

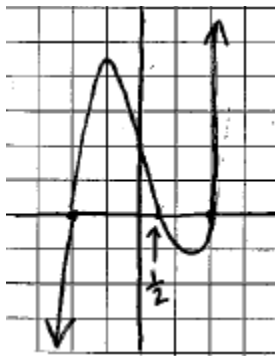
Topic 3 Test Review

Name _____

1. For $x^2 - 4x^3 + 7x - x^4 + 2$, which of the following statements is true?

- A. The degree of the polynomial is 3.
- B. The polynomial is a trinomial.
- C. The leading coefficient is -1.
- D. Written in standard form, the polynomial is $-4x^3 - x^4 + x^2 + 7x + 2$

2. The graph of function f is shown. Use the zeros and the turning points of the graph to find the rule for the function, f .



- A. $2x^3 - x^2 - 8x + 6$
- B. $x^3 - \frac{1}{2}x^2 - 4x + 2$
- C. $x^3 - x^2 - 8x + 4$
- D. $2x^2 - \frac{1}{2}x^2 - 4x + 2$

3. Simplify $(10x^2 - 7x^3) - (3x^2 + 6x^3 - x + 2)$

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

5. Is $x - 2$ a factor of $P(x) = x^3 - 7x^2 + 17x - 14$? If so, write $P(x)$ as a product of two factors.

6. Mark cuts 4 squares with a side length x in. from the corners of a 12in by 8 in cardboard rectangle. He folds the remaining cardboard to make a tray that is x in. high. Write and simplify a function for the volume V of the tray in terms of x .

7. Use polynomial identities to factor $27 - 8a^3$.

8. Use the binomial theorem to expand $(2x - 3y)^5$.

9. Use synthetic division to divide $x^4 + 4x^3 + 3x^2 + 12x + 12$ by $x + 3$.

10. Sketch a graph of the polynomial function $f(x) = x^3 + 3x^2 - 10x - 24$

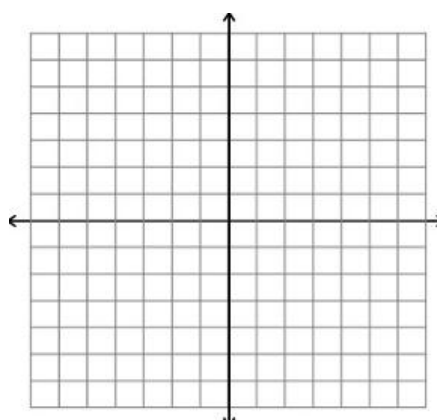
Increasing, decreasing, positive, negative

f is _____ on the intervals
 $(-\infty, -4) \cup (-2, 3)$

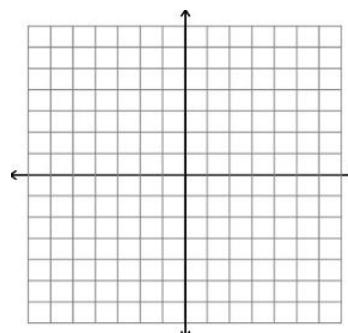
f is _____ on the intervals
 $(-3.1, 1.1) \cup (4.5, \infty)$

f is _____ on the intervals
 $(-4, -2) \cup (3, \infty)$

f is _____ on the interval
 $(-\infty, -3.1) \cup (1.1, \infty)$



11. Sketch the graph of $f(x) = x^3 + 3x^2 + 2x$ by finding the zeros.



12. What is the remainder when $f(x) = 3x^4 - 5x^3 + x^2 - 7$ is divided by $x - 2$?

13. Find the zeros of the function and describe the behavior of the graph at each zero (i.e., does it touch at the x-axis or cross the x-axis?).

A. $f(x) = x^3 + x^2 - 20x$

B. $f(x) = x^3 - 4x^2 + 4x$

14. List all the possible rational solutions of $3x^4 + 2x^3 + 5x^2 - 7x + 8$.

15. What are all the real and complex solutions of $x^3 - 6x^2 + x = -34$?

16. How does the graph of the function $f(x) = x^3 + 5$ differ from the graph of its parent function?

17. If a cubic function has a rational zero, a , and two irrational zeros, \sqrt{b} and $-\sqrt{b}$, where b is rational. What do we know about the coefficients of this function?

Will there be any complex numbers?

Will there be any irrational numbers?

Will there be any rational numbers?

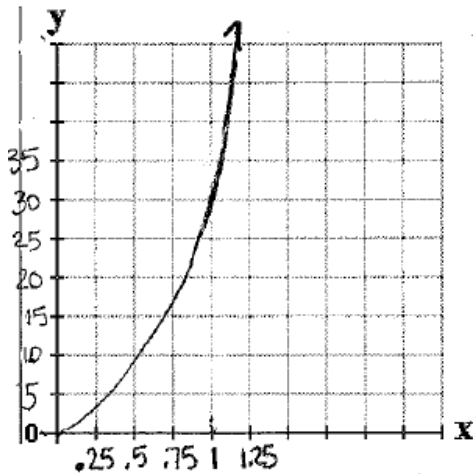
18. State whether the following functions are odd, even, or neither.

A. $f(x) = 3x^3 - x$

B. $f(x) = x^5 + x^3 - 5$

C. $f(x) = x^6 - 4x^4 + 2$

19. The volume of a cube with side length $2x$ is $V(x) = 8x^3$. The volume of a sphere with a radius of $2x$ is shown in the graph. When $x = 1$, which volume is greater?



20. Factor $49y^6 - 9x^4$