



Pre-Calculus

Week # 2

Chapter 3 Test, Form 2A

Determine whether the graph of each equation is symmetric with respect to the origin, the x-axis, the y-axis, the line $y = x$, the line $y = -x$, or none of these.

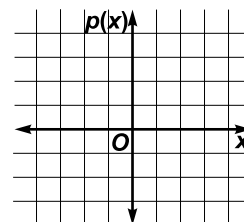
1. $xy = -4$ 1. _____

2. $x = 5y^2 - 2$ 2. _____

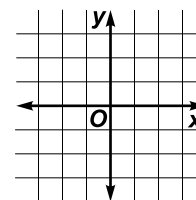
3. Determine whether the function $f(x) = \frac{x}{x^2 - 4}$ is odd, even, or neither. 3. _____

4. Describe the transformations relating the graph of $y = -2x^3 + 4$ to its parent function, $y = x^3$. 4. _____

5. Use transformations of the parent graph $p(x) = \frac{1}{x}$ to sketch the graph of $p(x) = \frac{1}{|x|} - 1$. 5.



6. Graph the inequality $y > 2x^2 - 1$. 6.



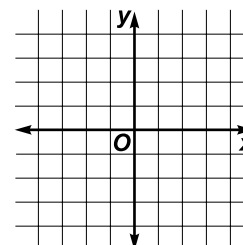
7. Solve $|5 - 2x| \geq 11$. 7. _____

Find the inverse of each function and state whether the inverse is a function.

8. $f(x) = \frac{x}{x + 2}$ 8. _____

9. $f(x) = x^2 - 4$ 9. _____

10. Graph $f(x) = x^3 - 2$ and its inverse. State whether the inverse is a function. 10.



Chapter 3 Test, Form 2A (continued)

Determine whether each function is continuous at the given x -value. If discontinuous, state the type of discontinuity (point, jump, or infinite).

11. $f(x) = \begin{cases} x^2 + 1 & \text{if } x < 1 \\ -x^3 + 2 & \text{if } x \geq 1 \end{cases}; x = 1$ 11. _____

12. $f(x) = \frac{x^2 + 9}{x + 3}; x = -3$ 12. _____

13. Describe the end behavior of $y = -3x^4 - 2x$. 13. _____

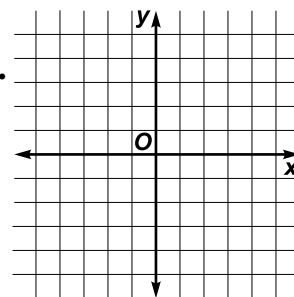
14. Locate and classify the extrema for the graph of $y = x^4 - 3x^2 + 2$. 14. _____

15. The function $f(x) = x^3 - 3x^2 + 3x$ has a critical point when $x = 1$. Identify the point as a maximum, a minimum, or a point of inflection, and state its coordinates. 15. _____

16. Determine the vertical and horizontal asymptotes for the graph of $y = \frac{x^2 - 4}{x^3 - 5x^2 + 6x}$. 16. _____

17. Find the slant asymptote for $y = \frac{3x^2 - 5x + 1}{x - 2}$. 17. _____

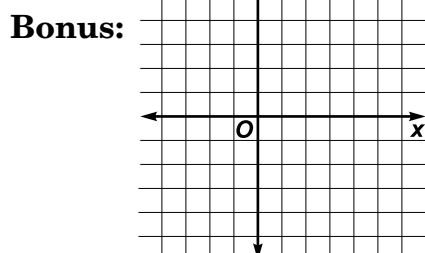
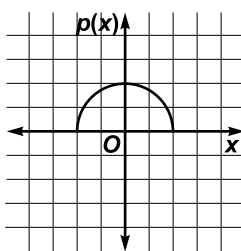
18. Sketch the graph of $y = \frac{x^2 - 1}{x^3 - x^2 - 12x}$. 18. _____



19. If y varies directly as x and inversely as the square root of z , and $y = 8$ when $x = 4$ and $z = 16$, find y when $x = 10$ and $z = 25$. 19. _____

20. **Physics** The kinetic energy E_k of a moving object, measured in joules, varies jointly as the mass m of the object and the square of the speed v . Find the constant of variation k if E_k is 36 joules, m is 4.5 kilograms, and v is 4 meters per second. 20. _____

Bonus Given the graph of $p(x)$, sketch the graph of $y = -2p\left[\frac{1}{2}(x - 2)\right] + 2$.



Chapter 4 Test, Form 2A

Solve each equation or inequality.

1. $(3x - 2)^2 = 121$ 1. _____

2. $\frac{3}{2}t^2 - 6t = -\frac{15}{2}$ 2. _____

3. $4 + \frac{4}{a+2} \geq \frac{4}{5}$ 3. _____

4. $\sqrt{2x+5} = 2\sqrt{2x} + 1$ 4. _____

5. $\sqrt{12b-3} \leq \sqrt{5b+2}$ 5. _____

6. $\frac{2}{x+2} + \frac{x}{2-x} < \frac{13}{4-x^2}$ 6. _____

7. $\sqrt{d-6} - 3 = \sqrt{d}$ 7. _____

8. Use the Remainder Theorem to find the remainder when $x^5 + x^3 + x$ is divided by $x - 3$. State whether the binomial is a factor of the polynomial. 8. _____

9. Determine between which consecutive integers the real zeros of $f(x) = 4x^4 - 4x^3 - 25x^2 + x + 6$ are located. 9. _____

10. Decompose $\frac{-3x-19}{2x^2-5x-3}$ into partial fractions. 10. _____

11. Find the value of k so that the remainder of $(x^4 - 3x^3 + kx^2 - 10x + 12) \div (x - 3)$ is 0. 11. _____

12. Approximate the real zeros of $f(x) = 2x^4 + 3x^2 - 20$ to the nearest tenth. 12. _____

Chapter 4 Test, Form 2A (continued)

13. Use the Upper Bound Theorem to find an integral upper bound and the Lower Bound Theorem to find an integral lower bound of the zeros of $f(x) = 2x^3 - 4x^2 + 2$. **13.** _____

14. Write a polynomial function with integral coefficients to model the set of data below. **14.** _____

x	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9
$f(x)$	7.3	11.2	12.1	11.2	8.0	6.2	3.5	2.5	2.2	5.7	12.0

15. Find the discriminant of $5x - 3x^2 = -2$ and describe the nature of the roots of the equation. **15.** _____

16. Find the number of possible positive real zeros and the number of possible negative real zeros for $f(x) = 2x^4 - 7x^3 - 5x^2 + 28x - 12$. **16.** _____

17. List the possible rational roots of $2x^3 + 3x^2 - 17x + 12 = 0$. **17.** _____

18. Determine the rational roots of $x^3 - 6x^2 + 12x - 8 = 0$. **18.** _____

19. Write a polynomial equation of least degree with roots -2 , 2 , $-3i$, and $3i$. How many times does the graph of the related function intersect the x -axis? **19.** _____

20. Francesca jumps upward on a trampoline with an initial velocity of 17 feet per second. The distance $d(t)$ traveled by a free-falling object can be modeled by the formula $d(t) = v_0t - \frac{1}{2}gt^2$, where v_0 is the initial velocity and g represents the acceleration due to gravity (32 feet per second squared). Find the maximum height that Francesca will travel above the trampoline on this jump. **20.** _____

Bonus Find f if f is a cubic polynomial function such that $f(0) = 0$ and $f(x)$ is positive only when $x > 4$. **Bonus:** _____