CHAPTER 2 – GRAPH

Exercise 1.

In Problems 1–6, find the following for each pair of points:

(a) The distance between the points
(b) The midpoint of the line segment connecting the points
(c) The slope of the line containing the points
(d) Interpret the slope found in part (c)

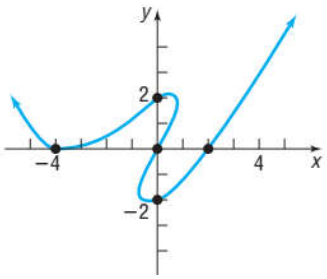
1. $(0,0);(4,2)$ **2.** $(0,0);(-4,6)$

3. $(1,-1);(-2,3)$ **4.** $(-2,2);(1,4)$

5. $(4,-4);(4,8)$ **6.** $(-3,4);(2,4)$

7. Graph $y = x^2 + 4$ by plotting points.

8. List the intercepts of the graph below.



Exercise 2.

In Problems 13 – 16, list the intercepts and test for symmetry with respect to the x-axis, the y-axis, and the origin.

13. $y = x^4 + 2x^2 + 1$ **14.** $y = x^3 - x$ **15.** $x^2 + x + y^2 + 2y = 0$ **16.** $x^2 + 4x + y^2 - 2y = 0$

Exercise 3.

In Problems 27–36, find an equation of the line having the given characteristics. Express your answer using either the general form or the slope–intercept form of the equation of a line, whichever you prefer.

27. Slope $= -2$; containing the point $(3,-1)$

28. Slope $= 0$; containing the point $(-5,4)$

29. Vertical; containing the point $(-3,4)$

30. x-intercept $= 2$; containing the point $(4,-5)$

31. y-intercept $= -2$; containing the point $(5,-3)$

32. Containing the points $(3,-4)$ and $(2,1)$

33. Parallel to the line $2x - 3y = -4$; containing the point $(-5,3)$

34. Parallel to the line $x + y = 2$; containing the point $(1,-3)$

35. Perpendicular to the line $x + y = 2$; containing the point $(4,-3)$

36. Perpendicular to the line $3x - y = -4$; containing the point $(-2,4)$

Exercise 4.

Graph the line with slope $2/3$ containing the point $(1,2)$.

Exercise 5.

Show that the points $A(-2,0), B(-4,4)$ and $C(8,5)$ are the vertices of a right triangle in two ways:
(a) By using the converse of the Pythagorean Theorem
(b) By using the slopes of the lines joining the vertices.

Exercise 6.

The endpoints of the diameter of a circle are $A(-3,2)$ and $B(5,-6)$. Find the center and radius of the circle. Write the standard equation of this circle.

Exercise 7.

In Problems 37–34, (a) find the center and radius r of each circle; (b) graph each circle; (c) find the intercepts, if any

27. $x^2 + y^2 + 4x - 4y - 1 = 0$ **28.** $x^2 + y^2 - 6x + 2y + 9 = 0$ **29.** $x^2 + y^2 - x + 2y + 1 = 0$

30. $x^2 + y^2 + x + y - \frac{1}{2} = 0$ **31.** $2x^2 + 2y^2 - 12x + 8y - 24 = 0$ **32.** $2x^2 + 2y^2 + 8x + 7 = 0$

33. $2x^2 + 8x + 2y^2 = 0$ **34.** $3x^2 + 3y^2 - 12y = 0$

Exercise 8.
Show that the points $A = (2,5), B = (6,1)$ and $C = (8,-1)$ lie on a line by using slopes

Exercise 9.
In Problems 35–42, find the standard form of the equation of each circle.

35. Center at the origin and containing the point $(-2, 3)$

36. Center $(1, 0)$ and containing the point $(-3, 2)$

37. Center $(2, 3)$ and tangent to the x-axis

38. Center $(-3, 1)$ and tangent to the y-axis

39. With endpoints of a diameter at $(1, 4)$ and $(-3, 2)$

40. With endpoints of a diameter at $(4, 3)$ and $(0, 1)$

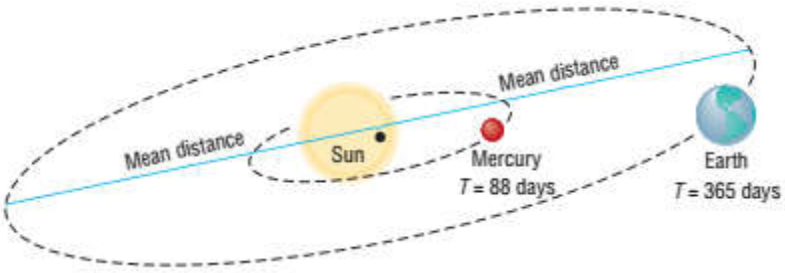
41. Center $(-1, 3)$ and tangent to the line $y = 2$

42. Center $(4, -2)$ and tangent to the line $x = 1$

Exercise 10.
Mortgage Payments. The monthly payment p on a mortgage varies directly with the amount borrowed B. If the monthly payment on a 30-year mortgage is $854.00 when $130,000 is borrowed, find an equation that relates the monthly payment p to the amount borrowed B for a mortgage with the same terms. Then find the monthly payment p when the amount borrowed B is $165,000.

Exercise 11.
Revenue Function At the corner Esso station, the revenue R varies directly with the number g of gallons of gasoline sold. If the revenue is $46.67 when the number of gallons sold is 13, find an equation that relates revenue R to the number g of gallons of gasoline. Then find the revenue R when the number of gallons sold is 11.2.

Exercise 12.
Kepler's Third Law of Planetary Motion Kepler's Third Law of Planetary Motion states that the square of the period of revolution T of a planet varies directly with the cube of its mean distance a from the Sun. If the mean distance of Earth from the Sun is 93 million miles, what is the mean distance of the planet Mercury from the Sun, given that Mercury has a "year"of 88 days?



HOMEWORKS
Exercise 1: 2;4;6
Exercise 2: 14, 16
Exercise 5
Exercise 6
Exercise 7: 30; 34
Exercise 9: 36;36;40
Exercise 11