1. Use the test-point method to solve the polynomial inequality.

$x^2 + 2x - 15 \le 0$

Move all terms to the left side of the inequality and then define the left side of the inequality as f(x). Then list the intervals determined by the real zeros of f. Complete the following table.
(Type your answers in interval notation. Use ascending order.)

Interval	$(-\infty,-5)$	$(-5,3)$	$(3,\infty)$
Sign	positive	negative	positive

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution is $[-5,3]$.
  (Type your answer in interval notation. Simplify your answer. Use integers or fractions for any numbers in the expression.)
- **B.** The solution is $\varnothing$.

---

2. Use the test-point method to solve the polynomial inequality.

$8x^2 + 6x - 9 \ge 0$

Move all terms to the left side of the inequality and then define the left side of the inequality as f(x). Then list the intervals determined by the real zeros of f. Complete the following table.
(Type your answers in interval notation. Use integers or fractions for any numbers in the expressions. Use ascending order.)

Interval	$\left(-\infty,-\frac{3}{2}\right)$	$\left(-\frac{3}{2},\frac{3}{4}\right)$	$\left(\frac{3}{4},\infty\right)$
Sign	positive	negative	positive

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution is $\left(-\infty,-\frac{3}{2}\right]\cup\left[\frac{3}{4},\infty\right)$.
  (Type your answer in interval notation. Simplify your answer. Use integers or fractions for any numbers in the expression.)
- **B.** The solution is $\varnothing$.

---

3. Use the test-point method to solve the polynomial inequality.

$x^2 \ge 9$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution set is $(-\infty,-3]\cup[3,\infty)$.
  (Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)
- **B.** The solution set is $\varnothing$.

---

4. Solve the rational inequality $\frac{x+4}{x-7} < 0$.

Move all terms to the left side of the inequality and then define the left side of the inequality as f(x). Then list the intervals determined by the real zeros of f and the real numbers for which f is undefined. Complete the following table.
(Type your answers in interval notation. Use integers or fractions for any numbers in the expressions. Use ascending order.)

Interval	$(-\infty,-4)$	$(-4,7)$	$(7,\infty)$
Sign	positive	negative	positive

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution is $(-4,7)$.
  (Type your answer in interval notation. Simplify your answer. Use integers or fractions for any numbers in the expression.)
- **B.** The solution is the empty set, $\varnothing$.

---

5. Solve the rational inequality $\frac{x+4}{x-5} < 0$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution set is $(-4,5)$.
  (Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)
- **B.** The solution is the empty set, $\varnothing$.

---

6. Solve the rational inequality $\frac{x+8}{x} < 0$.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution set is $(-8,0)$.
  (Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)
- **B.** The solution is the empty set, $\varnothing$.

---

7. Solve the rational inequality $\frac{x+3}{x+4} \le 3$.

Move all terms to the left side of the inequality and then define the left side of the inequality as f(x). Then list the intervals determined by the real zeros of f and the real numbers for which f is undefined. Complete the following table.
(Type your answers in interval notation. Use integers or fractions for any numbers in the expressions. Use ascending order.)

Interval	$\left(-\infty,-\frac{9}{2}\right)$	$\left(-\frac{9}{2},-4\right)$	$(-4,\infty)$
Sign	negative	positive	negative

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution is $\left(-\infty,-\frac{9}{2}\right] \cup (-4,\infty)$.
  (Type your answer in interval notation. Simplify your answer. Use integers or fractions for any numbers in the expression.)
- **B.** The solution is the empty set, $\varnothing$.

---

8. Solve the rational inequality $\frac{x+2}{x+3} \le 3$.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution set is $\left(-\infty, -\frac{7}{2}\right] \cup (-3, \infty)$.
(Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)

B. The solution is the empty set, $\varnothing$.

---

9. Solve the rational inequality $\frac{(x-2)(x+3)}{x} > 0$.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution set is $(-3,0) \cup (2,\infty)$.
(Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)

B. The solution is the empty set, $\varnothing$.

---

10. Solve the rational inequality $\frac{(x-4)(x+3)}{(x-5)(x+6)} \ge 0$.

Move all terms to the left side of the inequality and then define the left side of the inequality as f(x). Then list the intervals determined by the real zeros of f and the real numbers for which f is undefined. Complete the following table.
(Type your answers in interval notation. Use ascending order.)

Interval	$(-\infty, -6)$	$(-6, -3)$	$(-3,4)$	$(4,5)$	$(5,\infty)$
Sign	positive	negative	positive	negative	positive

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution is $(-\infty, -6) \cup [-3,4] \cup (5,\infty)$.
(Type your answer in interval notation. Simplify your answer. Use integers or fractions for any numbers in the expression.)

B. The solution is the empty set, $\varnothing$.

---

11. Solve the rational inequality $\frac{x^2-36}{x^2-64} \le 0$.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution set is $(-8, -6] \cup [6,8)$.
(Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)

B. The solution is the empty set, $\varnothing$.

---

12. Solve the rational inequality $\frac{x+6}{3x-2} \geq 1$.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution set is $\left(\frac{2}{3}, 4\right]$.

(Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)

B. The solution is the empty set, $\varnothing$.

13. Find (a) the distance between P and Q and (b) the coordinates of the midpoint of the line segment $\overline{PQ}$.

P(5,10), Q(5,1)

a. The distance between P and Q is 9.

(Simplify your answer. Type an exact answer, using radicals as needed.)

b. The coordinates of the midpoint of the line segment $\overline{PQ}$ are (5,5.5).

(Type an ordered pair. Use integers or decimals for any numbers in the expression.)

14. Find **(a)** the distance between P and Q and **(b)** the coordinates of the midpoint of the line segment PQ.

P(6,1), Q(7,3)

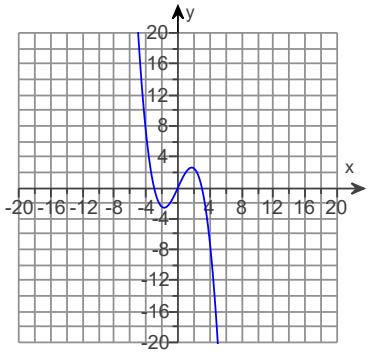
(a) The distance between P and Q is $\sqrt{5}$.

(Simplify your answer. Type an exact answer, using radicals as needed.)

(b) The coordinates of the midpoint of the line segment PQ are (6.5, 2).

(Type an ordered pair, using integers or decimals.)

15. Find **a.** x and y-intercepts. **b.** symmetries (if any) about the x-axis, the y-axis, and the origin.



a. Find the x-intercepts. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The x-intercept(s) is/are $-3, 0, 3$.
  (Type an integer or a fraction. Use a comma to separate answers as needed.)
- **B.** There are no x-intercepts.

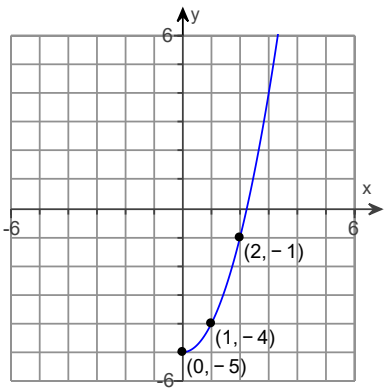
Find the y-intercepts. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The y-intercept(s) is/are 0.
  (Type an integer or a fraction. Use a comma to separate answers as needed.)
- **B.** There are no y-intercepts.

b. Select all that apply.

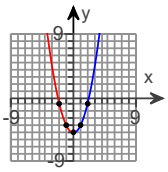
- [x] origin
- [ ] x-axis
- [ ] y-axis
- [ ] no symmetry

16. Draw a complete graph so that it has y-axis symmetry.

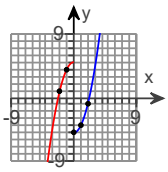


Choose the correct graph below.

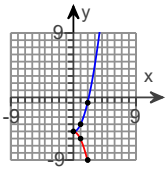
- **A.**



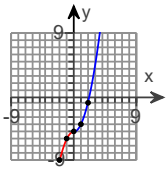
- **B.**



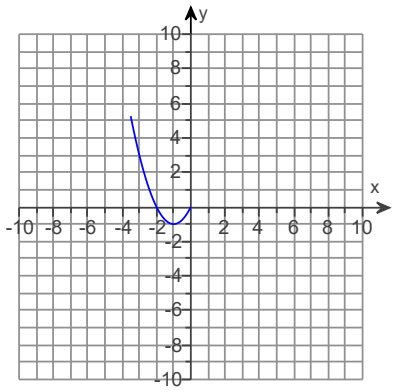
- **C.**



- **D.**

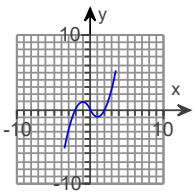


17. Complete the given graph so that it has the symmetry about the origin.

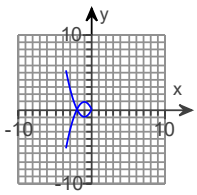


Choose the correct graph below.

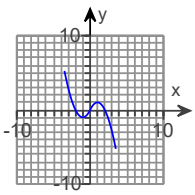
A.



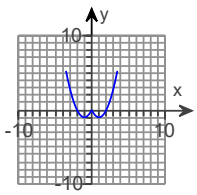
B.



C.



D.



18. Without sketching the graph, find the x-intercepts and y-intercepts of the graph of the equation.

$y = x^2 - x - 6$

What is/are the x-intercept(s)? Select the correct choice below and, if necessary, fill in the answer box within your choice.

A. The x-intercept(s) is/are $-2,3$.
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

B. There are no x-intercepts.

What is/are the y-intercept(s)? Select the correct choice below and, if necessary, fill in the answer box within your choice.

A. The y-intercept(s) is/are -6.
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

B. There are no y-intercepts.

19. Find the x- and y-intercepts of the graph of the equation.

$x^2 + y^2 = 4$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The x-intercept(s) is/are $-2,2$.
  (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)
- **B.** There are no x-intercepts.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The y-intercept(s) is/are $-2,2$.
  (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)
- **B.** There are no y-intercepts.

20. Specify the center and the radius of the circle.

$(x + 5)^2 + (y - 3)^2 = 4$

The center of the circle is $(-5,3)$.
(Type an ordered pair.)

The radius of the circle is 2.
(Simplify your answer. Type an exact answer, using radicals as needed.)

21. Specify the center and the radius of the circle below.

$(x + 5)^2 + (y + 1)^2 = 23$

What is the center of the circle?

$(-5, -1)$ (Type an ordered pair.)

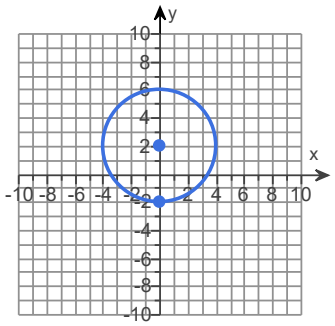
What is the radius of the circle?

$\sqrt{23}$ (Simplify your answer. Type an exact answer, using radicals as needed.)

22. Find the standard form of the equation of a circle with center (0,2) and radius 4. Graph the equation.

The standard form of the equation of the circle is $x^2 + (y - 2)^2 = 16$.
(Type an equation. Simplify your answer.)

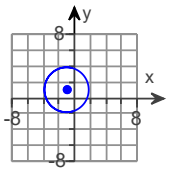
Use the graphing tool to graph the circle.

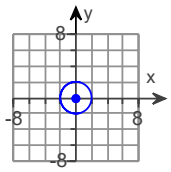


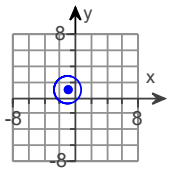
23. Find the standard form of the equation of a circle with center $(-1,1)$ and radius $\sqrt{3}$. Graph the equation.

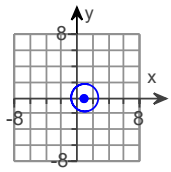
The standard form of the equation of the circle is $(x+1)^2+(y-1)^2=3$.
(Type an equation. Simplify your answer.)

Graph the equation. Choose the correct graph below.

A. 

B. 

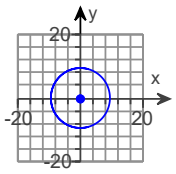
C. 

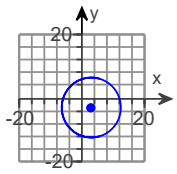
D. 

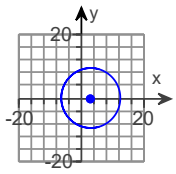
24. Find the standard form of the equation of a circle with center $(3,-3)$, passing through the point $(-5,2)$. Graph the equation.

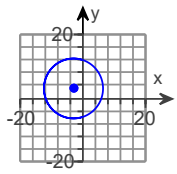
The standard form of the equation of a circle is $(x-3)^2+(y+3)^2=89$.
(Type an equation. Simplify your answer.)

Graph the equation. Choose the correct graph below.

A. 

B. 

C. 

D. 

26. **a.** Find the center and radius of the circle.
b. Find the x- and y-intercepts of the graph of the circle.

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

a. The center of the circle is $(3,3)$.
(Type an ordered pair.)

The radius of the circle is $\sqrt{26}$.
(Simplify your answer. Type an exact answer, using radicals as needed.)

b. Find the x-intercepts of the graph of the circle. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The x-intercept(s) is/are $3-\sqrt{17}, 3+\sqrt{17}$.
(Simplify your answer. Type an exact answer, using radicals as needed.
Use a comma to separate answers as needed.)

B. There are no x-intercepts.

Find the y-intercepts of the graph of the circle. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The y-intercept(s) is/are $3-\sqrt{17}, 3+\sqrt{17}$.
(Simplify your answer. Type an exact answer, using radicals as needed.
Use a comma to separate answers as needed.)

B. There are no y-intercepts.

27. **a.** Find the center and radius of the circle $2x^2 + 2y^2 - 32y = 0$.
b. Find the x- and y-intercepts of the graph of the circle $2x^2 + 2y^2 - 32y = 0$.

a. The center of the circle is $(0,8)$.
(Type an ordered pair.)

The radius of the circle is 8.
(Simplify your answer. Type an exact answer, using radicals as needed.)

b. Find the x-intercept(s) of the graph of the circle $2x^2 + 2y^2 - 32y = 0$. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The x-intercept(s) is/are 0.
  (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)
- **B.** There are no x-intercepts.

Find the y-intercept(s) of the graph of the circle $2x^2 + 2y^2 - 32y = 0$. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The y-intercept(s) is/are $0,16$.
  (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)
- **B.** There are no y-intercepts.

28. **a.** Find the center and radius of the circle $x^2 + y^2 + 7x = 0$.
b. Find the x- and y-intercepts of the graph of the circle $x^2 + y^2 + 7x = 0$.

a. The center of the circle is $\left(-\frac{7}{2},0\right)$.
(Type an ordered pair.)

The radius of the circle is $\frac{7}{2}$.
(Simplify your answer. Type an exact answer, using radicals as needed.)

b. Find the x-intercept(s) of the graph of the circle $x^2 + y^2 + 7x = 0$. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The x-intercept(s) is $-7,0$.
  (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)
- **B.** There are no x-intercepts.

Find the y-intercept(s) of the graph of the circle $x^2 + y^2 + 7x = 0$. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The y-intercept(s) is/are 0.
  (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)
- **B.** There are no y-intercepts.