Chapter 10

Geometry and Algebra

Questions: 10.1–10.24

Concept : Distance between two points

Q.10.1 A circle is drawn with centrer at the origin and radius 10 units. Classify the points below as those within, on and outside this circle

$(-4, 12)$, $(8, -6)$, $(8, 2)$, $(10, 0)$

Score : 3, Time : 6 minutes

Concept : Distance between two points

Q.10.2 A line drawn from the origin cuts the circle centred at C at $A(3, 4)$ and $B(6, 8)$. The tangent from the origin to this circle touches it at P. Draw a rough sketch and calculate the length of the tangent OP

Score : 4, Time : 7 minutes

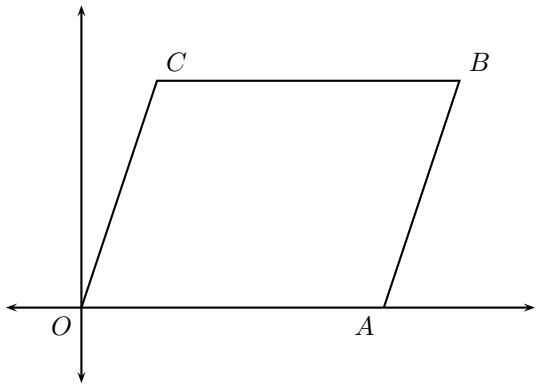
Concept : Distance between two points

Q.10.3 The vertices of a triangle are $O(0, 0)$, $A(6, 0)$, $B(2, 3)$. Draw a rough sketch of the axes and the triangle. Calculate the perimeter of the triangle

Score : 4, Time : 6 minutes

Concept : Distance between two points

Q.10.4 In the figure, $OABC$ is a parallelogram where the coordinates of C are $(2, 6)$ and the coordinates of B are $(10, 6)$



What are the coordinates of A? Find also the lengths of BC and OC.

Score : 3, Time : 4 minutes

Concept : Distance between two points

Q.10.5 The coordinates of some points are given below:

$A(2,4)$, $B(2,6)$, $C(5,4)$, $D(5,9)$, $E(8,4)$, $F(8,12)$

Calculate the lengths of AB, CD, EF and show that they are in arithmetic sequence.

Score : 3, Time : 5 minutes

Concept : Distance between two points

Q.10.6 A circle is drawn with its centre on the x-axis and radius 5 units and it passes through the point $(4,3)$. Taking the x-xoordinate of the centre as a, what are the coordinates of the centre in terms of a? Find the value of a and hence the coordinates of the centre.

Score : 5, Time : 12 minutes

Concept : Distance between two points

Q.10.7 A circle drawn with its centre on the x-axis passes through the points $(-5,12)$ and $(12,-5)$. Taking the x-coordinate of the center as p, find the value of p and hence the coordinates of the centre of the circle.

Score : 5, Time : 10 minutes

Concept : Distance between two points

Q.10.8 Draw the rough sketch of a circle passing through the points $(4,0)$, $(-3,2)$ and write down the coordinates of its centre

Score : 5, Time : 12 minutes

Concept : Distance between two points

Q.10.9 A is a point on the y-axis, equidistant from $(3, 5)$ and $(-2, 6)$. Draw a rough sketch. If the y-coordinate of A is p, what are the coordinates of A, in terms of p? Calculate the value of p and hence the coordinates of A.

Score : 5, Time : 10 minutes

Concept : Slope of a line

Q.10.10 What is the slope of the line joining $(3, 2)$ and $(5, 6)$? Is the point $(8, 12)$ on this line? Why?

Score : 3, Time : 5 minutes

Concept : Slope of a line

Q.10.11 A line of slope $\frac{2}{3}$ passes through the point $(4, 5)$. Does this line pass through $(8, 9)$? Find the coordinates of the point where this line meets the x-axis.

Score : 4, Time : 7 minutes

Concept : Slope of a line

Q.10.12 Prove that the line through the points $(-2, 5)$, $(3, 8)$ and the line through the points $(5, -2)$, $(8, 3)$ are not parallel. Write down the equation of a line parallel to one of these lines

Score : 4, Time : 9 minutes

Concept : Slope of a line

Q.10.13 What is the slope of the line through the points $(2, 5)$ and $(-3, -5)$? Write down the coordinates of a point on the line parallel to this and passing through $(4, 6)$

Score : 4, Time : 8 minutes

Concept : Slope of a line

Q.10.14 What is the point of intersection of the line through $(2, 6)$ with slope $\frac{1}{2}$ and the line through $(6, 2)$ with slope $-\frac{1}{2}$?

Score : 4, Time : 7 minutes

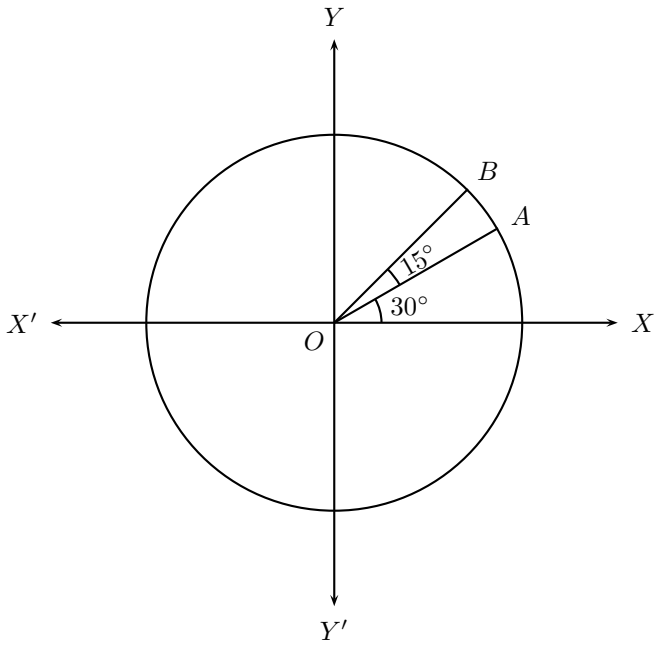
Concept : Slope of a line

Q.10.15 The coordinates of the points A, B, C are $(-2,-1)$, $(1,5)$ and $(3,9)$. Find the slopes of AB and BC. Prove that we cannot draw a triangle with A, B, C as vertices.

Score : 3, Time : 7 minutes

Concept : Slope of a line

Q.10.16 In the figure, the centre of the circle is the origin and its radius is 1 unit. The points A, B are on the circle with $\angle AOP = 30°$ and $\angle AOB = 15°$.



Find the coordinates of A and B. Also, find the relation between the slopes of the lines OA, OB and the tan measures of angles they make with the x-axis

Score : 5, Time : 10 minutes

Concept : Slope of a line

Q.10.17 Tangents are drawn at the endpoints A and B of the diameter of a circle. Two points on the tangent at A are $(4,5)$ and $(12,10)$ and one point on the tangent at B is $(8,5)$. Find the coordinates point on the tangent at B

Score : 4, Time : 7 minutes

Concept : Slope of a line

Q.10.18 Without drawing axes, draw a rough sketch showing the points $A(2,4)$, $B(8,4)$, $C(10,12)$, $D(4,12)$ marking them with their coordinates. Prove that $ABCD$ is a parallelogram

Score : 5, Time : 9 minutes

Concept : Equation of a line

Q.10.19 What is the slope of the line passing through the points $(5, 2)$ and $(8, 6)$? Find the equation of this straight line and find the coordinates of another point on it

Score : 4, Time : 8 minutes

Concept : Equation of a line

Q.10.20 Find the coordinates of any two points on the line $3x - 6y + 10 = 0$ and find the slope of this line

Score : 3, Time : 6 minutes

Concept : Equation of a line

Q.10.21 What is the slope of the line $4x + 2y - 9 = 0$? What is the equation of the line with the same slope, passing through $(4, 7)$?

Score : 5, Time : 10 minutes

Concept : Equation of a line

Q.10.22 A line is drawn through the points $(0, 2)$ and $(2, 4)$

(i) What is the slope of this line?

(ii) Find the coordinates of another point on this line

(iii) Prove the the y coordinate of any point on this line is 2 more than the x-coordinate.

Score : 5, Time : 10 minutes

Concept : Equation of a line

Q.10.23 What is the slope of the line joining $(2, 5)$ and $(3, 7)$? Find the equation of this line. Prove that if (x, y) is on this line, so is $(x + 1, y + 2)$.

Score : 4, Time : 9 minutes

Concept : Equation of a line

Q.10.24 Find the point of intersection of the lines $2x - 3y + 7 = 0$ and $3x + 2y - 9 = 0$. Find the equation of the line of slope $\frac{1}{2}$ through this point

Score : 5, Time : 10 minutes