



S2Math30A
Hwa Chong Institution
Integrated Programme
Secondary Two Mathematics

Name: _____ () Class: _____ Date: _____

Assignment 10

Topic: Geometry and Trigonometry II

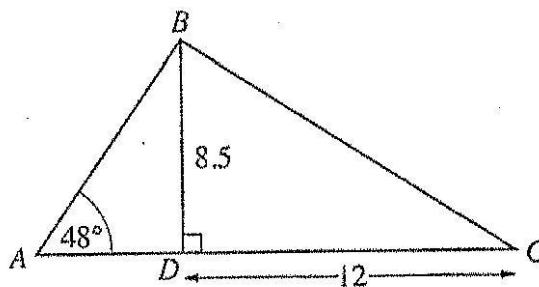
Sub-topic: Trigonometric Ratios

1.

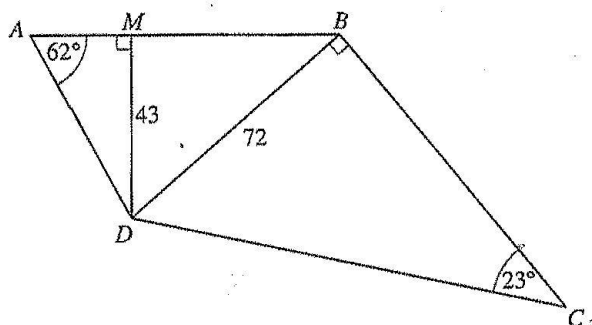
In triangle ABC, BD is perpendicular to AC. Angle $BAD = 48^\circ$, $BD = 8.5\text{cm}$ and $DC = 12\text{cm}$.

Calculate

- (i) $\angle BCD$,
- (ii) AB.



2.



The diagram shows a field, ABCD, which is crossed by two paths, DM and DB. DM is perpendicular to AB and DB is perpendicular to BC. $DM = 43\text{m}$, $DB = 72\text{m}$, $\angle BCD = 23^\circ$

Calculate

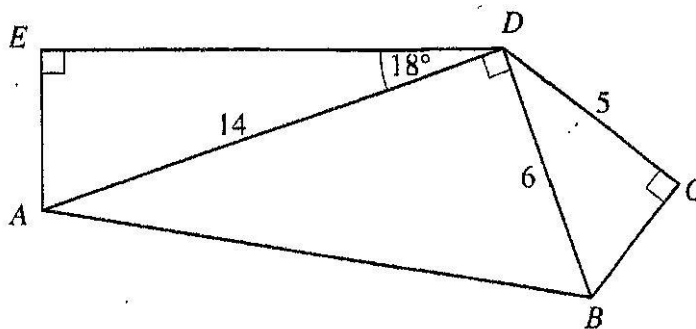
- (i) MB
- (ii) AB
- (iii) CD
- (iv) $\angle MBD$

3.

In the pentagon ABCDE, angles BCD, BDA and AED are each 90° and angle ADE is 18° . $CD = 5\text{cm}$, $BD = 6\text{cm}$ and $AD = 14\text{cm}$.

Calculate

- (i) angle CDB,
- (ii) AE,
- (iii) the radius of the circle through A, B and D.

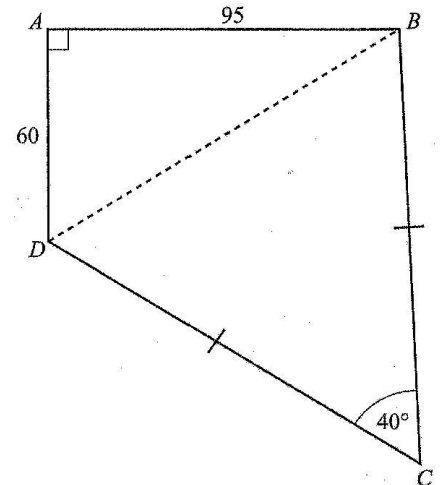


4.

The diagram shows a field ABCD on horizontal ground, crossed by a path BD. $AB=95\text{m}$, $AD=60\text{m}$ and $BC=CD$.

$\angle BAD = 90^\circ$ and $\angle BCD = 40^\circ$.

- Show that $\angle ADC = 127.7^\circ$, correct to one decimal place.
- Find CD.
- The land is valued at \$40,000 per hectare. Given that 1 hectare = 10 000 square metres, calculate the value of the field.
- A bird is hovering vertically above B. The angle of elevation of the bird from A is 18° . Find the angle of elevation of the bird from D.



5.

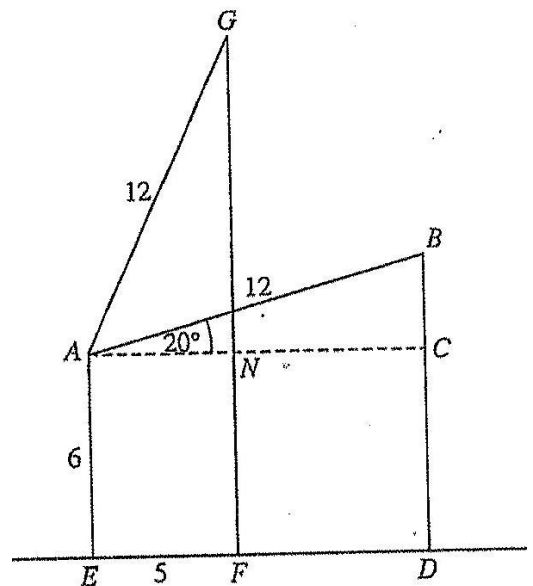
A crane stands on level ground.

It may be represented by a vertical tower AE of height 6m and a jib AB of length 12m. A vertical cable hangs from B and is attached to a load on the ground at the point D. The jib is inclined at an angle of 20° to the horizontal line AC.

- Calculate BD.
- The load is lifted from D as the jib is rotated in a vertical plane about A. When the jib is in the position AG, the load is lowered to the point F on the ground, vertically below G. The line AC cuts GF at N. $EF = 5\text{m}$.

Calculate

- GN,
- the angle through which the jib has rotated.



6.

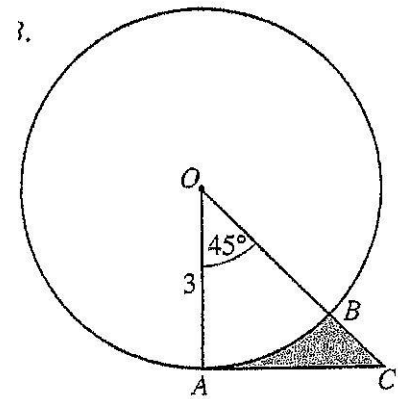
In the diagram, the circle, centre O , passes through A and B .
The tangent at A meets OB produced at C .
The radius of the circle is 3cm and $\angle AOB = 45^\circ$.

(i) The area of the shaded region can be written as $(p - q\pi)\text{cm}^2$.

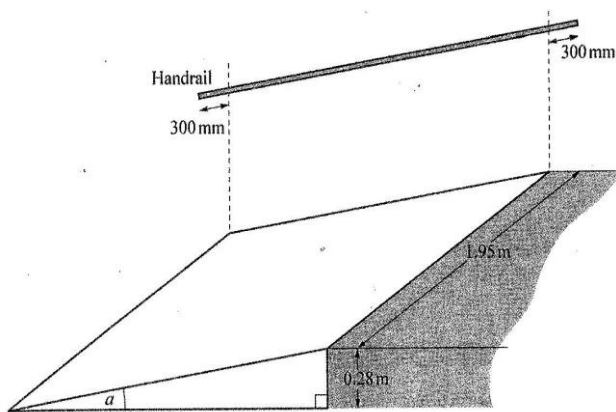
Find the values of p and q .

(ii) The perimeter of the shaded region can be written $(v\pi + \sqrt{t})\text{cm}$.

Find the values of v and t .



7.



There is a vertical step 0.28m high on horizontal ground at the entrance to a building. The width of the step is 1.95m .

A ramp in the shape of a prism is to be installed so that wheelchairs can enter the building. The gradient of the ramp is such that the ratio vertical distance: horizontal distance is $1:12$.

(i) Show that the angle, a , of the ramp is 4.76° , correct to 3 significant figures.

(ii) The ramp is to be made of concrete. When it is set, the mass of 1m^3 of concrete is 2300kg . Calculate the mass of the completed ramp.

(iii) A handrail is to be positioned on the wall, parallel to the ramp. The handrail must extend 300mm at both ends of the ramp. Calculate the total length, in metres, of the handrail.

8.

A rectangular advertising hoarding, $ABCD$, is strengthened by three struts, AQ , AP and PQ .
 $AQ = 9.4\text{m}$ $AP = 12.1\text{m}$ $\angle PAQ = 32^\circ$ and $\angle QAD = 49^\circ$.

Calculate

- AD ,
- PB ,
- the area of triangle APQ ,
- PQ

