

**4.6**

Name: \_\_\_\_\_

**In Exercises 1–8, identify the number of solutions or zeros.**

1.  $x^4 + 3x^3 - 4x^2 + 2x = 0$

2.  $3y^3 + y^2 - 3 = 0$

3.  $8q^5 - 4q^3 + 7q = 0$

4.  $6r^6 + 3r^4 - 7r^2 = 0$

5.  $-x^4 + 4x^3 + 4x^2 - 3x = 0$

6.  $3y^5 + 2y^3 - 5y = 0$

7.  $8q^3 - 5q^2 + 7q = 0$

8.  $9r^6 + 6r^5 - 7r^3 = 0$

**In Exercises 9 – 14, find all zeros of the polynomial function.**

9.  $f(x) = x^4 - 5x^2 - 36$

10.  $f(x) = x^4 + x^3 - 7x^2 - x + 6$

11.  $g(x) = x^4 - x^3 + 9x^2 - 9x$

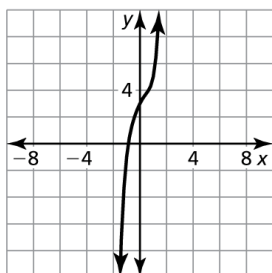
12.  $h(x) = x^4 - 11x^2 + 18$

13.  $g(x) = x^5 + 4x^4 + x^3 - 14x^2 - 20x - 8$

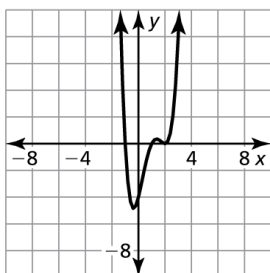
14.  $f(x) = x^5 + 2x^4 - 13x^3 - 26x^2 + 36x + 72$

In Exercises 15 – 18, determine the number of imaginary zeros for the function with the given degree and graph. Explain your reasoning.

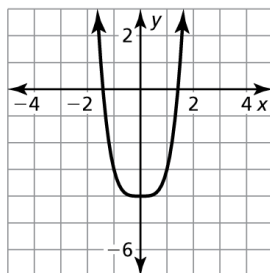
9. Degree: 5



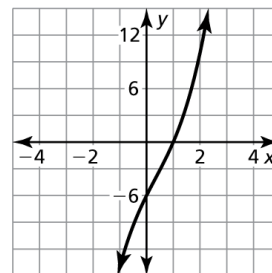
10. Degree: 4



11. Degree: 4



12. Degree: 3



In Exercises 19 - 24, write a polynomial function  $f$  of least degree that has rational coefficients, a leading coefficient of 1, and the given zeros.

19.  $-4, 1, 2$

20.  $2, 3, -1$

21.  $-1, 2, 3, 3$

22.  $0, 4, -3$

23.  $2i, 5$

24.  $-2, -3i$