LESSON 168 Review: Polynomial Equations and Functions

Try to complete as fast as you can. You may use a calculator unless otherwise specified.

1. $x^6 + 1 = (x^2 + 1)(x^4 + x^2 + 1)$

Determine if the equation above is an identity.

2. $2x^3 + 16$

Factor the polynomial above completely.

3. $x^4 + 3x^2 - 4$

Factor the polynomial above completely.

4. $3x^3 + x^2 - 12x - 4$

Factor the polynomial above completely.

5. $x^2(x-5)^3(x+5) = 0$

Find the solutions to the equation above and state their multiplicity.

6. $x^3 - x^2 = x$

Find the solutions to the equation above.

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

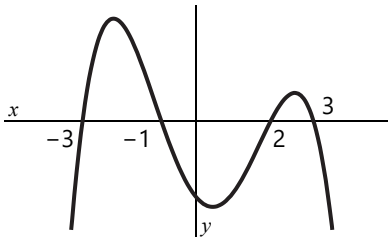
Find the solutions to the equation above.

8. Write a polynomial equation of least degree in standard form whose leading coefficient is 1 and whose solutions are 3, $2i$, and $-2i$.

9. Write a polynomial equation of least degree in standard form whose leading coefficient is 1 and whose solutions are 0, $2+\sqrt{5}$, and $2-\sqrt{5}$.

10. Write a polynomial equation of least degree in standard form whose leading coefficient is 1 and whose solutions are 0 (multiplicity 1), 2 (multiplicity 1), and 1 (multiplicity 2).

11. Which function could be graphed below?



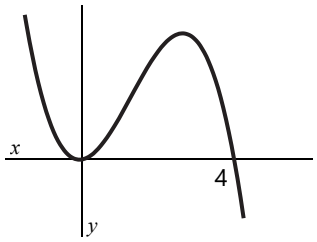
A) $f(x) = -(x+1)(x-2)(x^2+9)$

B) $f(x) = -(x+1)(x-2)(x^2-9)$

C) $f(x) = -(x-1)(x+2)(x^2+9)$

D) $f(x) = -(x-1)(x+2)(x^2-9)$

12. Which function could be graphed below?



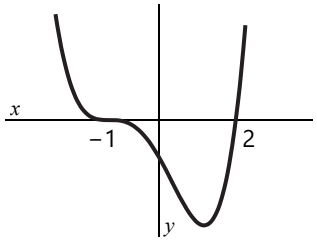
A) $f(x) = x^2(x+4)$

B) $f(x) = x^2(x-4)$

C) $f(x) = -x^2(x+4)$

D) $f(x) = -x^2(x-4)$

13. Which function could be graphed below?



A) $f(x) = (x+1)^3(x-2)$

B) $f(x) = (x+1)^2(x-2)^2$

C) $f(x) = (x-1)^3(x+2)$

D) $f(x) = (x-1)^2(x+2)^2$

14. $f(x) = -(x-1)^3(x+3)^2$

Which statement is true about the function above? Select all that apply.

A) The zero 1 has multiplicity 1.

B) The graph touches (not crosses) the x-axis at $x = -3$.

C) The function is positive over the interval $(-3, 1)$.

D) Both ends of the graph go down.

15. $f(x) = x^5 + 2x^4 + x^3$

Find the zeros of the function above. At each zero, state the multiplicity and if the graph touches or crosses the x-axis.

16. $f(x) = x(x-1)(x-3)$

Over what intervals is the function above positive? Write in interval notation.

17. $f(x) = -x^3 + 3x^2$

Over what intervals is the function above positive? Write in interval notation.

18. Write a polynomial function in standard form with zeros -2, 2, and 3 whose graph passes through $(0, 6)$.

19. Write a polynomial function in standard form with zeros 0 (multiplicity 2) and 2 (multiplicity 2) whose graph passes through $(1, 3)$.

20. (CHALLENGE) What is the sum of the solutions to $x^3(x^2 - 5) + 4x = 0$?

21. (CHALLENGE) If $x = 2i$ is a solution to $x^3 + bx^2 + cx - 4 = 0$ where b and c are integers, what are the values of b and c ?