Math 110 – Chapter 2 – Worksheet 1 – Version A

Graphs of Equations in Two Variables; Lines; Functions; Properties of Functions

Section 2.1 The Coordinate Plane – The Distance Formula, The Midpoint Formula

1. Find the distance between the points: $P(-2,5)$ and $Q(3,-4)$
2. Determine if the triangle with vertices $A(-2,0)$, $B(6,2)$ and $C(1,5)$ is an isosceles right triangle – that is, a right triangle with two sides of equal length.
3. A baseball diamond is a square with a distance of 90 feet between two consecutive bases. If the third baseman throws a ball to the first baseman, calculate the approximate distance the ball travels.
4. Find the midpoint of the line segment with endpoints $P(5,-2)$ and $P(6,-1)$.

Section 2.2 Graphs of Equations

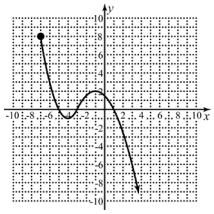
5. Sketch the graph of $y = -x^2 + 4$ be plotting points.
6. Find the x –intercept(s) and y –intercept of the graph of the equation $y = 2x^2 + 3x - 2$
7. Determine whether the graph of $x^2 - y^2 = 1$ is symmetric about the y –axis.
8. Determine whether the graph of $x^2 = y^3$ is symmetric about the x – axis, y – axis and the origin.
9. Find the standard form of the equation of the circle with center $(3,-6)$ and radius 10.
10. Graph the equation $(x-2)^2 + (y+1)^2 = 36$
11. Find the center and radius of the circle with equation $x^2 + y^2 + 4x - 6y - 12 = 0$.

Section 2.3 Lines

12. Find the slope of the line through $(-7,5)$ and $(6,-3)$.
13. Find the point-slope form of the equation of the line passing through $(-2,3)$ and with slope $-\frac{2}{3}$. Then solve for y.
14. Find the point-slope form of the equation of the line passing through the points $(-3,4)$ and $(-1,6)$. Then solve for y.
15. Find the point-slope form of the equation of the line with slope 2 and y – intercept –3. Then solve for y.
16. Graph the equation with slope $-\frac{2}{3}$ that contains the point $(0,4)$.
17. Graph the lines $x = -3$ and $y = 7$.
18. Graph the equation $3x + 4y = 24$.
19. Suppose the height H of a human male is related to the length x of his femur by the formula $H = 2.6x + 65$. If the femur of a person (male) measures between 43 and 44 centimeters, estimate the height of the person in meters.
20. Find the general form of the equation of the line through $(-2,5)$ and parallel to the containing $(2,3)$ and $(5,7)$.
21. Find the general form of the equation of the line through $(3,-4)$ and perpendicular to the line $4x + 5y + 1 = 0$.

Section 2.4 Functions

22. Determine whether each relation defines a function.
    a) $R = \{(2,1), (-2,1), (3,2)\}$
    b) $S = \{(2,5), (3,-2), (3,5)\}$
23. Determine whether y is a function of x for each equation.
    a) $2x^2 - y^2 = 1$
    b) $x - 2y = 5$
24. Let g be the function $g(x) = -2x^2 + 5x$. Find each function value
    a) $g(0)$
    b) $g(-1)$
    c) $g(x+h)$
25. Find the domain of each function.
    a) $f(x) = \frac{1}{\sqrt{1-x}}$
    b) $g(x) = \sqrt{\frac{x+2}{x-3}}$
26. Let $f(x) = x^2$ with domain $[-3,3]$.
    a) Is 10 in the range of f?
    b) Is 4 in the range of f?
    c) Find the range of f.
27. Let $f(x) = x^2 + 4x - 5$
    a) Is the point $(2,7)$ on the graph of f?
    b) Find all values of x so that $(x,-8)$ is on the graph of f.
    c) Find the $y-$ intercept of the graph of f.
    d) Find the $x-$ intercepts of the graph of f.
28. Find the domain and the range of $y = h(x)$ in figure given below.



29. Two points A and B are opposite to each other on the banks of a straight river that is 500 feet wide. The point D is on the same side as B but 1200 feet up the river from B. The local internet company wants to lay cable from A to D. The cost of the cable is \$5 per under water and \$3 per foot on land. To save money, the company lays the cable under water from A to P, a point in between B and D, and then on land from P to D. Let x be the distance between B and P. Write the total cost C as a function of x.
30. Metro Entertainment Company spent \$100,00 on production costs for its off-Broadway play Bride and Prejudice. Once the play runs, each performance costs \$1200 and the revenue from each show is \$2500. Using x to represent the number of shows,
    a) Write the cost function $C(x)$.
    b) Write the revenue function $R(x)$.
    c) Write the profit function $P(x)$.
    d) Determine how many showings of Bride and Prejudice must be held for Metro to break even.