11/670/2016

**B**

# Second Terminal Evaluation - 2016
# MATHEMATICS

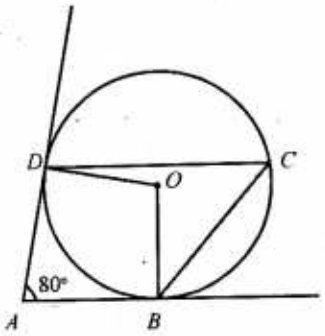
**Class: X**

**Time: 2½ hours**
**Score: 80**

***Instructions***

- The first 15 minutes is given as '**cool off time**'. You may read and understand the questions during this time.
- Answer all the questions.
- If there is an **OR** between any two questions, you may answer one among them.
- Simplification using irrationals like $\pi$, $\sqrt{2}$, $\sqrt{3}$ etc., with their approximate values is not required if not specified in the question.

1. In the figure, $AB$ and $AD$ are tangents to the circle. with centre at $O$, If $\angle BAD = 80°$, then find $\angle BOD$ and $\angle BCD$.

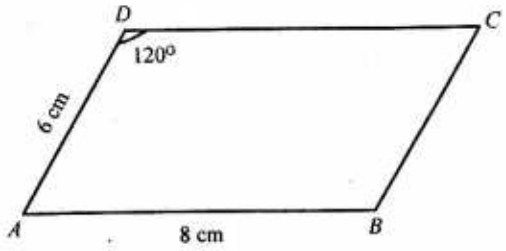



(2)

2. What is the slant height of a cone of base perimeter $12\pi$ cm and height 8 cm. (2)

3. The product of first two terms of an arithmetic sequence with common difference 6 is 135. Find the first term. (2)

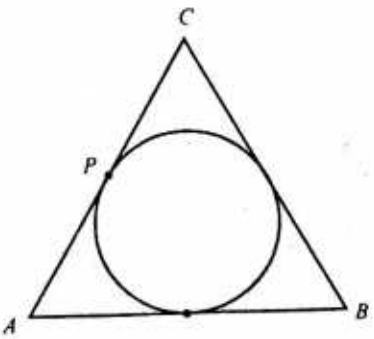
4. $ABCD$ is a parallelogram. $AB = 8$ cm, $AD = 6$ cm and $\angle D = 120°$. Find the area of the parallelogram.




(3)

5. $A(1,2)$, $B(6,4)$ and $C(8,9)$ are the vertices of the parallelogram $ABCD$. Find the co-ordinates of $D$. (3)

6. Perimeter of triangle $ABC$ is 20 cm and $AC = BC = 7$cm. What is $CP$?

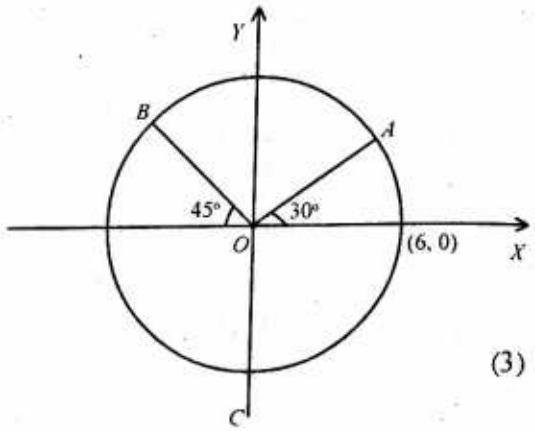



(3)

7. Lateral surface area of square pyramid with base area 196 sq. cm is 700 sq. cm. Find its
   a) Base edge
   b) Slant height
   c) Height
   (3)

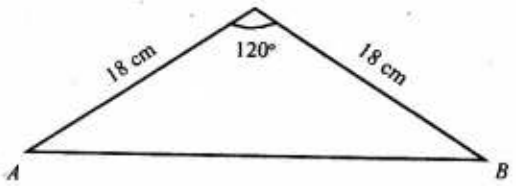
8. For a rectangle, area is 40 sq. cm, and perimeter 28 cm. Find the length and breadth of the rectangle.
   (3)

9. A circle with centre as origin passes through the point (6, 0).
   a) Find the radius of the circle.
   b) Write the co-ordinates of $A$ and $B$.

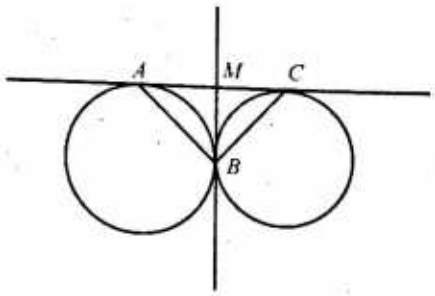



   (3)

10. In triangle $ABC$, $AC = BC = 18$ centimeter and $\angle ACB = 120°$.
   a) Find the perpendicular distance from $C$ to $AB$.
   b) What is the area of the triangle?
   c) What is the ratio of sides of the triangle with angles 30°, 30° and 120°?
   (4)




11. Two circles touches the point $B$. $AC$ and $BM$ are common tangents to these circles.
   a) Prove that $M$ is the midpoint of $AC$.
   b) Prove that triangle $ABC$ is right angled.
   (4)




12. Radius of a cylinder made by wax is 6 cm and its height is 8 cm. A cone of maximum size is carved out from this cylinder.
   a) Find the curved surface area of the cone.
   b) How many cylindrical candles of radius 1 cm and height 8 cm can be made using the remaining wax?
   (4)

13. Can you cut out a triangle having one angle 37° and side opposite to this angle as 9 cm from a circular cardboard sheet of radius 14 cm?

   [sin 37° = 0.60; cos 37° = 0.79; tan 37° = 0.75]
   (4)

***OR***

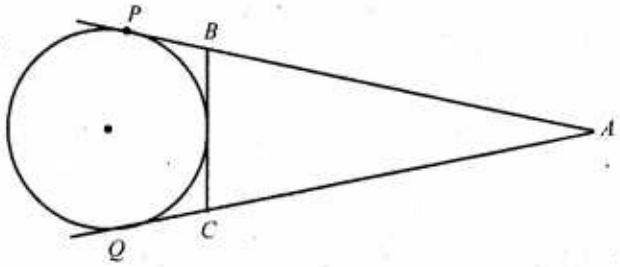
In triangle $ABC$, $AB = 14$ cm, $AC = 15$ cm, $\sin A = \frac{4}{5}$. Find the following:

a) The perpendicular distance from $C$ to $AB$.

b) The area of the triangle?

c) The length of $BC$?

14.




The point $A$ is at a distance of 13 cm from the centre of a circle of radius 5 cm. $PA$ and $AQ$ are tangents. $BC$ is another tangent.

a) Find the length of $PA$.

b) What is the perimeter of triangle $ABC$? (4)

15. Construct a triangle of inradius 3 cm and two angles 60° and 70°. Measure its sides. (4)

16. (3, –1) is point on the circle with centre at (6, 3).

a) What is the radius of the circle?

b) Is the circle cut the $y$ axis?

c) Find the co-ordinates of the points of intersection of the circle with $x$ axis. (4)

17. Find the ratio of base edge, slant height and height of a square pyramid with all its edges equal. (4)

18. If in triangle $ABC$, $AC = BC$; $\angle ACB = 80°$ and $AB = 16$ cm, then compute the following.

a) The perpendicular distance from $C$ to $AB$.

b) The area of triangle $ABC$.

c) The length of the sides $AC$ and $BC$. (4)

[$\sin 80° = 0.98$; $\sin 50° = 0.77$; $\tan 80° = 5.67$; $\tan 50° = 1.19$]

19. A ball starts to move along a straight line at a speed of 40 metres/second and the speed decreases at the rate of 4 metres/second every second. Write the algebra for the distance from the starting point to the ball after $t$ seconds.

At what time, the ball is 150 metres away from the starting point?

At what time, the ball is at a maximum distance from the starting point? (5)

***OR***

While solving a second degree equation, the coefficient of $x$ was written as –5 instead of 5. The solutions then found were 2 and 3. Find the solutions of the actual equation.

20. $A$ (–6, 5), $B$ (6, 10), $C$ (6, –4) are the vertices of the triangle $ABC$.

a) Find the length of the sides $AB$, $BC$ and $AC$.

b) Find the area of the triangle. (5)

21. From the top of a building, one sees the top of another taller building at an angle of elevation of 70° and bottom at an angle of depression of 40°.

a) Draw a rough figure and mark the measurements given.

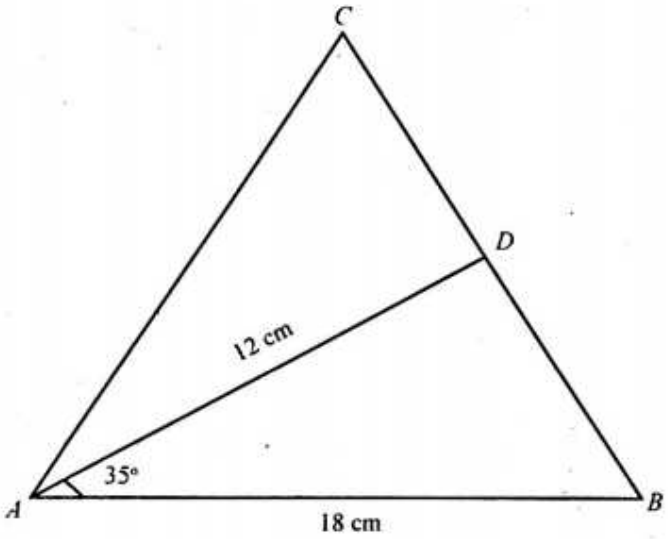
b) Find the height of the taller building. (5)

Necessary values can be taken from the table below.

| | 40° | 70° |
|---|---|---|
| sin | 0.64 | 0.94 |
| cos | 0.77 | 0.34 |
| tan | 0.84 | 2.75 |

***OR***

In triangle $ABC$, $AD$ is the median from $A$. $\angle BAD = 35°$, $AB = 18$ cm and $AD = 12$ cm.




Find

a) The ratio of the areas of the triangles $ADC$ and $ABC$.

b) The perpendicular distance from $D$ to $AB$.

c) The length of $BC$.

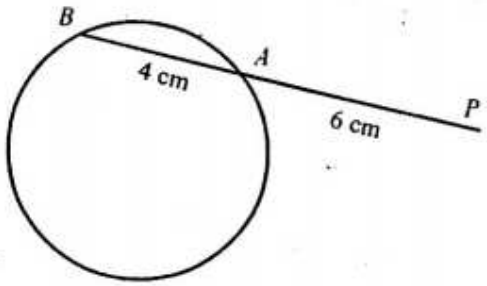
[sin 35° = 0.57; cos 35° = 0.82; tan 35° = 0.7]

22. Draw the figure using the given measurements. $PA = 6$ cm and $AB = 4$ cm.

a) Find the length of the tangent from $P$ to the circle.

b) Construct a tangent from $P$ to the circle.

c) Construct a square of area 60 sq. cm.




(5)