

Section 4.1 – Practice Problems

Solve for the following Trigonometric Ratios. (Round to 4 decimals)

1. $\sin 12^\circ = 0.2079$	2. $\tan 57^\circ = 1.5399$	3. $\cos 123^\circ = -0.5446$
4. $\cos 34^\circ = 0.8290$	5. $\sin 360^\circ = 0$	6. $\tan 270^\circ = \text{NO SOLUTION}$
7. $\sin 234^\circ = -0.8090$	8. $\tan 2^\circ = 0.0349$	9. $\cos 180^\circ = -1$
10. $\tan 45^\circ = 1$	11. $\sin 45^\circ = 0.7071$	12. $\cos 45^\circ = 0.7071$

Solve for the following angles. (Round to 1 decimal)

13. $\sin^{-1}(0.8660) = 60^\circ$	14. $\tan^{-1}(0.2354) = 13.2^\circ$	15. $\cos^{-1}(0.6775) = 47.4^\circ$
16. $\cos^{-1}(0.1111) = 83.6^\circ$	17. $\sin^{-1}(0.9999) = 89.2^\circ$	18. $\tan^{-1}(1.234) = 51.0^\circ$
19. $\sin^{-1}(0.5628) = 34.2^\circ$	20. $\tan^{-1}(0.5555) = 29.1^\circ$	21. $\cos^{-1}(0.6258) = 51.3^\circ$
22. $\tan^{-1}(1.879) = 62.0^\circ$	23. $\sin^{-1}(0.1111) = 6.4^\circ$	24. $\cos^{-1}(0.0001) = 90.0^\circ$

Solve the following proportions for the variable a .

25. $b = \frac{a}{c} \cdot c$

$cb = a$

26. $b = \frac{c}{a} \cdot a$

$$\frac{ab}{b} = \frac{c}{b}$$

$a = \frac{c}{b}$

27. $c = \frac{b}{a+d} \cdot (a+d)$

$$(a+d)c = b$$

$$ac + dc = b$$

$$ac = b - dc$$

$a = \frac{b-dc}{c}$

28. $d = ab - ac$

$$d = a(b-c)$$

$a = \frac{d}{b-c}$

29. $ab = ac + d$

$$ab - ac = d$$

$$a(b-c) = d$$

$a = \frac{d}{b-c}$

30. $b = \frac{ac}{d}$

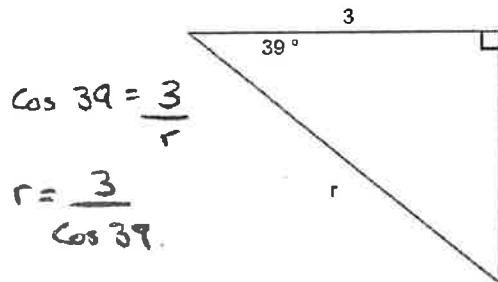
$$bd = ac$$

$a = \frac{bd}{c}$

Section 4.2 – Practice Problems

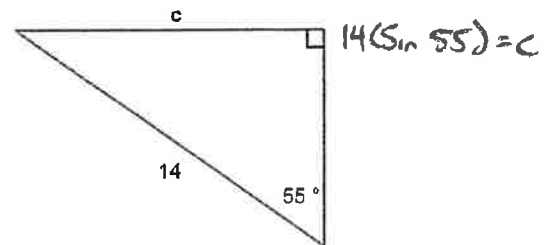
Use your Trigonometric Ratios to solve for the desired side.

1. $r = \underline{3.86}$

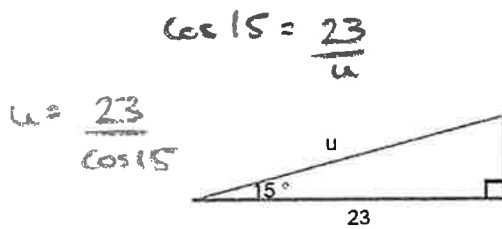


2. $c = \underline{11.47}$

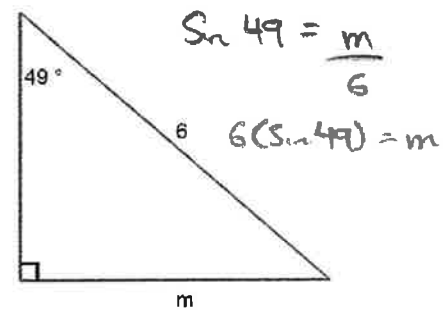
$$\sin 55 = \frac{c}{14}$$



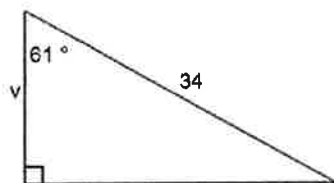
3. $u = \underline{23.81}$



4. $m = \underline{4.53}$



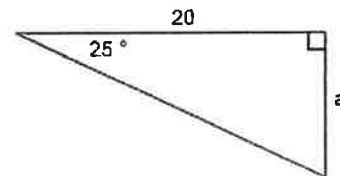
5. $v = \underline{16.48}$



$$\cos 61 = \frac{v}{34}$$

$$34(\cos 61) = v$$

6. $a = \underline{9.33}$

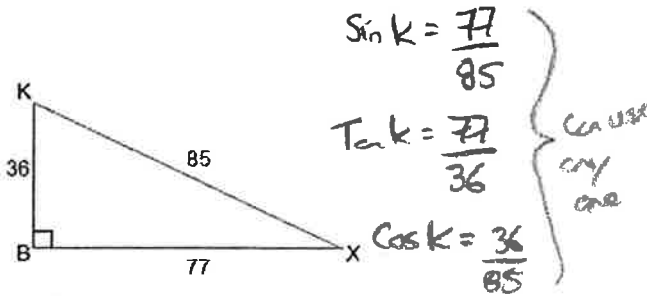


$$\tan 25 = \frac{a}{20}$$

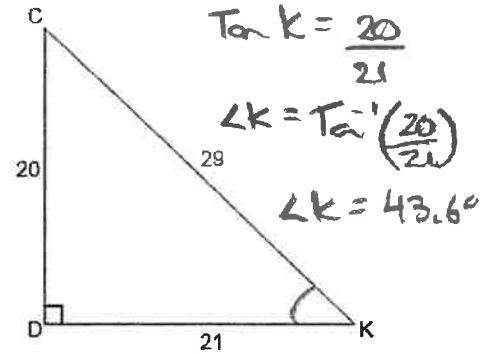
$$20(\tan 25) = a$$

Find the measure of the indicated angle, to the nearest tenth of a degree.

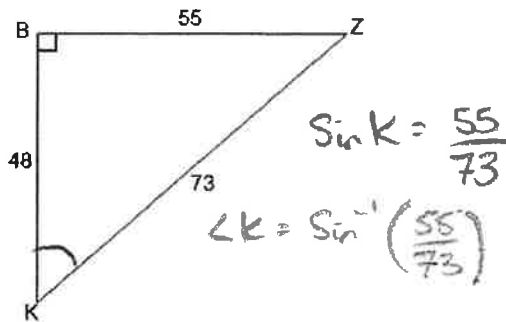
7. $\angle K = \underline{64.9^\circ}$



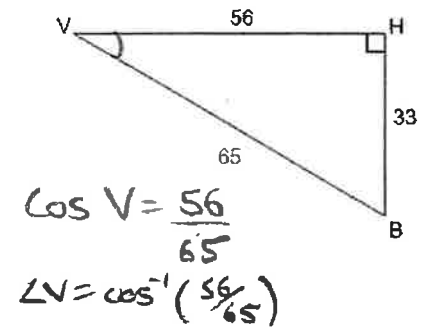
8. $\angle K = \underline{43.6^\circ}$



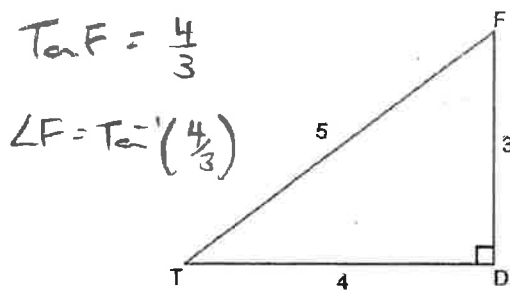
9. $\angle K = \underline{48.9^\circ}$



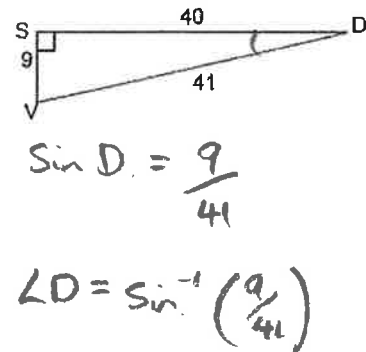
10. $\angle V = \underline{30.5^\circ}$



11. $\angle F = \underline{53.1^\circ}$



12. $\angle D = \underline{12.7^\circ}$

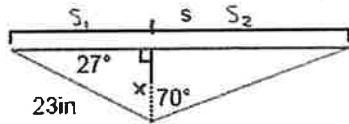


Find the length of the side denoted by a variable. Round answers to the nearest tenth.

13. $s = \underline{49.1}$ in

$\tan 70 = \frac{s_2}{10.4}$ $s_2 = 28.6$

$\sin 27^\circ = \frac{x}{23}$
 $x = 10.4$



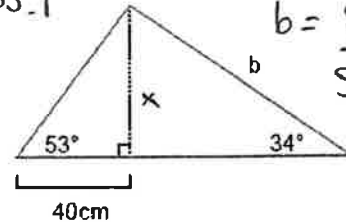
$\cos 27^\circ = \frac{s_1}{23}$ $s_1 = 20.5$

14. $b = \underline{94.9}$ cm

$\tan 53 = \frac{x}{40}$

$\sin 34 = \frac{53.1}{b}$

$x = 53.1$

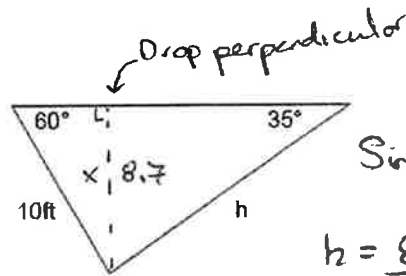


$b = \frac{53.1}{\sin 34}$

15. $h = \underline{15.1}$ ft

$\sin 60 = \frac{x}{10}$

$x = 8.7$



$\sin 35 = \frac{8.7}{h}$

$h = \frac{8.7}{\sin 35}$

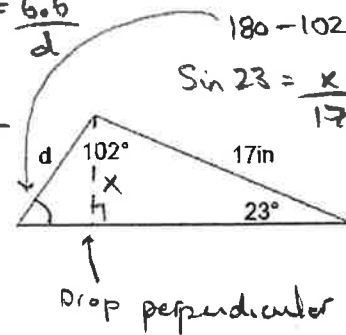
16. $d = \underline{8.1}$ in

$\sin 55 = \frac{6.6}{d}$

$d = \frac{6.6}{\sin 55}$

$\sin 23 = \frac{x}{17}$

$x = 6.6$



Find the area of the triangle. Round answers to the nearest tenth.

in².

17. Area = 924.8 mm²

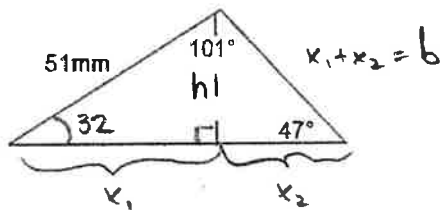
18. Area = 3729.9 yd²

$A = \frac{bh}{2} = \frac{68.5(27)}{2}$

$b = 68.5$

$b = 43.3 + 25.2$

$180 - 101 - 47$



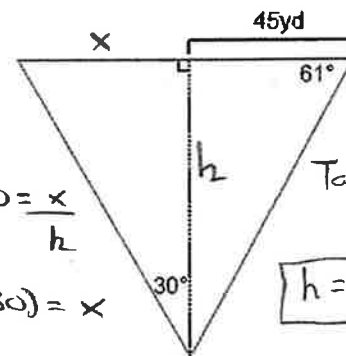
$\sin 32 = \frac{h}{51}$

$\cos 32 = \frac{x_1}{51}$

$h = 27$

$x_1 = 43.3$

$\tan 47 = \frac{h}{x_2} \rightarrow x_2 = \frac{27}{\tan 47} = 25.2$



$\tan 30 = \frac{x}{h}$

$\tan 61 = \frac{h}{45}$

$h(\tan 30) = x$

$h = 81.2$

$x = 46.9$

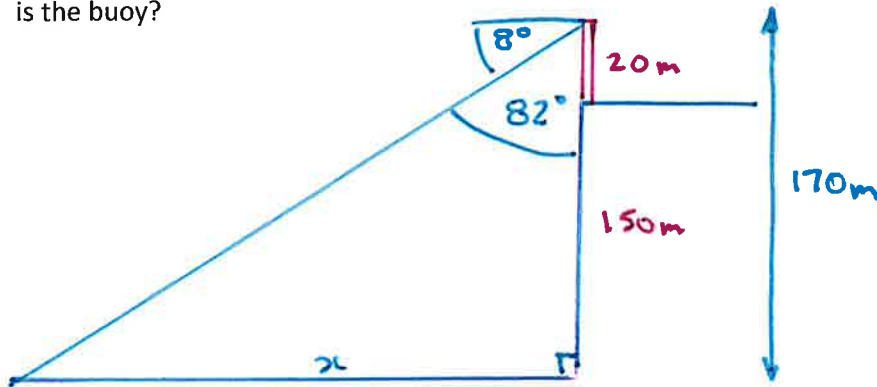
$46.9 + 45 = \text{base}$

$91.9 =$

$A = \frac{91.9 \cdot 81.2}{2} = 3729.9$

Section 4.3 – Practice Problems

1. A lighthouse is perched at the top of the White Cliffs of Dover (Google it) at the edge of the ocean. The cliffs are 150m high and the lighthouse is 20m high. An ocean buoy is spotted from the top of the lighthouse at an angle of depression of 8°. How far out from the base of the cliff is the buoy?



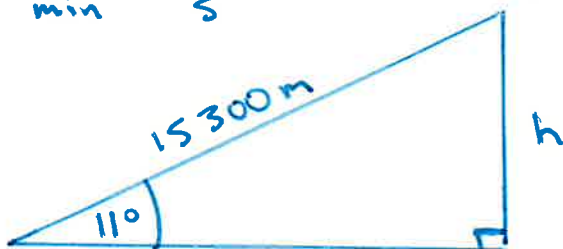
$$\tan 82^\circ = \frac{x}{170}$$

$$x = 170 \tan 82^\circ$$

$$x = 1209.6 \text{ m}$$

2. When an airplane leaves the runway, its angle of ascent is 11°, with a speed of 85m per second. Find the altitude of the plane after 3 minutes.

$$3 \text{ min} \frac{60 \text{ s}}{\text{min}} \frac{85 \text{ m}}{\text{s}} = 15300 \text{ m}$$



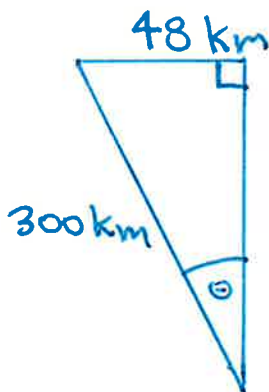
$$\sin 11^\circ = \frac{h}{15300}$$

$$h = 15300 \sin 11^\circ$$

$$h = 2919.4 \text{ m}$$

$$h = 2.9 \text{ km}$$

3. After an hour of flying, a jet has covered 300km, but winds have blown it off course. The instruments on the plane show that it is 48km West of the planned flight path. By how many degrees is the plane off course?

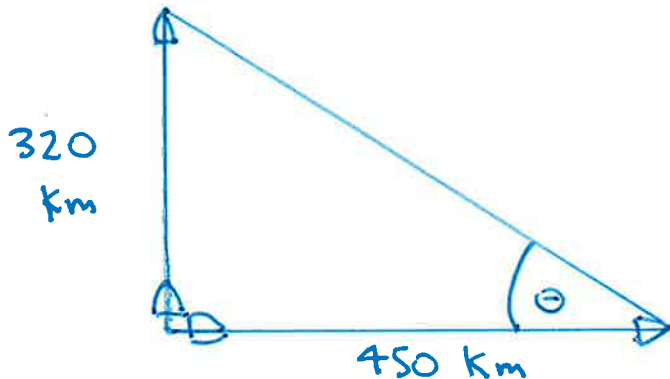


$$\sin \theta = \frac{48}{300}$$

$$\theta = \sin^{-1} \left(\frac{48}{300} \right)$$

$$\theta = 9.2^\circ$$

4. Two boats take-off from the same spot. One travels due North for 320km, and the other due East for 450km. If the boat travelling East wanted to turn to travel to where the other boat stopped, what angle North of West should it turn?

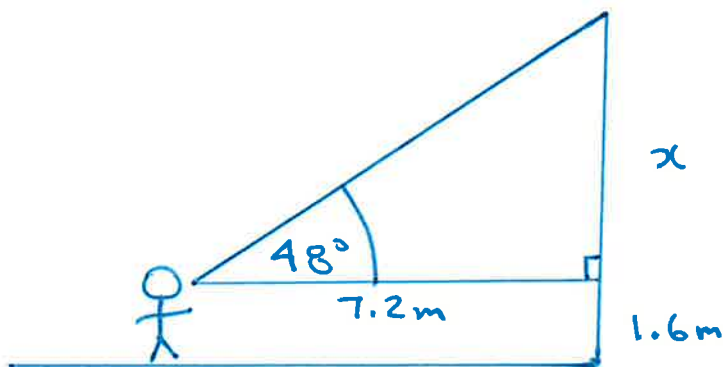


$$\tan \theta = \frac{320}{450}$$

$$\theta = \tan^{-1} \left(\frac{320}{450} \right)$$

$$\theta = 35.4 \text{ N of W}$$

5. Butch, who is 1.6m tall and works for the forestry department is tasked to measure the approximate height of some trees. The angle of inclination from his head to the tip of the tree is 48° , and he is 7.2m from the tree. How tall is the tree?



$$\tan 48^\circ = \frac{x}{7.2}$$

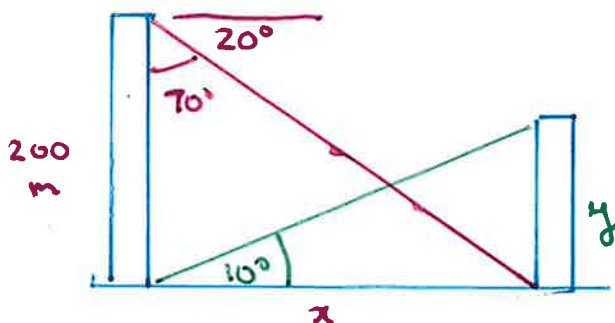
$$x = 7.2 \tan 48^\circ$$

$$x = 8.0 \text{ m}$$

height of tree:

$$8.0 \text{ m} + 1.6 \text{ m} = 9.6 \text{ m}$$

6. From the top of a 200 meters high building, the angle of depression to the bottom of a second building is 20 degrees. From the bottom of the building, the angle of elevation to the top of the second building is 10 degrees. Calculate the height of the second building.



$$\tan 70^\circ = \frac{x}{200}$$

$$x = 200 \tan 70^\circ$$

$$x = 549.2 \text{ m}$$

$$\tan 10^\circ = \frac{y}{549.2}$$

$$y = 549.2 \tan 10^\circ$$

$$y = 96.9 \text{ m}$$