SCHOLARS ACADEMY
Class Tag Line

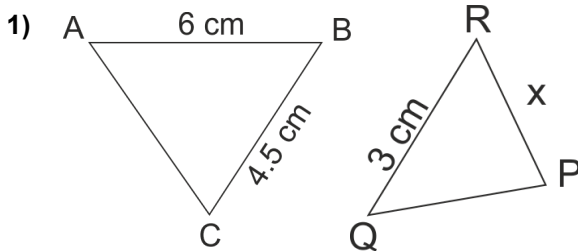| Std.: 10 (English)	WWW.SCHOLARSCLASSES.COM/BLOG	Time: 2 hrs
Date: 17-01-21	SUB : MATHEMATICS PART - II	Marks: 40

Q.1 A) Solve Multiple choice questions.   (4)

1)

In the given figure, $\triangle ABC \sim \triangle QRP$. The value of x is
a. 2.25cm   b. 4cm   c. 4.5cm   d. 5.25cm

2) When see at a higher level, from the horizontal line, angle formed is ....
a. angle of elevation   b. angle of depression   c. 0   d. straight angle

3) $\triangle LMN \sim \triangle XYZ$ and $\dfrac{LM}{XY} = \dfrac{3}{5}$, then ....
a. $\triangle LMN$ is bigger   b. $\triangle XYZ$ is bigger
c. Both the triangles will be equal   d. Cannot be decided

4) In $\triangle ABC$, $\angle A = 60°$, $\angle C = 30°$, $\angle B = 90°$ and AC = 6 cm. Find the length of side AB.
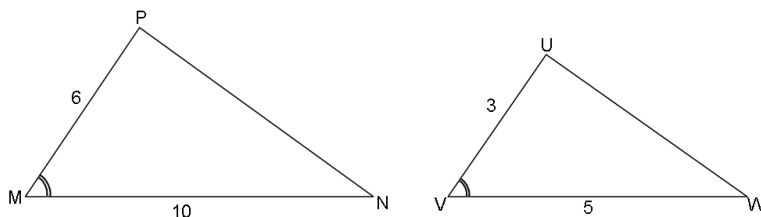a. 3   b. 4   c. 5   d. 6

B) Solve the following questions.   (4)

1) Prove the following
$\cos^2\theta \, (1 + \tan^2\theta) = 1$

2) Find the distance between each of the following pairs of points.
L $(5, -8)$, M $(-7, -3)$

3)
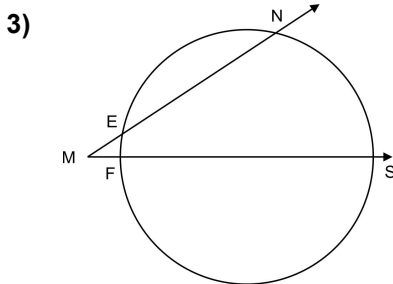
In the adjoining figure, m(arc NS) = 125° , m(arc EF) = 37°, find the measure of $\angle NMS$.

4) Are two triangles in figure similar, according to the information given? If yes, by which test?

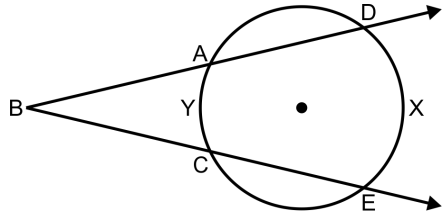**Q.2 A) Complete the following Activities. (Any two)**   (4)

1) If $\triangle ABC \sim \triangle PQR$ and AB : PQ = 2 : 3, then fill in the blanks.
$\dfrac{A(\triangle ABC)}{A(\triangle PQR)} = $ _____ $= \dfrac{2^2}{3^2} = $ _____

2) In the figure, if m (arc DXE) = 100° and m (arc AYC) = 40°, find ∠DBE.

$$\angle DBE = \frac{1}{2}\ [m\ (\underline{\quad\quad})\ \text{-}\ m\ (arc\ AYC)]$$

$$= \frac{1}{2}\ (\underline{\quad\quad})$$

$$= \frac{1}{2} \times \underline{\quad\quad}$$

$$= \underline{\quad\quad}$$

$$\angle DBE = \underline{\quad\quad}$$

3) Prove that : (secθ - cosθ) (cotθ + tanθ) = tanθ secθ.

LHS = (secθ - cosθ) (cotθ + tanθ)

$$= \left(\frac{1}{\cos\theta} - \cos\theta \right) \underline{\quad\quad} \qquad\qquad \left[\sec\theta = \frac{1}{\cos\theta}\ ,\ \cot\theta = \frac{1}{\tan\theta} \right]$$

$$= \underline{\quad\quad} \left(\frac{1 + \tan^2\theta}{\tan\theta} \right)$$

$$= \left(\frac{\sin^2\theta}{\cos\theta} \right) \left(\frac{\sec^2\theta}{\tan\theta} \right) \qquad\qquad \dots [\sin^2\theta + \cos^2\theta = 1,\ 1+\tan^2\theta = \sec^2\theta]$$

$$= \frac{\sin^2\theta}{\cos\theta} \times \frac{1/\cos^2\theta}{\sin\theta/\cos\theta} \qquad\qquad \dots \left[\tan\theta = \frac{\sin\theta}{\cos\theta} \right]$$

$$= \frac{\sin^2\theta}{\cos\theta} \times \frac{1}{\cos\theta \times \sin\theta}$$

$$= \underline{\quad\quad} \times \frac{1}{\cos\theta}$$

$$= \tan\theta \times \underline{\quad\quad}$$

$$\therefore \quad \underline{\quad\quad} = \text{RHS}$$

**B) Solve the following questions. (Any four)**   **(8)**

1) Prove that, any rectangle is a cyclic quadrilateral.

2) Find the centroids of the triangles whose vertices are given below.
(4, 7), (8, 4), (7, 11)

3) Do sides 7 cm, 24 cm, 25 cm form a right angled triangle? Given reason.

4) If tan A + $\frac{1}{\tan A}$ = 2, show that $\tan^2 A$ + $\frac{1}{\tan^2 A}$ = 2

5) Are the triangles in figure similar? If yes, by which test?
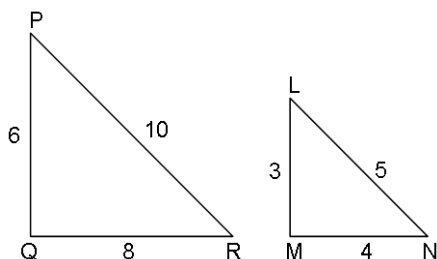
Q.3 A) Complete the following activity. (Any one)   **(3)**

1) In a △ABC, D and E are points on the sides AB and AC respectively such that DE ∥ BC. If AD = 2.4 cm, AE = 3.2 cm, DE = 2 cm and BC = 5 cm, find the BD and CE.
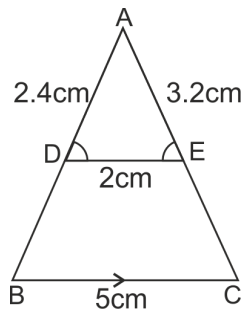
In $\triangle$ABC
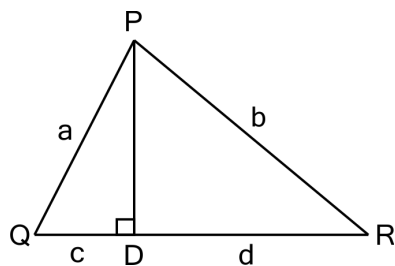
$\because$ DE $\parallel$ BC

$\therefore$ $\dfrac{AD}{AB}$ = _____

$\dfrac{2.4}{AB} = \dfrac{3.2}{AC} = \dfrac{2}{5}$

$\dfrac{2.4}{AB} = \dfrac{2}{5}$

AB = _____

    = 6cm

$\dfrac{3.2}{AC} = \dfrac{2}{5}$

and   AC = _____ = 8cm

$\therefore$ BD = _____

    = 6 - 2.4

    = _____

and   CE = AC - AE

    = 8 - 3.2

    = _____

2) In $\triangle$PQR PD$\perp$ QR, such that D lies on QR. If PQ = a, PR =b, QD=c and DR = d, Prove that (a + b) (a - b) = (c + d) (c - d).

Now in right $\triangle$PQD

PQ^2 = _____

PD^2 = PQ^2 - QD^2

    = _____   ... (1)

Similarly in right $\triangle$PDR

PR^2 = _____

PD^2 = PR^2 - DR^2

    = _____   ... (2)

From (1) and (2)

a^2 - c^2 = b^2 - d^2

_____ = c^2 - d^2

(a + b) (a - b) = _____

B) Solve the following questions. (Any two)   **(6)**

1)
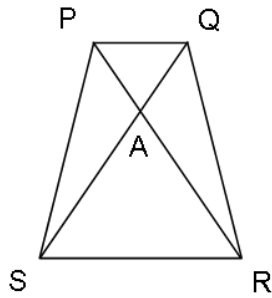
In trapezium PQRS, side PQ ∥ side SR, AR = 5AP, AS = 5AQ then prove that, SR = 5PQ.

2) Prove the following.

$$\frac{\sin A + \cos A}{\sin A - \cos A} + \frac{\sin A - \cos A}{\sin A + \cos A} = \frac{2}{\sin^2 A - \cos^2 A}$$

3) Prove that : If an angle has its vertex on the circle, its one side touches the circle and the other intersects the circle in one more point, then the measure of the angle is half the measure of its intercepted arc.

4) Prove that : In a right angled triangle, the square of the hypotenuse is equal to the sum of the squares of remaining two sides.

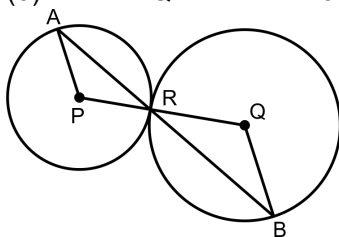## Q.4   Solve the following questions. (Any two)   (8)

1)
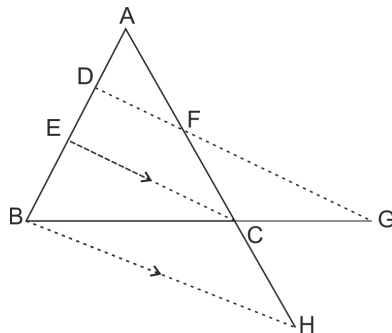
In the given figure, 2AD = BD, E is mid-point of BD and F is mid-point of AC and EC ∥ BH. Prove that :
i) DF ∥ BH
ii) AH = 3 AF.

2) Two building are in front of each other on either side of a road of width 10 meters. From the top of the first building, which is of 30 meters of height the angle of elevation of the top second is 45º what is the height of the other building?

3) In the circles with centres P and Q touch each other at R. A line passing through R meets the circles at A and B respectively. Prove
that -
(1) seg AP ∥ seg BQ,
(2) △APR ~ △RQB, and
(3) Find ∠RQB if ∠PAR = 35°

Q.5   Solve the following questions. (Any one)   (3)

1) Ramesh goes 24 km to south, then turns and goes to west for 10 km.
    i.   From the figen information, draw a proportionate figure.
    ii.   If starting point and end point are joined, then which type of triangle do we get ?

iii. At last how far is he from the starting point ?

2) In the figure, AB is the diameter of the circle with centre P. Line CB is a tangent to the circle at the point B. AC intersects the circle in the point D. Prove that AC $\times$ AD = 4 (radius)^2.