

Question 1: Solve the following inequalities. State your answers using interval notation.

(a) $x^2 - x - 6 > 0$

[5]

(b) $\frac{3x + 6}{x - 5} \geq 0$

[5]

Question 2:

(a) Find the distance between the points $P(-4, 3)$ and $Q(-2, 5)$.

[3]

(b) Find the midpoint of the line segment joining the points $P(-4, 3)$ and $Q(-2, 5)$.

[3]

(c) Suppose $Q(-2, 5)$ is the midpoint of the line segment joining $P(-4, 3)$ and some other point $R(a, b)$. Find the coordinates a, b of R .

[4]

Question 3:

(a) Find the equation of the circle with center $(2, -3)$ and radius $3/4$.

[2]

(b) Determine (i) the center and (ii) the radius of the circle having equation

$$x^2 + y^2 + 8x - 6y + 16 = 0 .$$

[4]

(c) Find all points of intersection of the line $y = 1$ with the circle of radius 2 and center $(3, 0)$.

[4]

Question 4:

(a) Determine the domain of $f(x) = \frac{\sqrt{4x+1}}{x}$. State your answer using interval notation.

[3]

(b) Let $g(x) = x^2 - 3x + 2$. Find and simplify $g(2a + 1)$.

[3]

(c) Determine the value of a if the point $(3, 2)$ is on the graph of $f(x) = \frac{1}{2x - a}$.

[4]

Question 5:

(a) Find the slope and y -intercept of the line $5x - 2y = 10$.

[2]

(b) State an equation of the vertical line through the point $(-7, 3)$.

[2]

(c) Determine an equation of the line through the points $(-1, 3)$ and $(3, 4)$.

[3]

(d) Determine an equation of the line through the point $P(1, 6)$ that is perpendicular to the line $3x + 5y = 1$.

[3]