LESSON 166 Review: Polynomial Operations and Functions

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

1. $(x^3 + 5x + 2 - x^2) - (1 - 2x^3)$

Simplify the expression above. Write your answer in standard form.

2. $(x + 2)(x - 4)$

Which expression is equivalent to the expression above?

A) $(x - 1)^2 - 8$

B) $(x - 1)^2 - 9$

C) $(x + 1)^2 - 8$

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

3. $(x^2 - 5x + 4)(x + 2)$

If the expression above is rewritten in the form $ax^3 + bx^2 + cx + d$, what is the value of $a + b + c + d$?

4. $2x^2 + 7x + 3$

Factor the expression above.

5. $3x - 4 + x(1 - x)$

Which expression is equivalent to the expression above?

A) $(x + 2)^2$ B) $-(x + 2)^2$

C) $(x - 2)^2$ D) $-(x - 2)^2$

6. $x^4 - 16$

Which is NOT a factor of the polynomial above?

A) $x + 2$ B) $x - 2$

C) $x + 4$ D) $x^2 + 4$

7. $\frac{4x^2 - 9}{2x + 1} = 2x + a + \frac{b}{2x + 1}$

Given the equation above, what is the value of ab ?

8. $(3x^3 - 2x^2 - 7x + 4) \div (x - 2)$

What are the quotient and remainder of the expression above?

9. $2x^3 + x^2 + kx - 6$

If the polynomial above is divisible by $x + 1$, what is the value of k ?

10. A polynomial $p(x)$ has $x + 5$ as a factor. Which statement is true about $p(x)$?

A) $p(5) = 0$ B) $p(-5) = 0$

C) $p(0) = 5$ D) $p(0) = -5$

11. Which relation is NOT a function?

A) $\{(1,1),(2,2),(3,3),(4,4)\}$

B) $\{(0,1),(0,3),(1,5),(1,7)\}$

C) $\{(2,6),(4,6),(6,6),(8,6)\}$

D) $\{(3,0),(1,5),(2,9),(4,3)\}$

12. $f(x) = -x + 2$

What is the range of the function above when the domain is $[-1,3)$? Write your answer in interval notation.

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

Given the function above, if $f(1) = 4$, what is the value of $f(-2)$?

14. If $f(x) = x^2 + 3x$, what is $f(x-2)$?

15. $f(x) = x - 2$

$g(x) = -x + 7$

Given the functions above, for what value of x is $(f/g)(x)$ is undefined?

16. Which function has a graph whose end behavior is the same as that of $y = x^3$?

A) $f(x) = 1$ B) $f(x) = x$

C) $f(x) = x^2$ D) $f(x) = |x|$

17. The graph of function g is the graph of function f stretched vertically by a factor of 3, reflected over the x-axis, and shifted up 2 units. Which correctly defines function g ?

A) $g(x) = 3f(-x) + 2$

B) $g(x) = 3f(-x) - 2$

C) $g(x) = -3f(x) + 2$

D) $g(x) = -3f(x) - 2$

18. $f(x) = -x^2 + 4x + 5$

What is the average rate of change of the function above over the interval $[0,5]$?

19. Determine if $f(x) = |x| - 6$ is even, odd, or neither.

20. If $f(x) = 2x - 3$, what is $(f + f^{-1})(1)$?

21. $g(x) = \begin{cases} 3 & if\ x < 0 \\ -x + 3 & if\ 0 \le x < 3 \\ 2x - 6 & if\ x \ge 3 \end{cases}$

What is the range of the function above? Write your answer in interval notation.

22. (CHALLENGE) If $f(3x-5) = x^2 - 2x$, what is the value of $f(1)$?