Unit 8 · Coordinate Geometry

WORKSHEET

Full marks 31

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 31

1 Key words [3]

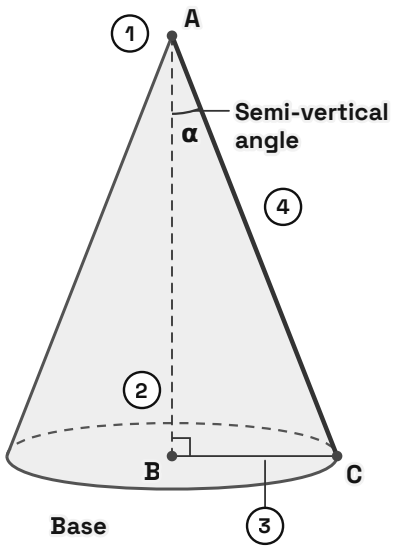
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

concentric **ellipse** **hyperbola** **parabola** **parallel** **perpendicular** **perpendicular bisector** **tangent**

Two lines are _____ when their slopes are equal, and _____ when the product of their slopes is -1. The line at right angles to a segment through its midpoint is its _____. Circles with the same center but different radii are called _____ circles. A plane that cuts a cone parallel to a generator makes a _____, and a plane that cuts both nappes of a double cone makes a _____.

2 Label the cone [2]

The drawing shows a right circular cone. Write the names of the parts left blank.



1. _____ **2.** _____

3. _____ **4.** _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. Which is the equation of the line through $(a, 0)$ and $(0, b)$? [1]

a. $\frac{x}{b} + \frac{y}{a} = 1$ **b.** $\frac{x}{a} + \frac{y}{b} = 1$

c. $bx + ay = 0$ **d.** $ax + by = 0$

ii. What is the slope of a line perpendicular to $2x - 5y + 7 = 0$? **[1]**

a. $\frac{2}{5}$ **b.** $-\frac{2}{5}$

c. $\frac{5}{2}$ **d.** $-\frac{5}{2}$

iii. What is the obtuse angle between $\sqrt{3}x - y - 5 = 0$ and $y + 10 = 0$? **[1]**

a. 120° **b.** 135°

c. 150° **d.** 160°

iv. A plane cuts a right circular cone at an angle to the axis smaller than the semi-vertical angle. Which conic section is formed? **[1]**

a. parabola **b.** ellipse

c. circle **d.** hyperbola

v. What are the center and radius of $x^2 + y^2 - 4x - 8y - 45 = 0$? **[1]**

a. center (2, 4), radius 5 units **b.** center (4, 8), radius 65 units

c. center (4, 8), radius $\sqrt{65}$ units **d.** center (2, 4), radius $\sqrt{65}$ units

4 Very short answers **[3]**

Write very short answers to the following questions.

a. Write the equation of the circle with center (h, k) and radius r. **[1]**

b. Find the diameter of the circle $x^2 + y^2 = 49$. **[1]**

c. Is the point $(3, -2)$ on the line $2x + 3y = 0$? Show why. **[1]**

5 Short answers **[8]**

Write short answers to the following questions. Show your working.

a. Find the line through (3, 1) parallel to the line joining (2, 3) and (3, −1). **[2]**

b. Find the mistake. Hari finds the center and radius of $x^2 + y^2 - 6x + 8y - 11 = 0$ like this: "$2g = -6$ and $2f = 8$, so the center is $(g, f) = (-3, 4)$ and the radius is $\sqrt{9 + 16 - 11} = \sqrt{14}$." Find his mistakes and give the correct answer. **[2]**

c. The lines $ax + 10y + 20 = 0$ and $4x - 8y + 7 = 0$ are parallel. Find a. **[2]**

d. The ends of a diameter are $(2, -4)$ and $(-3, 7)$. Find the equation of the circle. **[2]**

6 Long answers **[8]**

Solve the following problems. Show your working.

a. The points $A(2, 2)$, $B(2, 8)$ and $C(-6, 2)$ are the vertices of $\triangle ABC$. **[4]**

i. Find the midpoint M of BC.

ii. Find the length of the median AM.

iii. Find the equation of the median AM.

Answer:

b. A circle passes through $P(4, 1)$ and $Q(6, 5)$, and its center $C(h, k)$ lies on the line $4x + y = 16$. **[4]**

i. Using $CP = CQ$, show that $h + 2k = 11$.

ii. Find the center and the radius.

iii. Find the equation of the circle.

Answer: _____

7 Think **[2]**

Think, then answer.

Three stations record an earthquake. The first is at (0, 0) and the start is 5 units from it; the second is at (6, 0) and the start is 5 units from it too. Write the two circles' equations, subtract them, and say what the result tells you. Why is a third station still needed?

8 Activity: Points on a circle (not marked)

On graph paper, draw the circle with center O and radius 5 cm (1 cm to 1 unit) with a compass. Find every grid point that the circle passes through exactly, and check each with the equation $x^2 + y^2 = 25$.

Point (x, y)	x^2	y^2	$x^2 + y^2$	On the circle?
(3, 4)				
(2, 4)				