Solution

MA180 Professor Katiraie Spring 2007 Quiz One Form A

1. Use the distance formula to find the distance between the pair of points:

(3, 4) (−4, −6)

$D = \sqrt{(-4-3)^2+(-6-4)^2} = \sqrt{149}$

2) Find all the points having an *x*-coordinate of 9 whose distance from the point (3, −2) is 10.

(9, y) (3, −2) (9, 6) (9, −10)

$10 = \sqrt{(y+2)^2+(9-3)^2}$

$100 = (y+2)^2 + 36 \rightarrow 64 = (y+2)^2 \rightarrow \pm 8 = y+2$

$y = 8-2 = 6$

$y = -8-2 = -10$

3) Find the midpoint of the line segment joining the points (7, 1) and (−16, −16).

$\text{Midpoint} = \left(\frac{-16+7}{2}, \frac{-16+1}{2}\right) = \left(\frac{-9}{2}, \frac{-15}{2}\right)$

Solve the problem.

4) If (*a*, 3) is a point on the graph of $y = 2x - 5$, what is *a*?

$3 = 2a - 5$

$+5 \quad +5$

$8 = 2a \Rightarrow a = 4$

5) List the x-intercept(s) and y-intercept of the following:

$x^2 + y - 25 = 0$

$y = -x^2 + 25$

x-intercepts (5, 0) (−5, 0)

y-intercept (0, 25)

6) Determine whether the function is symmetric with respect to the y-axis, symmetric with respect to the x-axis, symmetric with respect to the origin, or none of these.

$y = 3x^2 - 2$

$f(-x) = 3(-x)^2 - 2 = 3x^2 - 2 = f(x)$

$f(-x) = f(x)$

Function is Even and it is symmetric w.r.t y-axis.

7) Solve the equation, and write your answer in interval notation.

$-1 \le -2x - 2 < 5$

$+2 \quad +2 \quad +2$

$1 \le -2x < 7$

$-\frac{1}{2} \ge x > -\frac{7}{2}$

$\left(-\frac{7}{2}, -\frac{1}{2}\right]$

8) Solve the equation, and write your answer in interval notation.

$|3x - 2| < 5$

$-5 < 3x - 2 < 5$

$+2 \quad +2 \quad +2$

$-3 < 3x < 7$

$\frac{-3}{3} < x < \frac{7}{3}$

$\left(-1, \frac{7}{3}\right)$

9) Solve the following:

$\sqrt{2x+3} - \sqrt{x} = 1$

$\sqrt{2x+3} = 1 + \sqrt{x}$ Now square both sides

$2x + 3 = (1 + \sqrt{x})(1 + \sqrt{x})$

$2x + 3 = 1 + 2\sqrt{x} + x$

$x + 2 = 2\sqrt{x}$ square both sides again

$x^2 + 4x + 4 = 4x \implies x^2 + 4 = 0$ No Real solutions

10) Write an equation of the line passing through the point (2, 1) and perpendicular to the line $y = -4x - 5$.

$y - 1 = \frac{1}{4}(x - 2)$

$y - 1 = \frac{1}{4}x - \frac{1}{2}$

$y = \frac{1}{4}x + \frac{1}{2}$

Solution

MA180 Professor Katiraie Spring 2007 Quiz One Form B

1. Find all the points having an x-coordinate of 9 whose distance from the point (3, –2) is 10.

$(9, y)$
$(3, -2)$

$10 = \sqrt{(y+2)^2 + (9-3)^2}$

$100 = (y+2)^2 + 36$

$64 = (y+2)^2$

$\pm 8 = y+2$ → $y = 8-2 = 6$, $y = -8-2 = -10$

$(9, 6)$ & $(9, -10)$

2) Find the midpoint of the line segment joining the points (7, 1) and (–16, –16).

$\text{Midpoint} = \left(\frac{-16+7}{2}, \frac{-16+1}{2}\right) = \left(\frac{-9}{2}, \frac{-15}{2}\right)$

3) **Use the distance formula to find the distance between the pair of points:**
(3, 4) (–4, –6)

$D = \sqrt{(-4-3)^2 + (-6-4)^2} = \sqrt{49 + 100} = \sqrt{149}$

4) **Solve the equation, and write your answer in interval notation.**

$-1 \le -2x - 2 < 5$
$+2 \quad +2 \quad +2$
$1 \le -2x < 7$
$\frac{-1}{2} \ge x > \frac{7}{-2}$

$\left(\frac{-7}{2}, -\frac{1}{2}\right]$

5) Write an equation of the line passing through the point (2, 1) and perpendicular to the line $y = -4x - 5$.

$m_{\perp} = \frac{1}{4}$

$y - 1 = \frac{1}{4}(x-2)$

$y = \frac{1}{4}x - \frac{2}{4} + 1 = \frac{1}{4}x + \frac{1}{2}$

6) Determine whether the function is symmetric with respect to the y-axis, symmetric with respect to the x-axis, symmetric with respect to the origin, or none of these.

$y = 3x^2 - 2$

$f(-x) = 3(-x)^2 - 2 = 3x^2 - 2 = f(x)$

So the function is even and it is symmetric w.r.t y-axis

7) If $(a, 3)$ is a point on the graph of $y = 2x - 5$, what is a?

$3 = 2a - 5$

$+5 \quad +5$

$8 = 2a \Longrightarrow \boxed{a = 4}$

8) Solve the equation, and write your answer in interval notation.

$|3x - 2| < 5$

$-5 < 3x - 2 < 5$

$+2 \quad +2 \quad +2$

$-3 < 3x < 7$

$\frac{-3}{3} < x < \frac{7}{3}$

$-1 < x < \frac{7}{3}$

$\boxed{(-1, \frac{7}{3})}$

9) Solve the following:

$\sqrt{2x+3} - \sqrt{x} = 1$

$\sqrt{2x+3} = 1 + \sqrt{x}$ square both sides

$(\sqrt{2x+3})^2 = (1+\sqrt{x})^2$

$2x+3 = (1+\sqrt{x})(1+\sqrt{x})$

$2x+3 = 1+2\sqrt{x}+x$

$x+2 = 2\sqrt{x}$

$(x+2)^2 = (2\sqrt{x})^2$

$x^2+4x+4 = 4x$

$x^2+4 = 0 \quad x^2 = -4$

No Real Solution

10) **List the x-intercept(s) and y-intercept of the following:**

$x^2 + y - 25 = 0$

$y = -x^2 + 25$

x-intercepts $(5, 0)$ $(-5, 0)$

y-intercept $(0, 25)$