

Your name: Answers

Thursday June 2, 2022

MPM2D Unit 6 Test B

TOTAL / 30

Pythagorean Theorem: $a^2 + b^2 = c^2$

SOH CAH TOA: $\sin \theta = \frac{\text{opp}}{\text{hyp}}$ $\cos \theta = \frac{\text{adj}}{\text{hyp}}$ $\tan \theta = \frac{\text{opp}}{\text{adj}}$

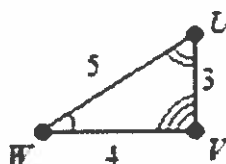
Sine Law: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$

Cosine Law: $c^2 = a^2 + b^2 - 2ab \cos C$ $\cos C = \frac{a^2 + b^2 - c^2}{2ab}$

1. This is a pair of similar triangles. [4 A]

a) Write a similarity statement.

$$\triangle UVW \sim \triangle XYZ$$

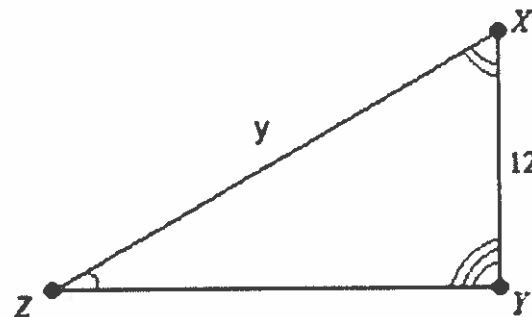


b) What is the scale factor?

$$3 \rightarrow 12 \text{ so } \textcircled{4} \text{ or } \frac{1}{4}$$

c) What is the length of y? (No units needed)

$$y = 5 \times 4 = \textcircled{20}$$



d) If the area of the smaller triangle is 6 units², what is the area of the larger triangle?

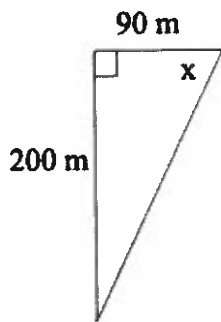
$$A_{\text{larger}} = 6 \times 4^2$$

$$= \textcircled{96 \text{ units}^2}$$

2. Calculate the unknown length or angle in each triangle.

a)

[3A]



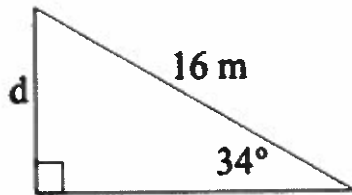
$$\tan x = \frac{200}{90}$$

$$x = \tan^{-1}\left(\frac{200}{90}\right)$$

$$x = 65.77^\circ$$

b)

[3A]



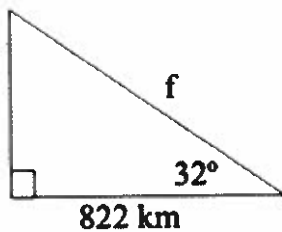
$$\sin 34^\circ = \frac{d}{16}$$

$$16 \times \sin 34^\circ = d$$

$$8.95 \text{ m} = d$$

c)

[3A]

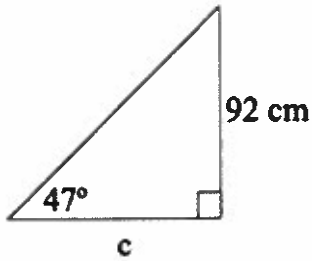


$$\cos 32^\circ = \frac{822}{f}$$

$$f = \frac{822}{\cos 32^\circ}$$

$$f = 969.28 \text{ km}$$

d)



$$\tan 47^\circ = \frac{92}{c}$$

$$c = \frac{92}{\tan 47^\circ}$$

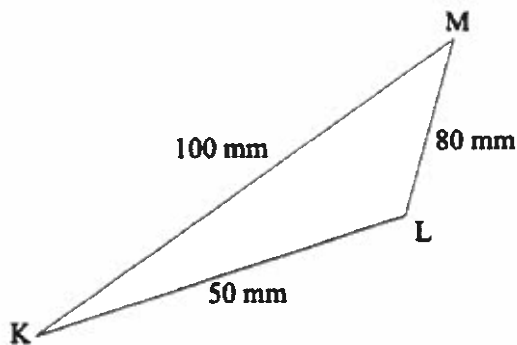
$$c = 85.79 \text{ cm}$$

[3A]

3. Calculate the specified length or angle in each triangle.

a) Solve for angle L

[3T]



$$\cos L = \frac{50^2 + 80^2 - 100^2}{2(50)(80)}$$

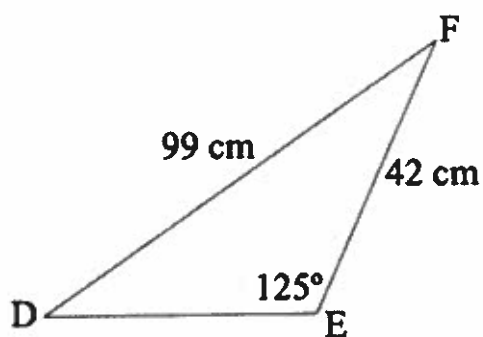
$$\cos L = \frac{-1100}{8000}$$

$$L = \cos^{-1}\left(\frac{-1100}{8000}\right)$$

$$L = 97.90^\circ$$

b) Solve for angle D

[3 T]



$$\frac{\sin D}{42} = \frac{\sin 125^\circ}{99}$$

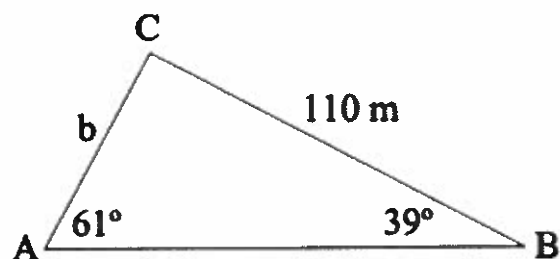
$$\sin D = \frac{\sin 125^\circ}{99} \times 42$$

$$D = \sin^{-1}(0.3475)$$

$$D = 20.36^\circ$$

c) Solve for side length b .

[3 T]



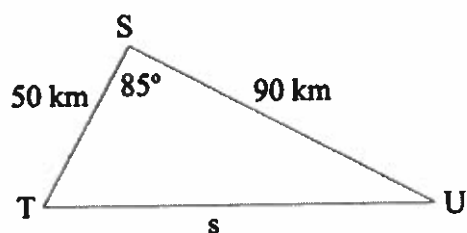
$$\frac{b}{\sin 39^\circ} = \frac{110}{\sin 61^\circ}$$

$$b = \frac{110}{\sin 61^\circ} \times \sin 39^\circ$$

$$b = 79.15 \text{ m}$$

d) Solve for side length s

[3 T]



$$s^2 = 50^2 + 90^2 - 2(50)(90)\cos 85^\circ$$

$$s^2 = 2500 + 8100 - \overset{784.40}{\cancel{697.25}}$$

$$s^2 = \cancel{9902.75} \quad 9815.60$$

$$s = \sqrt{\cancel{9902.75}} \quad \sqrt{9815.60}$$

$$s = \cancel{99.51} \text{ km}$$

$$99.07 \text{ km}$$

4. Below is a molecule of hypofluorous acid.

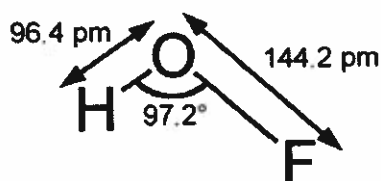
The H and the O are separated by a distance of 96.4 pm ("picometers").

The F and the O are separated by a distance of 144.2 pm.

The bond angle at O is 97.2° .

How far apart are the H and F? Round your answer to the nearest tenth.

[2 A]



$$x^2 = 96.4^2 + 144.2^2 - 2(96.4)(144.2)\cos 97.2^\circ$$

$$x^2 = 9292.36 + 20793.64 + 3484.48$$

$$x^2 = 33571.08$$

$$x = \sqrt{33571.08}$$

$$x = 183.22 \text{ pm}$$

