

Polynomial Division, Factors, and Graphs

Factor completely and sketch:

1. $f(x) = x^3 - 2x^2 - 4x + 8$

2. $p(x) = x^3 - 3x + 2$

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

4. $z(x) = 2x^4 - x^3 - 26x^2 - 11x + 12$

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

6. $q(x) = 8x^4 + 52x^3 + 66x^2 + 31x + 5$ (has factor $x + 5$)

7. $y = x^3 - 7x^2 - 5x + 75$ (has zero $x = -3$)

8. $p(x) = x^4 - 10x^3 + 35x^2 - 56x + 48$ (has a zero $x=4$, multiplicity 2)

9. $y = x^5 + x^4 - 2x^3 - 5x^2 - 5x - 2$ (has factor $x^2 + x + 1$)

10. $f(x) = 6x^3 + 41x^2 - 9x - 14$ (has factor $2x + 1$)

Use synthetic substitution to evaluate.

11. $f(x) = 2x^3 - 5x^2 + 3x - 4$, find $f(1)$

12. $g(x) = 5x^4 - x^2 + 2x - 3$, find $g(-2)$

13. $h(x) = -3x^4 + 5x^3 + x^2 - 6$, find $h(-3)$

14. $j(x) = -4x^3 + 1$, find $j(2)$

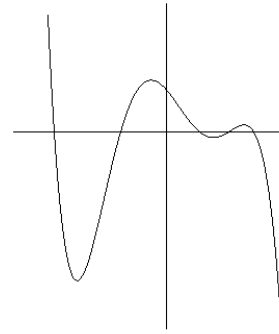
HAT 10/9/17

Name: _____

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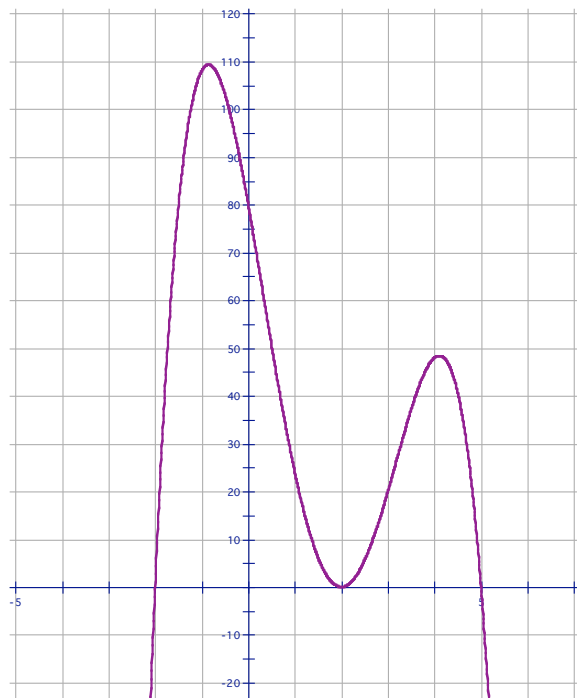
15. The graph of polynomial p is given.

- Is the degree of p even or odd?
- Is the leading coefficient of p positive or negative?
- Write limit statements for the end behavior.



16. If 4 , $1 + \sqrt{3}$ and $1 - \sqrt{3}$ are the zeros of a cubic polynomial $p(x)$, and $(0, -2)$ is the y -intercept. Find the equation for $p(x)$. Expand $p(x)$. Show a sketch of $p(x)$.

17. Find an equation for this graph. Account for the x - and y -intercepts!



18. **Challenge:** Prove why synthetic substitution works.