
Unit 3 Polynomial Functions Test Review

Short Answer: Complete each problem on a separate sheet of paper. Must show appropriate work for credit!

1. What are the factors of $P(x) = 2x^3 + 7x^2 + 4x - 4$?

Solve the equation by graphing.

2. $-8x^3 - 13x^2 + 6x = 0$
3. Determine the remainder for $(5x^4 - 6x^3 + 2x - 8) \div (x + 3)$.

Factor the expression.

4. $x^4 - 20x^2 + 64$
5. $x^3 + 216$
6. Write $6x^3 - 12x^2 - 48x$ in factored form.
7. Use a graphing calculator to find the relative minimum, relative maximum, and zeros of $y = 3x^3 + 15x^2 - 12x - 60$. If necessary, round to the nearest hundredth.
8. Divide
 $(x^4 + 15x^3 - 77x^2 + 13x - 36) \div (x - 4)$
9. Find the zeros of $f(x) = (x - 2)^4(x + 4)^3$ and state the multiplicity.
10. Determine which binomial is a factor of $2x^3 + 4x^2 - 2x + 12$.
11. Find all zeros of $2x^4 - 5x^3 + 53x^2 - 125x + 75 = 0$.
12. Find $p(-2)$ and $p(5)$ for the function $p(x) = 7x^5 - 10x^4 - 7x^2 + 16x - 13$.

Given a polynomial and one of its factors, find the remaining factors of the polynomial. Some of the factors may not be binomials.

13. $64x^3 - 528x^2 - 1815x - 1331; x - 11$
14. A polynomial equation with rational coefficients has the roots $5 + \sqrt{1}, 4 - \sqrt{7}$. Find two additional roots.

15. For the polynomial function $y = x(x - 4)(x - 2)$
- Graph the very accurately.
 - Find the zeros (including a multiplicities), max/min values, and y-intercept.
16. What is the end behavior of the function $f(x) = -x^6 + x^5 - 3x^2$?
17. Miguel is designing shipping boxes that are rectangular prisms. One shape of box with height h in feet, has a volume defined by the function $V(h) = h(h - 8)(h + 10)$. Graph the function. What is the maximum volume for the domain $0 < h < 10$? Round to the nearest cubic foot.
18. Write a polynomial function in standard form with zeros at 4, -3, and 5.
19. Use synthetic substitution to find $g(4)$ and $g(-6)$ for the function $g(x) = x^5 - 9x^3 - 10x + 8$.
20. Ian designed a child's tent in the shape of a cube. The volume of the tent in cubic feet can be modeled by the equation $s^3 - 64 = 0$, where s is the side length. What is the side length of the tent?
21. Zach wrote the formula $w(w - 1)(2w + 4)$ for the volume of a rectangular prism he is designing, with width w , which is always has a positive value greater than 1. Find the product and then classify this polynomial by degree and by number of terms.
22. What is the degree of the function $g(x) = 3x^3 - 5x + 6x^4 - 2x^2 + 109$?

For the given graph,

- describe the end behavior,
- determine whether it represents an odd-degree or even-degree polynomial function, and
- state the number of real zeros.

23.

