

Target 4A: End Behavior of Polynomials

Describe the end behavior of each function

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

2. $f(x) = -3x^7 + 2x^2 - 1$

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

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

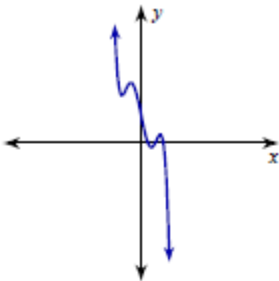
Target 4B: Graph Polynomial Functions

Which graph shows the general sketch of each function?

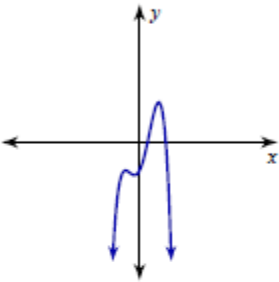
5. $f(x) = 2x^2 - 16x + 31$

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

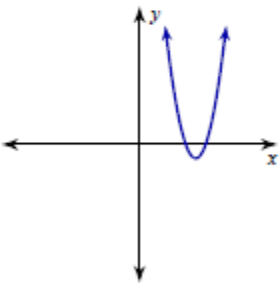
A)



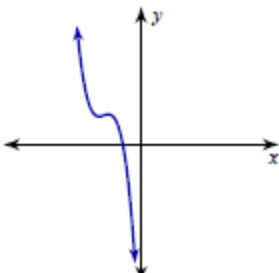
B)



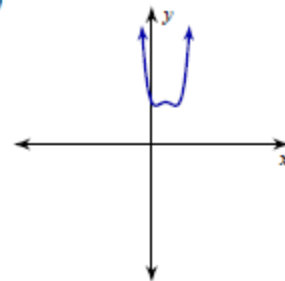
C)



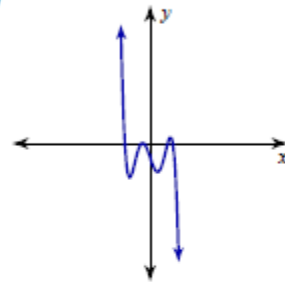
D)



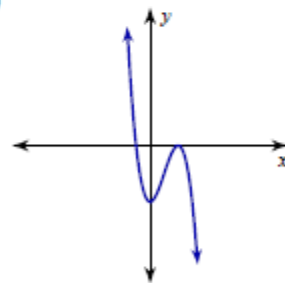
A)



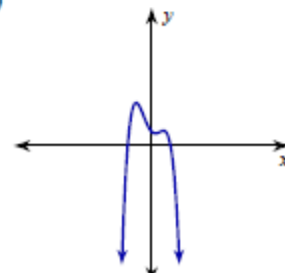
B)



C)



D)



Target 4C: Addition, Subtraction, and Multiplication of Polynomials

Simplify each expression

7. $(2a^3 + 3a^2 + 7a) + (a^4 + a^2 - 2a)$

8. $(4x^2 + 13x + 9) + (12x^2 + x + 6)$

9. $(3x^2 - 2x + 9) - (x^2 - x + 7)$

10. $(3c^2 - 8c + 4) - (7 + c^3 - 8c)$

11. $(6p + 8)(5p - 8)$

12. $(4p - 1)^2$

13. $(7r^2 - 6r - 6)(2r - 4)$

14. $(2n + 6)^3$

Target 4D: Division of Polynomials

15. $(a^4 - 5a^3 - 13a^2 + 53a + 60) \div (a + 1)$

16. $(2m^4 - 5m^3 - 10m + 8) \div (m - 3)$

17. Is $(b + 1)$ a factor of $(2b^3 + b^2 - 2b + 3)$? Explain how you know.

18. What is the value of k such that $(n^3 + 2n^2 + kn + 12) \div (n + 4)$ has a remainder of 4? (Hint: you may have to work backwards at some point or try "guess and check", if all else fails)

Target 4E: Find zeros of polynomials

19. If a factor in the following polynomial is $(x - 2)$, use division to find the other factors and list the zeros.

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

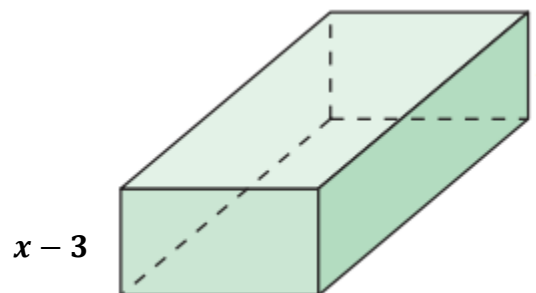
Factors: _____

Solutions: _____

20. The volume (V) of any rectangular prism can be found using the formula " $V = Bh$ ", where B is the base area and h is the height of the prism.

For this rectangular prism, its volume can be expressed using the polynomial: $V = 2x^3 + 7x^2 - 18x - 63$

What is the expression for the length of the base? What is the expression for the width of the base?



Length of the base: _____

Width of the base: _____

Target 4F: Fundamental Theorem of Algebra and Finding Solutions

Given a polynomial, identify the number of solutions or zeros.

21. $0 = x^4 + 2x^3 - 4x^2 + x$

Total number of solutions: _____

23. $g(y) = 4y^5 - 3y^3 + 2y^7 - 2$

Total number of zeros: _____

25. For $f(x) = -2(x + 3)^2(x - 1)^3$,

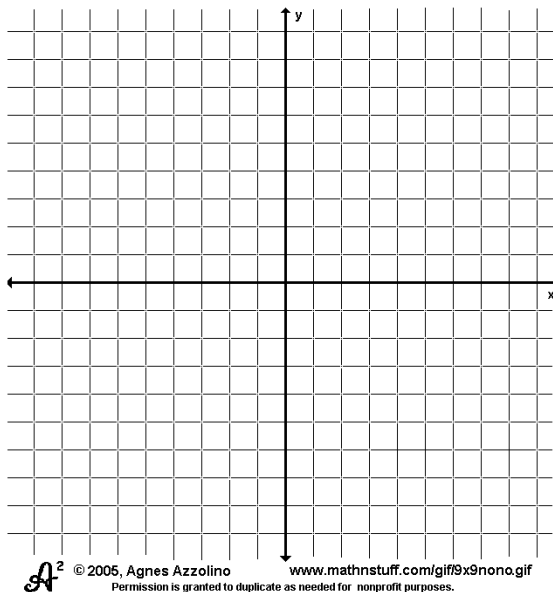
- Determine end behavior
- zeros of the function
- y-intercept
- Sketch the general shape of the polynomial

22. $-3x^{10} + 5x^9 - 2x^5 + 2x = 0$

Total number of solutions: _____

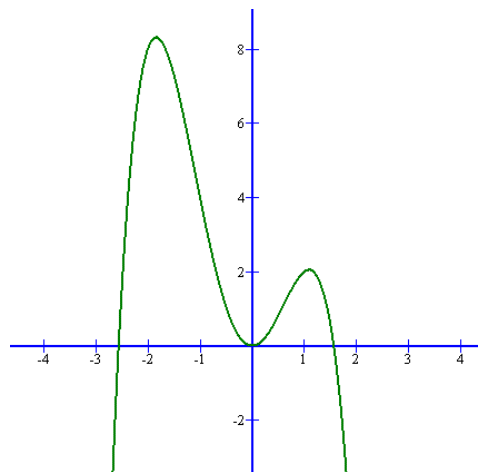
24. $h(x) = 5x^4 + 7x^8 - x^{12}$

Total number of zeros: _____



26. The degree of the graph at the right is 4.

- How many real roots?
- How many imaginary roots?



Write the polynomial function of least degree with integral coefficients whose zeros include the following.

27. 6 and $2i$

28. 4, -1, and $-3i$