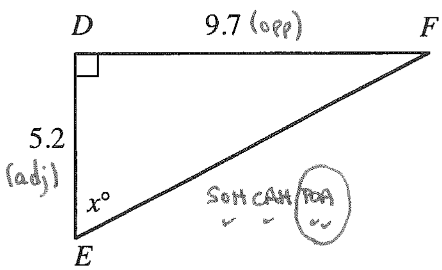
Assignment

1. In each case calculate the indicated measure. Give angles to the nearest degree and sides to the nearest tenth.

a)

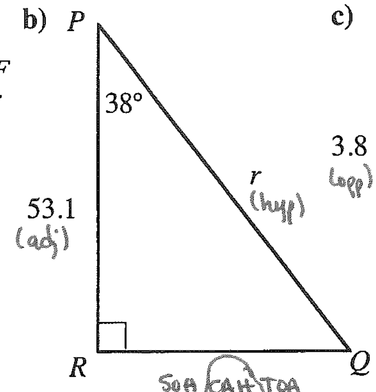


$\tan x° = \frac{9.7}{5.2}$

$\boxed{2nd}\ \boxed{TAN}$ (9.7/5.2) $\boxed{ENTER}$

$x° = \underline{\underline{62°}}$

b)



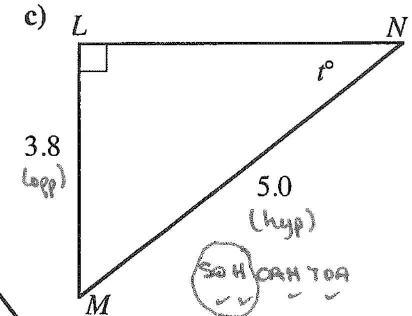
$\cos 38° = \frac{53.1}{r}$

$r \cos 38° = 53.1$

$\frac{r\cos 38°}{\cos 38°} = \frac{53.1}{\cos 38°}$

$r = \frac{53.1}{\cos 38°} = \underline{\underline{67.4}}$

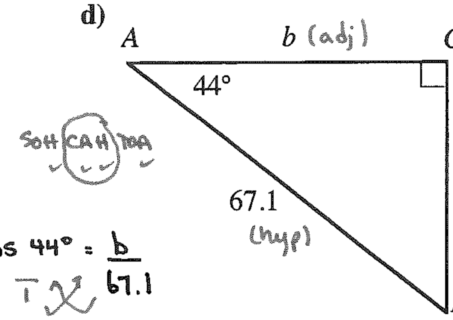
c)



$\sin t° = \frac{3.8}{5.0}$

$t° = \underline{\underline{49°}}$

d)



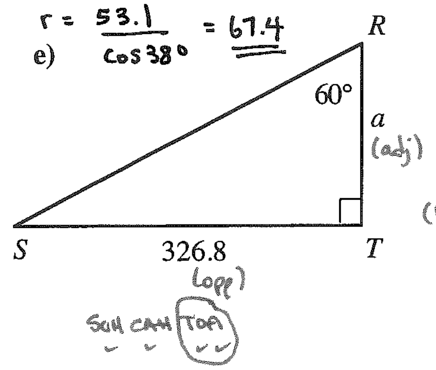
$\cos 44° = \frac{b}{67.1}$

$b = 67.1 \cos 44°$

67.1 $\boxed{\cos}$ (44)

$b = \underline{\underline{48.3}}$

e)

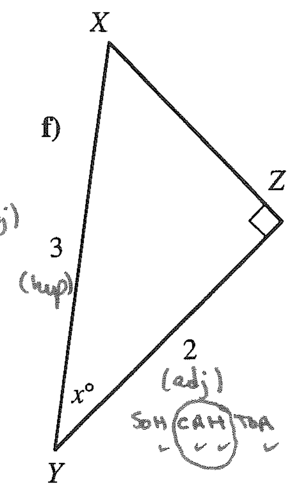


$\tan 60° = \frac{326.8}{a}$

$a = \frac{326.8}{\tan 60°} = \underline{\underline{188.7}}$

326.8 $\boxed{\div}$ $\boxed{TAN}$ (60)

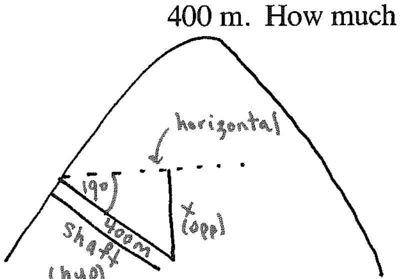
f)



use Cos x° = 48°

$\cos x° = \frac{2}{3}$, $x° = \underline{\underline{48°}}$

2. A mine shaft which slopes at an angle of 19° to the horizontal is driven into a hillside for 400 m. How much lower, to the nearest metre, is the end of the shaft than the beginning?



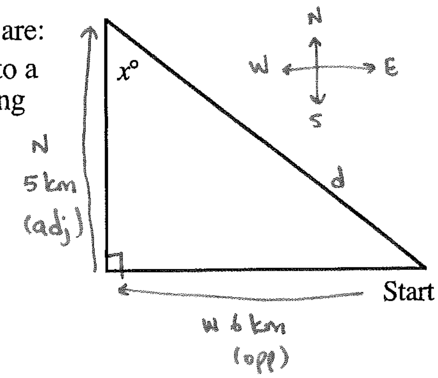
$\sin 19° = \frac{x}{400}$

$x = 400 \sin 19°$

$= 130.2\ldots$

$\underline{\underline{130m}}$ lower

3. In a yacht race over a triangular course the instructions are: "Sail due west to a buoy 6 km away, then due north to a buoy 5 km away, and then return directly to the starting point".



a) Calculate the measure of the angle marked x, to the nearest degree.

$\tan x° = \frac{6}{5}$, $x° = 50°$

b) Calculate, to the nearest tenth of a km, the total distance travelled in the race.

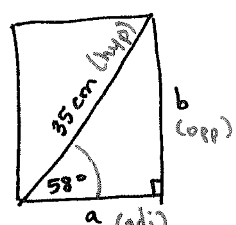
$c^2 = a^2 + b^2$

Let $a = 6$
$b = 5$
$c = d$

$d^2 = 6^2 + 5^2$
$= 61$
$d = \sqrt{61}$
$= 7.8$ km

total distance $= 5 + 6 + 7.8$
$= \underline{18.8 \text{ km}}$

4. The diagonal of a rectangle is 35 cm long and makes an angle of 58° with the shorter side of the rectangle. Determine the length and width of the rectangle to the nearest tenth of a cm.



Length

$\sin 58° = \frac{b}{35}$

$b = 35 \sin 58°$
$= \underline{29.7 \text{ cm}}$

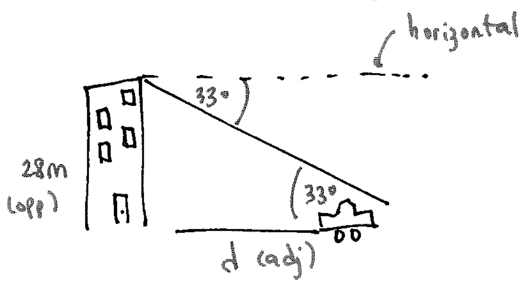
Width

$\cos 58° = \frac{a}{35}$

$a = 35 \cos 58°$
$= \underline{18.5 \text{cm}}$

Thus, the length and width are 29.7 cm and 18.5 cm.

5. From the top of a building a surveyor determines the angle of depression of a parked car on the street below to be 33°. If the building is 28 m high, calculate the distance from the foot of the building to the parked car. Answer to the nearest metre.



SOH CAH TOA

$\tan 33° = \frac{28}{d}$

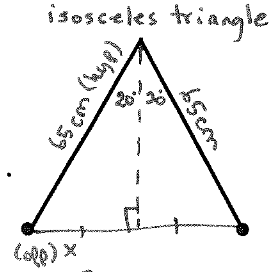
$d = \frac{28}{\tan 33°} = 43.1\ldots$

Distance = 43m

6. A pendulum 65 cm long swings through an angle of 40°. Calculate the distance, to the nearest 0.1 cm, between the two extreme positions of the pendulum bob.

SOH CAH TOA

isosceles triangle



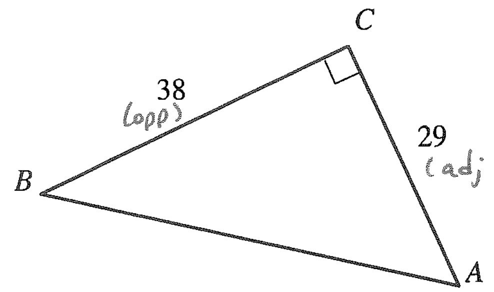
$\sin 20° = \frac{x}{65}$

$x = 65 \sin 20° = 22.231\ldots$
65 $\boxed{\sin}$ (20)

Now double since isosceles triangle.
distance $= 2(22.231\ldots)$
$= \underline{44.5 \text{ cm}}$

Problem: No right triangle. So lets make one!

7. Solve triangle *ABC* giving each measure correct to the nearest whole number.



Sides

AB = 48

AC = 29

BC = 38

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

Let a = 38

b = 29

c = AB

$AB^2 = 38^2 + 29^2 = 2285$

$AB = \sqrt{2285}$

$= \underline{\underline{48}}$

Angles

∠ABC = 37°

∠BAC = 53°

∠ACB = 90°

$\boxed{\text{Angle BAC}}$

$\tan A = \frac{38}{29}$

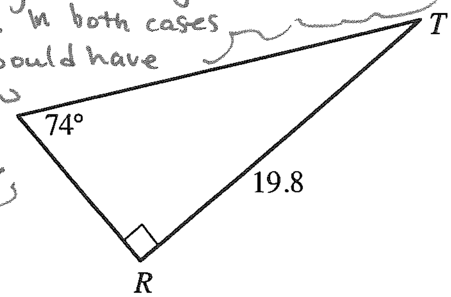
$\angle A = \underline{\underline{53°}}$

$\boxed{\text{Angle ABC}}$

$180° - 90° - 53° = \underline{\underline{37°}}$

Recall: We could have also used a trig ratio to solve for angle ABC. I just choose not to. In both cases I would have used follow through information.

8. Solve triangle *RST*. Give all sides correct to the nearest tenth and all angles correct to the nearest whole number.



Sides

RT = 19.8

RS = 5.7

ST = 20.6

Must Solve for

- Side ST
- Side RS
- ∠RTS

Angles

∠RST = 74°

∠SRT = 90°

∠RTS = 16°

ST: $\sin 74° = \frac{19.8}{ST}$

$ST = \frac{19.8}{\sin 74°} = \underline{\underline{20.6}}$

RS: $\tan 74° = \frac{19.8}{RS}$

$RS = \frac{19.8}{\tan 74°} = \underline{\underline{5.7}}$

$180° - 90° - 74° = \underline{\underline{16°}}$

9. Solve triangle *DEF* in which angle $DEF = 90°$, angle $EDF = 50°$, and $DF = 173$ mm. Give all answers to the nearest whole number. Note: More way to solve than shown. This applies to most questions in this section, solving triangles.

Sides

DF = 173 mm

DE = 111 mm

EF = 133 mm

Side DE

$\cos 50° = \frac{DE}{173}$

$DE = 173 \cos 50°$

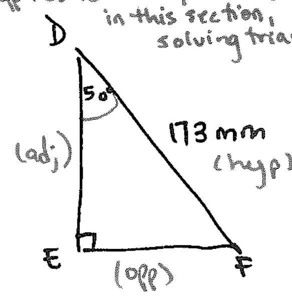
$= \underline{\underline{111 \text{ mm}}}$

Side EF

$\sin 50° = \frac{EF}{173}$

$EF = 173 \sin 50°$

$= \underline{\underline{133 \text{ mm}}}$



Angles

∠DEF = 90°

∠EDF = 50°

∠DFE = 40°

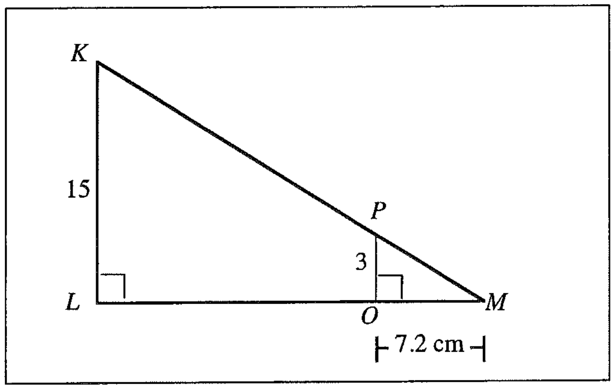
$\angle DFE = 180° - 90° - 50° = \underline{\underline{40°}}$

10. Why is it not possible to solve $\triangle PQR$ in which $\angle PQR = 90°$, $\angle PRQ = 67°$ and $\angle QPR = 23°$?

No side length given.

Matching

Use the following information for the matching question



Match each item in List 1 on the left with the equivalent item in List 2 on the right. Each item in List 2 may be used once, more than once, or not at all.

List 1

E **11.** The length of side PM is

A **12.** Angle MPO is

A **13.** Angle LKM is

C **14.** The length of side LM is

H **15.** The length of side LO is

D **16.** Angle PMO is

B **17.** The length of side KP is

List 2

A. 67.4° **B.** 31.2 cm **C.** 36.0 cm

D. 22.6° **E.** 7.8 cm **F.** 15.8 cm

G. 29.3 cm **H.** 28.8 cm **I.** 39.0 cm

11. $PM^2 = 3^2 + 7.2^2 = 60.84$, $PM = \sqrt{60.84} = \underline{7.8}$

12. $\tan \angle MPO = \frac{7.2}{3}$, $\angle MPO = \underline{67.4^\circ}$

13. $\angle LKM = \angle MPO = \underline{67.4^\circ}$ (corresponding angles)

14. $\tan \angle LKM = \frac{LM}{15}$, $LM = 15 \tan \angle LKM = 15 \tan 67.4^\circ = \underline{36.0}$

15. $LO = LM - OM = 36.0 - 7.2 = \underline{28.8}$

16. $\angle PMO = 180^\circ - 90^\circ - 67.4^\circ = \underline{22.6^\circ}$

17. $KM^2 = KL^2 + LM^2$

$KM^2 = 15^2 + 36.0^2 = 1521$

$KM = \sqrt{1521} = 39$

$KP = 39 - 7.8 = \underline{31.2}$

Answer Key

1.a) 62° **b)** 67.4 **c)** 49° **d)** 48.3 **e)** 188.7 **f)** 48° **2.** 130 m

3.a) 50° **b)** 18.8 km **4.** length = 29.7 cm, width = 18.5 cm **5.** 43 m **6.** 44.5 cm

7. angle $ABC = 37°$, angle $BAC = 53°$, angle $ACB = 90°$, $AB = 48$, $AC = 29$, $BC = 38$

8. angle $RST = 74°$, angle $SRT = 90°$, angle $RTS = 16°$, $RT = 19.8$, $RS = 5.7$, $ST = 20.6$

9. angle $DEF = 90°$, angle $EDF = 50°$, angle $DFE = 40°$, $DF = 173$ mm, $DE = 111$ mm, $EF = 133$ mm

10. No side length is given. **11.** E **12.** A **13.** A **14.** C **15.** H **16.** D **17.** B