

## Practice Test A

1. Find the  $x$ -intercepts for the graph of  $f(x) = x^2 - 6x + 2$ .
2. Graph  $f(x) = 3 - (x + 2)^2$ .
3. Find the vertex of the parabola described by  $y = -7x^2 + 14x + 3$ .
4. Find the domain of the function  $f(x) = \frac{x^2 - 1}{x^2 + 3x - 4}$ .
5. Find the quotient and remainder of  $\frac{x^3 - 2x^2 - 5x + 6}{x + 2}$ .
6. Graph the polynomial function  $P(x) = x^5 - 4x^3$ .
7. Find all the zeros of  $f(x) = 2x^3 - 2x^2 - 8x + 8$  given that 2 is one of the zeros.
8. Find the quotient:  $\frac{-6x^3 + x^2 + 17x + 3}{2x + 3}$ .
9. Find the value  $P(-2)$  of the polynomial  $P(x) = x^4 + 5x^3 - 7x^2 + 9x + 17$  using the Remainder Theorem.
10. Find all rational roots of the equation  $x^3 - 5x^2 - 4x + 20 = 0$  and then find the irrational roots, if any.
11. Find the zeros of the polynomial function  $f(x) = x^4 + x^3 - 15x^2$ .
12. For  $P(x) = 2x^{18} - 5x^{13} + 6x^3 - 5x + 9$ , list all possible rational zeros given by the Rational Zeros Test, but do not check to see which values are actually zeros.
13. Describe the end behavior of  $f(x) = (x + 3)^3(x - 5)^2$ .
14. Find the zeros and the multiplicity of each zero for  $f(x) = (x^2 - 4)(x + 2)^2$ .
15. Determine how many positive and how many negative real zeros the polynomial function  $P(x) = 3x^6 + 2x^3 - 7x^2 + 8x$  can have.

16. Find the horizontal and the vertical asymptotes of the graph of  $f(x) = \frac{2x^2 + 3}{x^2 - x - 20}$ .

17. Write an equation that expresses the statement, “ $y$  is directly proportional to  $x$  and inversely proportional to the square of  $t$ .”

18. In Problem 17, suppose  $y = 6$  when  $x = 8$  and  $t = 2$ . Find  $y$  if  $x = 12$  and  $t = 3$ .

19. The cost,  $C$ , of producing  $x$  thousand units of a product is given by

$$C = x^2 - 30x + 335 \text{ (dollars).}$$

Find the value of  $x$  for which the cost is minimum.

20. From a rectangular  $8 \times 17$  piece of cardboard, four congruent squares of side length  $x$  are cut out, one at each corner. The sides can then be folded to form a box. Find the volume,  $V$ , of the box as a function for  $x$ .

21. Write  $(2 + 3i)(3 - 2i)$  in the form  $a + bi$ .

22. Write  $\frac{3 + 5i}{1 - 3i}$  in the form  $a + bi$ .