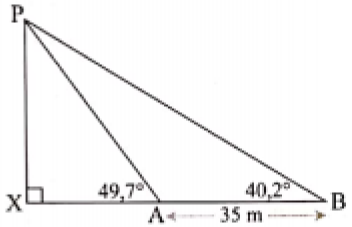
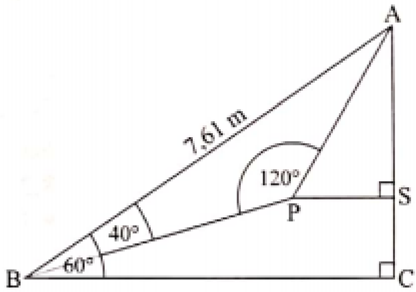
GR 11 REVISION: 2D TRIG

Exercise 1

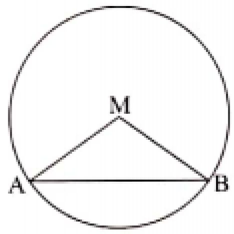
1. In the diagram, AB = 35 m, $\hat{B} = 40{,}2°$ and $P\hat{A}X = 49{,}7°$.
   Calculate the height of PX.



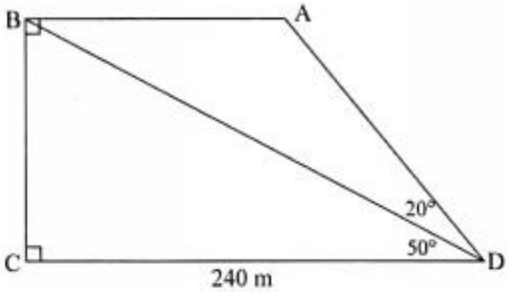
2. Calculate the following from the diagram.
   2.1 AP
   2.2 AS



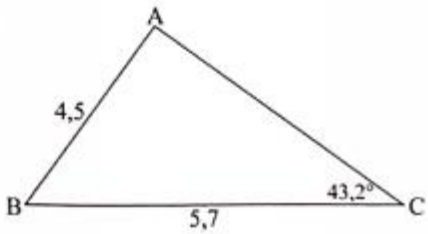
3. In the diagram, M is the centre of the circle.
   AB = 75,3 m and $A\hat{M}B = 110°$.
   Calculate the following correct to two decimal places.
   3.1 the length of AM
   3.2 the area of △AMB



4. Calculate the area of △ABD.



5. Given: $\hat{C} = 43{,}2°$, AB = 4,5 and BC = 5,7.
   Determine the following.
   5.1 $\hat{A}$
   5.2 AC



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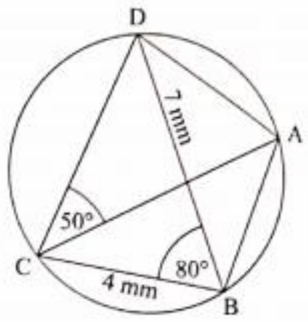
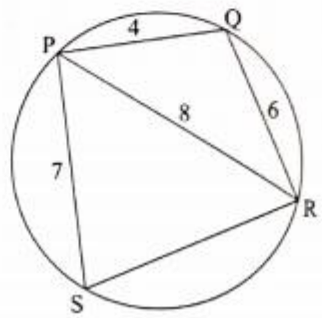
6. In the diagram, BC = 4 mm, BD = 7 mm, $D\hat{B}C = 80°$ and $A\hat{D} = 50°$. ABCD is cyclic.
Determine (correct to two decimal places):

6.1 the length of DC
6.2 the area of △BCD
6.3 the size of $A\hat{B}C$
6.4 the length of AD.



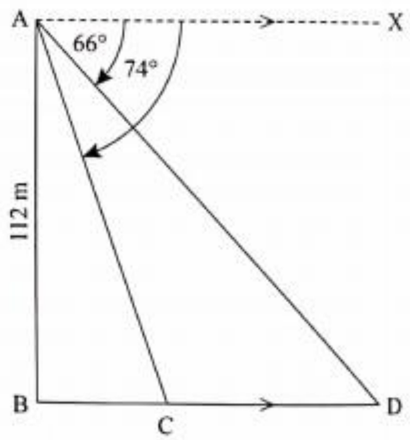
7. P, Q, R, and S, in that order, are points on the circumference of a circle. PQ = 4, QR = 6, PR = 8 and PS = 7.
Calculate correct to one decimal place, the size of:

7.1 $\hat{Q}$
7.2 $\hat{S}$
7.3 Area △PSR



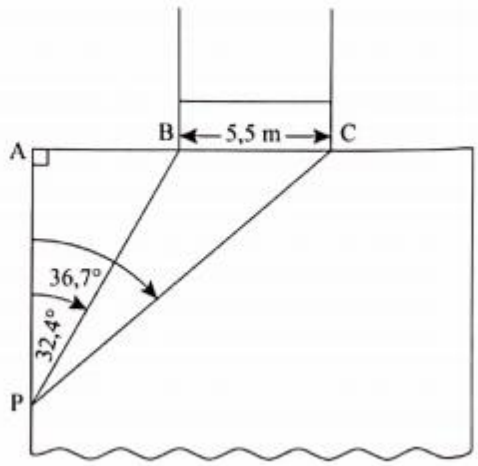
8. In the diagram, AB represents a lighthouse with height 112 m. From A the angles of depression of C and D, two boats in the same horizontal line as B, are 74° and 66° respectively. AX ∥ BCD.

8.1 Write down the size of $A\hat{C}B$.
8.2 Calculate AC.
8.3 Calculate the distance between the two boats, i.e. calculate CD.



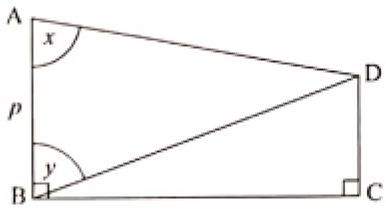
9. The result of an important rugby match is determined by a penalty kick during injury time. Point P, in the diagram, indicates where the ball is placed for the penalty kick. After the match, a surveyor determined that the angle between the touch-line and left post ($A\hat{P}B$) and the angle between the touch-line and right post ($A\hat{P}C$) were 32,4° and 36,7° respectively. The distance between the goal posts is 5,5 metres. Calculate:

9.1 $P\hat{B}C$
9.2 the distance to the right hand post
9.3 the shortest distance, PA, to the goal line.



10. **10.1** Use the diagram and prove that

$DC = \frac{p \sin x \cos y}{\sin(x + y)}$.



10.2 If $x = 80°$, $y = 70°$ and $p = 50$ m, calculate DC.

11. In the diagram, HTP is a straight line.

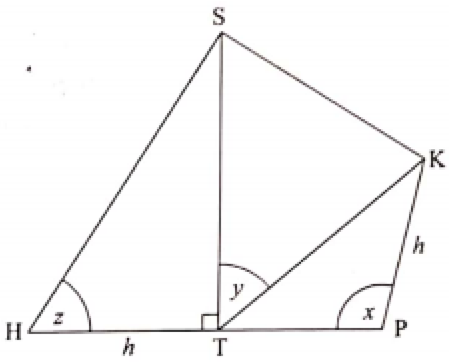
$ST \perp HP$

$S\hat{H}T = z$

$S\hat{T}K = y$

$K\hat{P}T = x$

$HT = KP = h$



11.1 Write down $K\hat{T}P$ in terms of y.

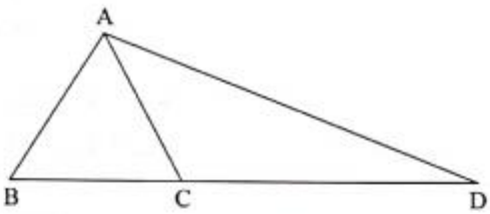
11.2 Prove that $KT = \frac{h \sin x}{\cos y}$

11.3 Prove that $ST = h \tan z$.

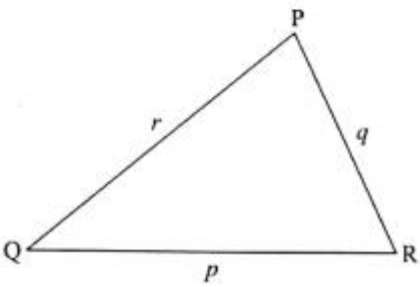
11.4 Prove that Area $\triangle KTS = \frac{1}{2}h^2 \sin x \tan z \tan y$.

11.5 Calculate the area of $\triangle KTS$ to the nearest square metre if $h = 28$ metres, $x = 115{,}7°$, $y = 43{,}5°$ and $z = 61{,}6°$.

12. ABC is an equilateral triangle and BC is produced to D such that CD = 2BC. If AB = p units, show that AD = $\sqrt{7}\,p$ units.



13. $\triangle PQR$ is an acute-angled triangle.



13.1 Write down the area of $\triangle PQR$ in terms of p, q and R.

13.2 Apply the sine rule in $\triangle PQR$ and determine q in terms of p, Q and P.

13.3 Use 13.1 and 13.2 to prove that $p^2 = \frac{2(\text{area } \triangle PQR) \sin P}{\sin Q \sin R}$

13.4 The area of $\triangle PQR = 65{,}4 \text{ cm}^2$ and two angles of the triangle are $30{,}6°$ and $49{,}7°$. Calculate the length of side p, correct to one decimal place, if p is the longest side of the triangle.