Mrs

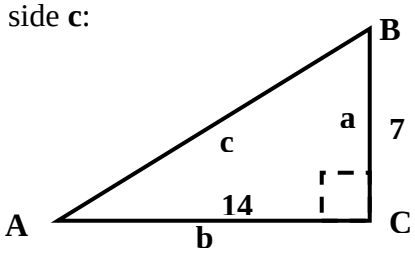
GRADE 11 ESSENTIAL
UNIT G – TRIGONOMETRY
PRACTICE QUESTIONS

Name: _____

You may use your course Reference Notes and a calculator.
Show work for best marks
Round lengths to two decimal places and angles to one decimal place.
Diagrams are not necessarily drawn to scale, use the dimensions given!

Trig ratios should be rounded to 4 places

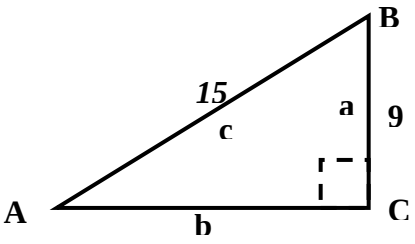
1. Find side **c**:



Pythagoras (easiest)

$c^2 = a^2 + b^2 = 7^2 + 14^2 = 245$
$c = \sqrt{245} = 16.65$
or cosine law
$c^2 = a^2 + b^2 - 2ab\cos\angle C$
$= 7^2 + 14^2 - 2 \cdot 7 \cdot 14 \cdot \cos 90^\circ$
$= 245$
$\therefore c = \sqrt{245} = 16.65$
FYI: $\cos 90^\circ = 0$

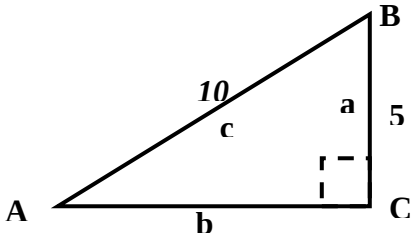
2. Find side **b**.



Pythagoras:
$c^2 = a^2 + b^2 \quad \therefore 15^2 = 9^2 + b^2$
$225 = 81 + b^2$
$\therefore b^2 = 144 \quad \therefore b = \sqrt{144} = 12$

Use Trig? (messy)
$\angle B = \cos^{-1}(9/15) \approx 53.13^\circ$
Now sine law:
$\frac{15}{\sin 90} = \frac{b}{\sin 53.13} \quad \therefore b = 11.9999\ldots$
$= 12$

3.



Find:

a. sin (A) $= \frac{\text{Opp to A}}{\text{Hyp}} = \frac{5}{10} = \frac{1}{2} = 0.5$

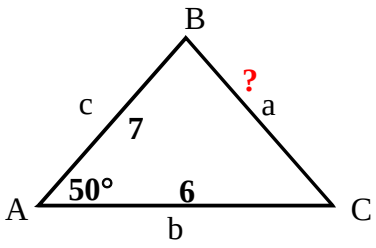
b. cos (A) $= \frac{\text{Adj to A}}{\text{Hyp}} = \frac{\sqrt{75}}{10}$
$= 0.8660$

c. tan (B) $= \frac{\text{Opp to B}}{\text{Adj to B}} = \frac{5}{\sqrt{75}}$
or 0.5774

d. the measure of angle B (m∠B):
$\angle B = \tan^{-1}(0.5774) = 30.0^\circ$

Mr F

4. Find side **a**:



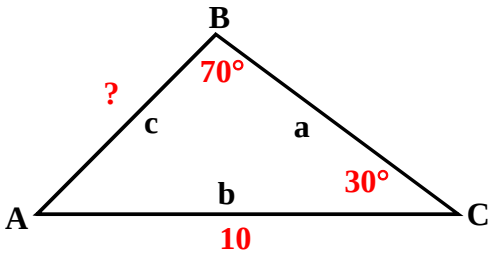
COSINE LAW

$a^2 = b^2 + c^2 - 2bc \cdot \cos \angle A$

$a^2 = 6^2 + 7^2 - 2 \cdot 6 \cdot 7 \cdot \cos 50^\circ$

$a^2 = 31.0058\ldots$

$a = \sqrt{31.0058\ldots} = 5.57$



Not Cosine; so Sine Law

$\frac{c}{\sin 30^\circ} = \frac{10}{\sin 70^\circ}$

$\therefore c = \frac{10 \cdot \sin 30^\circ}{\sin 70^\circ}$

$c = 5.32$

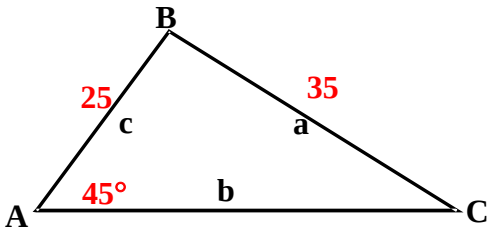
5. Find side **c**:

6. What angle has a cosine of **0.691**?

$\cos(\overset{?}{x}) = 0.691$

$x = \cos^{-1}(0.691) \cong 46.3^\circ$

7. **Bonus Question**. Find the missing measures of angle **C**, side **b**, and angle **B**.



OMG!

① $\frac{\sin \angle C}{25} = \frac{\sin 45^\circ}{35} \cdot \angle C \cong 30.34$

② $\angle B = 180^\circ - (45^\circ + 30.34^\circ) = 104.66$

③ Sine law: $\frac{b}{\sin 104.66} = \frac{35}{\sin 45^\circ}$

$\therefore b = 47.89$ length

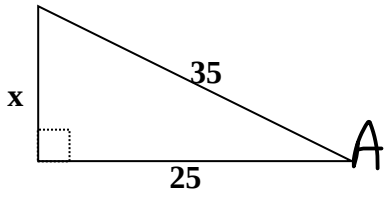
OR cosine law:

$b^2 = a^2 + c^2 - 2 \cdot a \cdot c \cdot \cos B$

$b^2 = 2292.89\ldots$

$\therefore b = 47.88$ long

8. Find the value of side x.



Mr F

Pythagoras is easiest!

$35^2 = 25^2 + x^2$

$\therefore x^2 = 600$

$\therefore x = 24.49$

or be goofy use trig functions

$\angle A = \cos^{-1}(25/35) \therefore \angle A \cong 44.42^\circ$

SO $x^2 = 25^2 + 35^2 - 2 \cdot 35 \cdot 25 \cdot \cos 44.42$

$x^2 = 600.10\ldots \therefore x = 24.50$

or $\tan 44.42 = x/25$

$\therefore x = 24.50$ etc...

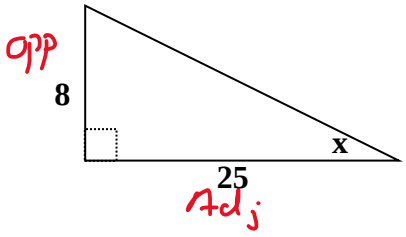
9. Find the value of angle x.

use trig ratios

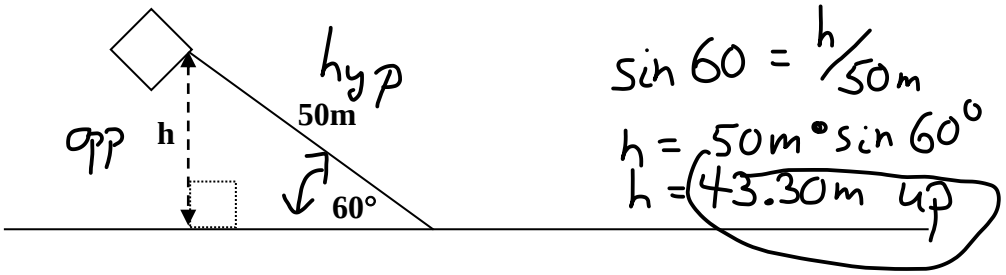
$\tan(x) = 8/25$

$x = \tan^{-1}(8/25)$

$x = 17.7^\circ$



10. Kyle is flying a kite. The string is **50** metres long. The string makes an angle of **60°** with the flat ground. What is the vertical height, ***h***, of the kite above ground?

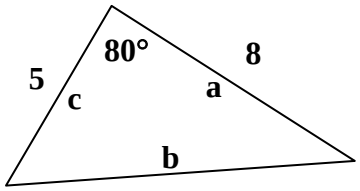


$\sin 60 = h/50m$

$h = 50m \cdot \sin 60^\circ$

$h = 43.30m$ up

11. Find the value of side b. .



Mr F

cosine law

$b^2 = a^2 + c^2 - 2 \cdot a \cdot c \cdot \cos B$

$b^2 = 8^2 + 5^2 - 2 \cdot 8 \cdot 5 \cdot \cos 80^\circ$

$b^2 = 75.108\ldots$

$b = \sqrt{75.108\ldots} = 8.67$ long

12. Find the value of angle θ.

Sine law

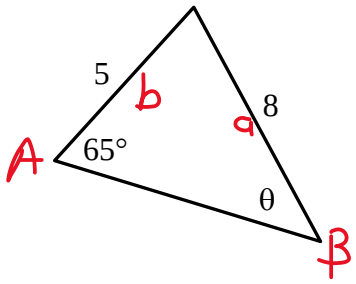
$$\frac{8}{\sin 65} = \frac{5}{\sin B}$$

Easier steps if write like this:

$$\frac{\sin B}{5} = \frac{\sin 65}{8}$$

$$\sin B = \frac{5 \sin 65}{8} = 0.5664\ldots$$

$$\angle B = \sin^{-1}(0.5664) = 34.5^\circ$$



BONUS QUESTION (for 2 extra marks if needed)

Solve the following equation for the unknown 'x':

$$\frac{2}{3}x + 4 = 7$$

Mr A

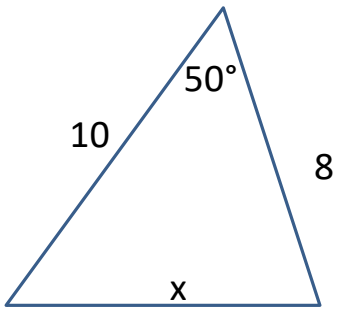
13. Find the measure of length x

$x^2 = 8^2 + 10^2 - 2 \cdot 8 \cdot 10 \cdot \cos 50^\circ$

$x^2 = 61.15\ldots$

$x = \sqrt{61.15\ldots} \approx 7.82$

TLAR



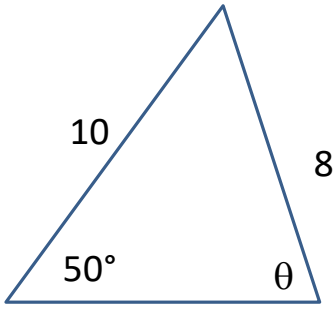
14. Find the measure of angle θ

$\frac{\sin\theta}{10} = \frac{\sin 50}{8}$

$\sin\theta = \frac{10 \cdot \sin 50}{8}$

$\theta = \sin^{-1}\left(\frac{10 \cdot \sin 50}{8}\right) = 73.2^\circ$

TLAR



15. Solve for the remaining three parts of the triangle.

omg. ♡!

(1) $a^2 = b^2 + c^2 - 2 \cdot b \cdot c \cdot \cos(60^\circ)$

$a^2 = 5.5^2 + 8^2 - 2 \cdot 5.5 \cdot 8 \cdot \cos(60^\circ)$

$a^2 = 50.25$

$\therefore a = \sqrt{50.25} = 7.09$ long

(2) Solve for ∠C (sine law or cos law)

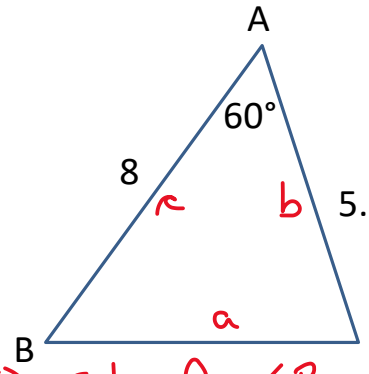
sin law

$\frac{\sin\angle C}{8} = \frac{\sin 60}{7.09}$

$\therefore \angle C = \sin^{-1}\left(\frac{8 \cdot \sin 60}{7.09}\right) = 77.7^\circ$

or cos law

$\angle C = \cos^{-1}\left(\frac{5.5^2 + 7.09^2 - 8^2}{2 \cdot 5.5 \cdot 7.09}\right) = 77.8^\circ$



(3) Solve for ∠B

$\angle B = 180^\circ - 137.78^\circ$

$\angle B = 42.22^\circ$

OR $\angle B = \cos^{-1}\left(\frac{8^2 + 7.09^2 - 5.5^2}{2 \cdot 8 \cdot 7.09}\right)$

$\angle B = 42.21$