SOLUTIONS => Trigonometry Worksheet #1

1

a) hypotenuse => 13 cm
b) opposite < A => 12 cm
c) opposite < B => 5 cm
d) adjacent to < A => 5 cm
e) adjacent to < B => 12 cm.

2a) $\sin A = \dfrac{opp}{hyp}$

$= \dfrac{12}{13}$

b) $\cos A = \dfrac{adj}{hyp}$

$= \dfrac{5}{13}$

c) $\tan A = \dfrac{opp}{adj}$

$= \dfrac{12}{5}$

d) $\sin B = \dfrac{opp}{hyp}$

$= \dfrac{5}{13}$

e) $\cos B = \dfrac{adj}{hyp}$

$= \dfrac{12}{13}$

f) $\tan B = \dfrac{opp}{adj}$

$= \dfrac{5}{12}$

3 TRUE   FALSE

b) $\tan R = \dfrac{4}{3}$ a) $\sin P = \dfrac{4}{5}$ => Should be: $\sin P = \dfrac{3}{5}$

c) $\cos R = \dfrac{3}{5}$ d) $\tan P = \dfrac{3}{5}$ => Should be: $\tan P = \dfrac{3}{4}$

4 a) $\sin Q = \dfrac{opp}{hyp}$ b) $\cos S = \dfrac{adj}{hyp}$ c) $\tan M = \dfrac{opp}{adj}$

$= \dfrac{6}{10}$ $= \dfrac{9}{15}$ $= \dfrac{24}{7}$

d) $\sin A = \dfrac{opp}{hyp}$ e) $\cos P = \dfrac{adj}{hyp}$ f) $\tan E = \dfrac{opp}{adj}$

$= \dfrac{15}{17}$ $= \dfrac{15}{25}$ $= \dfrac{36}{27}$

5. The first step is to find the missing side!

$$c^2 = a^2 + b^2$$
$$c^2 = (6)^2 + (8)^2$$
$$c^2 = 36 + 64$$
$$c^2 = 100$$
$$c = \sqrt{100}$$
$$c = 10$$

a) $\sin A = \dfrac{opp}{hyp}$
$$= \dfrac{8}{10}$$

b) $\sin B = \dfrac{opp}{hyp}$
$$= \dfrac{6}{10}$$

c) $\cos A = \dfrac{adj}{hyp}$
$$= \dfrac{6}{10}$$

d) $\cos B = \dfrac{adj}{hyp}$
$$= \dfrac{8}{10}$$

e) $\tan A = \dfrac{opp}{adj}$
$$= \dfrac{8}{6}$$

f) $\tan B = \dfrac{opp}{adj}$
$$= \dfrac{6}{8}$$

6 a) $c^2 = a^2 + b^2$
   $(13)^2 = (12)^2 + a^2$
   $169 = 144 + a^2$
   $169 - 144 = a^2$
   $25 = a^2$
   $\sqrt{25} = a$
   $5 = a$

$\sin A = \dfrac{opp}{hyp}$ $\cos A = \dfrac{adj}{hyp}$

$= \dfrac{5}{13}$ $= \dfrac{12}{13}$

$\tan A = \dfrac{opp}{adj}$

$= \dfrac{5}{12}$

b) $c^2 = a^2 + b^2$
   $(20)^2 = (16)^2 + b^2$
   $400 = 256 + b^2$
   $400 - 256 = b^2$
   $144 = b^2$
   $\sqrt{144} = b$
   $12 = b$

$\sin A = \dfrac{opp}{hyp}$ $\cos A = \dfrac{adj}{hyp}$

$= \dfrac{12}{20}$ $= \dfrac{16}{20}$

$\tan A = \dfrac{opp}{adj}$

$= \dfrac{12}{16}$

7.a) $c^2 = a^2 + b^2$ $\sin A = \dfrac{3}{5}$ $\sin B = \dfrac{4}{5}$

$(5)^2 = (4)^2 + b^2$

$25 = 16 + b^2$ $\cos A = \dfrac{4}{5}$ $\cos B = \dfrac{3}{5}$

$25 - 16 = b^2$

$9 = b^2$ $\tan A = \dfrac{3}{4}$ $\tan B = \dfrac{4}{3}$

$\sqrt{9} = b$

$3 = b$

b) $c^2 = a^2 + b^2$ $\sin X = \dfrac{15}{25}$ $\sin Y = \dfrac{20}{25}$

$(25)^2 = (15)^2 + b^2$

$625 = 225 + b^2$ $\cos X = \dfrac{20}{25}$ $\cos Y = \dfrac{15}{25}$

$625 - 225 = b^2$

$400 = b^2$ $\tan X = \dfrac{15}{20}$ $\tan Y = \dfrac{20}{15}$

$\sqrt{400} = b$

$20 = b$

5

c) $c^2 = a^2 + b^2$

$(17)^2 = (15)^2 + b^2$

$289 = 225 + b^2$

$289 - 225 = b^2$

$64 = b^2$

$\sqrt{64} = b$

$8 = b$

$\sin R = \dfrac{8}{17}$

$\cos R = \dfrac{15}{17}$

$\tan R = \dfrac{8}{15}$

$\sin Q = \dfrac{15}{17}$

$\cos Q = \dfrac{8}{17}$

$\tan Q = \dfrac{15}{8}$

d) $c^2 = a^2 + b^2$

$c^2 = (7)^2 + (24)^2$

$c^2 = 49 + 576$

$c^2 = 625$

$c = \sqrt{625}$

$c = 25$

$\sin L = \dfrac{24}{25}$

$\cos L = \dfrac{7}{25}$

$\tan L = \dfrac{24}{7}$

$\sin N = \dfrac{7}{25}$

$\cos N = \dfrac{24}{25}$

$\tan N = \dfrac{7}{24}$

6

8

a)

G

3

E   4   F
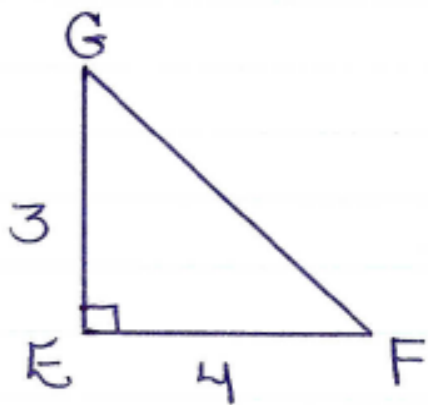
We need to find the missing side first?

$$c^2 = a^2 + b^2$$
$$c^2 = (3)^2 + (4)^2$$
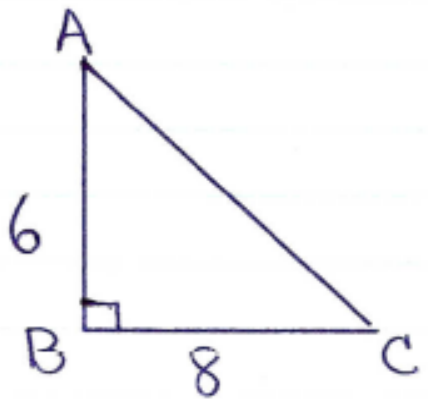$$c^2 = 9 + 16$$
$$c^2 = 25$$
$$c = \sqrt{25}$$
$$c = 5$$

$$\cos G = \frac{adj}{hyp}$$
$$= \frac{3}{5}$$

$$\sin F = \frac{opp}{hyp}$$
$$= \frac{3}{5}$$

9a)

A

6

B   8   C

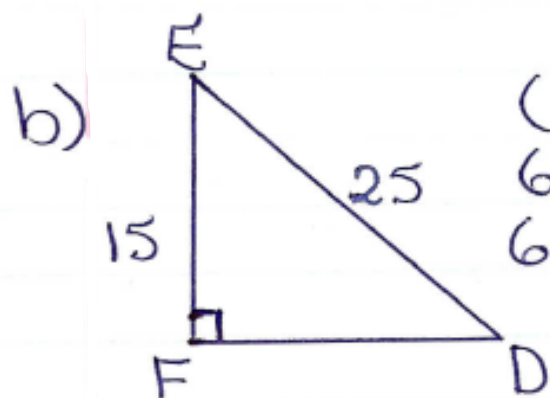$$c^2 = a^2 + b^2$$
$$c^2 = (6)^2 + (8)^2$$
$$c^2 = 36 + 64$$
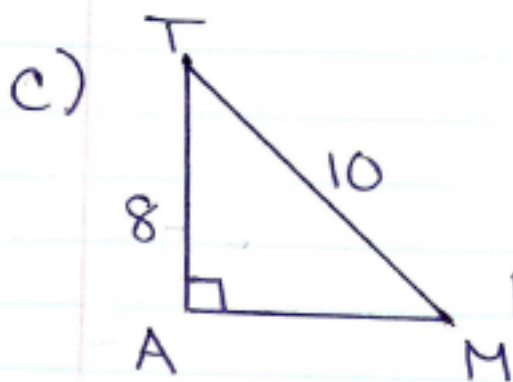$$c^2 = 100$$
$$c = \sqrt{100}$$
$$c = 10$$

$$\cos C = \frac{adj}{hyp}$$
$$= \frac{8}{10}$$

b)

E

25

15

F   D

$$c^2 = a^2 + b^2$$
$$(25)^2 = (15)^2 + b^2$$
$$625 = 225 + b^2$$
$$625 - 225 = b^2$$
$$400 = b^2$$
$$\sqrt{400} = b$$
$$20 = b$$

$$\sin E = \frac{opp}{hyp}$$
$$= \frac{20}{25}$$

c)

T

10

8

A   M

$$c^2 = a^2 + b^2$$
$$(10)^2 = (8)^2 + b^2$$
$$100 = 64 + b^2$$
$$100 - 64 = b^2$$
$$36 = b^2$$
$$\sqrt{36} = b$$
$$6 = b$$

$$\tan T = \frac{opp}{adj}$$
$$= \frac{6}{8}$$

8

10a) $\angle P = 180° - 90° - 41°$
$= 49°$

11a) $\sin 41° = 0.6561$
b) $\tan 41° = 0.8693$
c) $\cos 41° = 0.7547$
d) $\cos 49° = 0.6561$
e) $\tan 49° = 1.1504$
f) $\sin 49° = 0.7547$

12a) $\tan 41° = \dfrac{opp}{adj}$

$\tan 41° = \dfrac{h}{12}$

$12 \tan 41° = h$

$12(0.8693) = h$

$10.4\,m = h$

b)

$\angle VSU = 90° - 49° = 41°$

$\tan 41° = \dfrac{opp}{adj}$

$\tan 41° = \dfrac{72}{h}$

$\dfrac{h \tan 41°}{\tan 41°} = \dfrac{72}{\tan 41°}$

$h = \dfrac{72}{0.8693}$

$h = 82.8\,m$
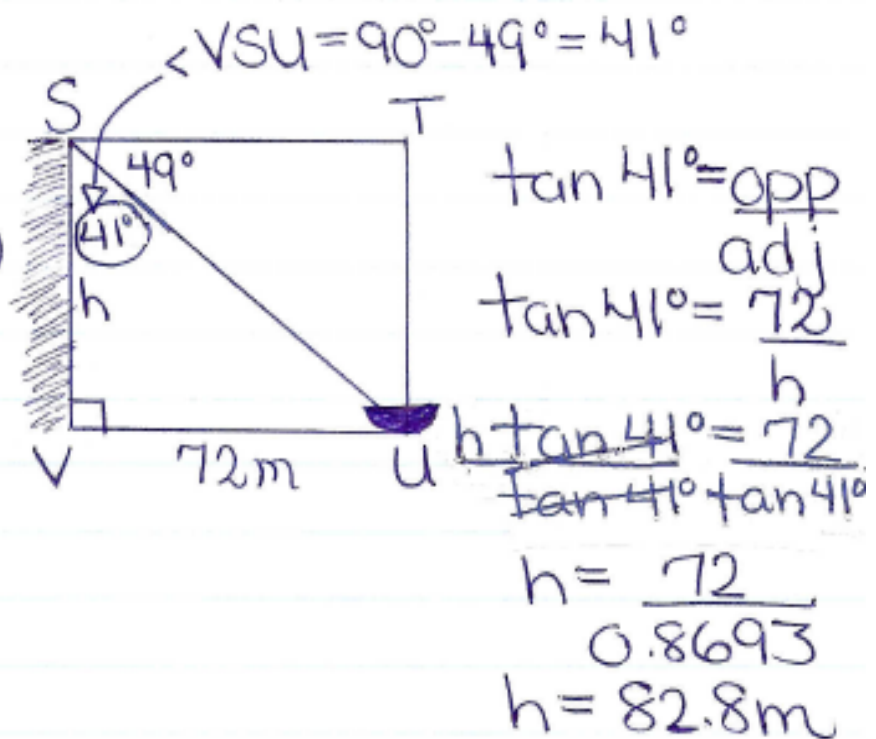
a) $\sin 41° = \dfrac{opp}{hyp}$

$\sin 41° = \dfrac{h}{120}$

$120 \sin 41° = h$

$120 (0.6561) = h$

$78.7 m = h$

d) $\tan 49° = \dfrac{opp}{adj}$

$\tan 49° = \dfrac{h}{122}$

$122 \tan 49° = h$

$122 (1.1504) = h$

$140 m = h$

13. $\tan 76° = \dfrac{opp}{adj}$

$\tan 76° = \dfrac{h}{50}$

$50 \tan 76° = h$

$50 (4.0108) = h$

$200.5 \, m = h$

or

$201 \, m = h$

14. $\tan 42° = \dfrac{opp}{adj}$

$\tan 42° = \dfrac{h}{1.5}$

$1.5 \tan 42° = h$

$1.5 (0.9004) = h$

$1.35 \, Km = h$

or

$1.4 \, Km = h$

15. $\tan 26° = \dfrac{h}{14}$

$14 \tan 26° = h$

$14 (0.4877) = h$

$6.8 \, m = h$

or

$7 \, m = h$