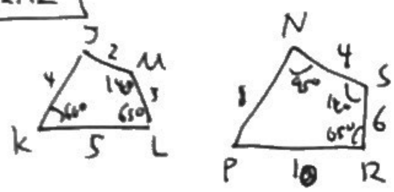
Compare ratios of short sides, middle sides, and long sides:

short: $\dfrac{AB}{DE} = \dfrac{30}{9} = \dfrac{10}{3}$ long: $\dfrac{AC}{DF} = \dfrac{40}{12} = \dfrac{10}{3}$

middle: $\dfrac{BC}{EF} = \dfrac{31}{9.3} = \dfrac{310}{93} \, {}^{/31}_{/31} = \dfrac{10}{3}$.

So by SSS similarity, $\triangle ABC \sim \triangle DEF$.

13.2.12



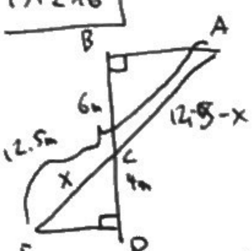
All corresponding side ratios are 2 (big to small).

Have $\angle S = \angle M$, $\angle L = \angle R$.

$\angle J = 360 - 140 - 65 - 60 = 95° = \angle N$, so also $\angle K = \angle P = 60°$.

So the quadrilaterals JKLM and NPRS are similar.

13.2.16



$\triangle EDC \sim \triangle ABC$

Since $\triangle EDC \sim \triangle ABC$,

$\dfrac{EC}{AC} = \dfrac{DC}{BC}$.

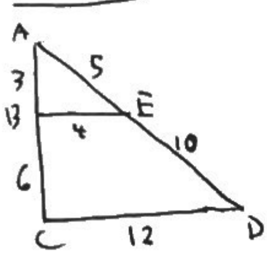
$\dfrac{x}{12.5 - x} = \dfrac{4}{6}$

$6x = 50 - 4x$

$10x = 50$

$\boxed{x = 5\text{m}}$

13.2.18



Several possibilities:

One is: $\dfrac{AB}{AC} = \dfrac{3}{9} = \dfrac{1}{3}$, $\dfrac{AE}{AD} = \dfrac{5}{15} = \dfrac{1}{3}$,

$\dfrac{BE}{CD} = \dfrac{4}{12} = \dfrac{1}{3}$, so by SSS similarity

$\triangle ABE \sim \triangle ACD$.

13.2.21 Similar in mathematics is used to say two objects are proportionate, while similar in common use just means that two objects share many attributes. We might say that a sailboat and a motorboat are similar in real life, but there will not be mathematically similar.

13.2.27

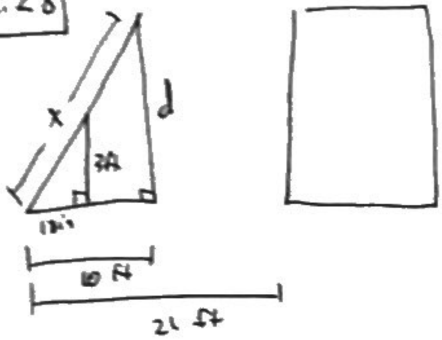
+1

a) The two triangles are similar by AA similarity, since they share the marked angle A and each have a right angle. +1

b) By similarity, $\frac{X}{6} = \frac{38}{8}$, so $8x = \frac{\cancel{38}^{\cancel{19}\,3}\cdot\cancel{6}}{\cancel{8}_{\cancel{4}\,2}} = \frac{57}{2} = 28.5$ ft

+1 +1

13.2.28



a) The triangles are again similar by AA similarity.

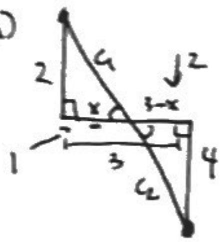
So $\frac{1.5\text{ft}}{3\text{ft}} = \frac{10\text{ft}}{d\text{ft}} \Rightarrow \boxed{d = 20\text{ft}}$

b) By Pyth Thm, $10^2 + 20^2 = x^2$, so $x = \sqrt{500} = 10\sqrt{5} \approx 22.36$ft.

This is more than the 21 ft from the base of the tree to the house, so yes, the tree will hit the house.

13.2.31

a)



b) The opposite angles marked in the diagram are equal, so the triangles are similar by AA similarity.

c) $\frac{x}{3-x} = \frac{2}{4} \Rightarrow 4x = 6 - 2x \Rightarrow 6x = 6 \Rightarrow x = 1$

so the missing legs are 1 and 2 mi.

d) By Pyth Thm, $c_1^2 = 2^2 + 1^2 = 5$, $c_2^2 = 2^2 + 4^2 = 20$

so $c_1 + c_2 = \sqrt{5} + \sqrt{20} = 3\sqrt{5}$, while the roads's $2+3+4 = 9$ mi long. So you save $9 - 3\sqrt{5} \approx \boxed{2.29 \text{ mi}}$