

Name: KEY
Algebra 2- Unit 7 Test Review

1. Classify the polynomial: $2x^3 + 2$

Cubic Binomial

2. Classify the polynomial: $33x^4 + 20x^2 - 12$

Quartic Trinomial

3. Determine the end behavior of $x^3 + 3x^2 - x$

Down - Up

4. Determine the end behavior of the graph of $f(x) = -x^2 + 4x - 12$

Down - Down

5. Determine the multiplicities of each zero:

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

3 multiplicity of 2

-1 multiplicity of 3

6. Factor $y = x^4 - 9x^2 + 14$

$$(x^2 - 2)(x^2 - 7)$$

7. Factor $y = 3x^4 - x^2 - 10$

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

8. Factor $y = x^3 - 5x^2 + 6x$

$$x(x-3)(x-2)$$

9. Factor $y = x^3 - 2x^2 - 23x + 60$ given $(x-3)$ is a factor.

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

10. Factor $y = x^3 - 27$

$$(x-3)(x^2 + 3x + 9)$$

11. Find ALL the roots. $x^4 - 3x^2 + 2 = 0$

$$x = \sqrt{2}, -\sqrt{2}, 1, -1$$

12. Find ALL the roots. $x^4 - 7x^2 + 12 = 0$

$$x = \sqrt{3}, -\sqrt{3}, 2, -2$$

For 13-18 use the following functions $f(x) = 2x^2 - 4x$ $g(x) = x - 5$

13. Find $(f + g)(x)$

$$2x^2 - 3x - 5$$

14. Find $f(x) - g(x)$

$$2x^2 - 5x + 5$$

15. Find $(f \cdot g)(x)$

$$2x^3 - 14x^2 + 20x$$

16. Find $\frac{f(x)}{g(x)}$

$$\frac{2x^2 - 4x}{x - 5}$$

17. Find $(g \circ f)(x)$

$$2x^2 - 4x - 5$$

18. Find $g^{-1}(x)$

$$g^{-1}(x) = x + 5$$

19. Determine the inverse of $f(x) = \frac{4x-9}{7}$

$$f^{-1}(x) = \frac{7x+9}{4}$$

20. Factor $x^4 - 7x^2 + 10$

$$(x^2 - 5)(x^2 - 2)$$

21. Find all roots of $x^4 - 7x^2 + 10 = 0$

$$x = \sqrt{5}, -\sqrt{5}, \sqrt{2}, -\sqrt{2}$$

For 22-25 and the bonus use:

$$f(x) = 3x^2 + 4 \text{ and } g(x) = 3x - 5$$

22. Determine $f(x) + g(x)$

$$3x^2 + 3x - 1$$

24. Determine $(g \circ f)(x)$

$$9x^2 + 7$$

23. Determine $f(x) \cdot g(x)$

$$9x^3 - 15x^2 + 12x - 20$$

25. Determine $g^{-1}(x)$

$$g^{-1}(x) = \frac{x+5}{3}$$

26. Determine $\frac{g(x)}{f(x)}$

$$\frac{3x-5}{3x^2+4}$$

Formulas:

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$