

PART 1: END BEHAVIOR

1. What is the degree of the polynomial $f(x) = 5(x-2)^2(x+4)(x-5)^3$? Explain how you know.

2. What is the leading coefficient of $f(x) = 5(x-2)^2(x+4)(x-5)^3$

3.
 - a. Explain why $5x^6 \rightarrow \infty$ as $x \rightarrow \pm \infty$.

 - b. Hence, describe the END BEHAVIOR of $f(x) = 5(x-2)^2(x+4)(x-5)^3$.

4. What is the degree and leading coefficient of $g(x) = -10x(x-3)^4$?

5.
 - a. Explain why $-10x^5 \rightarrow \infty$ as $x \rightarrow -\infty$ and $-10x^5 \rightarrow -\infty$ as $x \rightarrow \infty$.

 - b. Hence, describe the END BEHAVIOR of $g(x) = -10x(x-3)^4$.

6. GENERALIZATION:
END BEHAVIOR of polynomial depends on the DEGREE (odd or even) and LEADING COEFFICIENT (positive or negative). Complete the table:

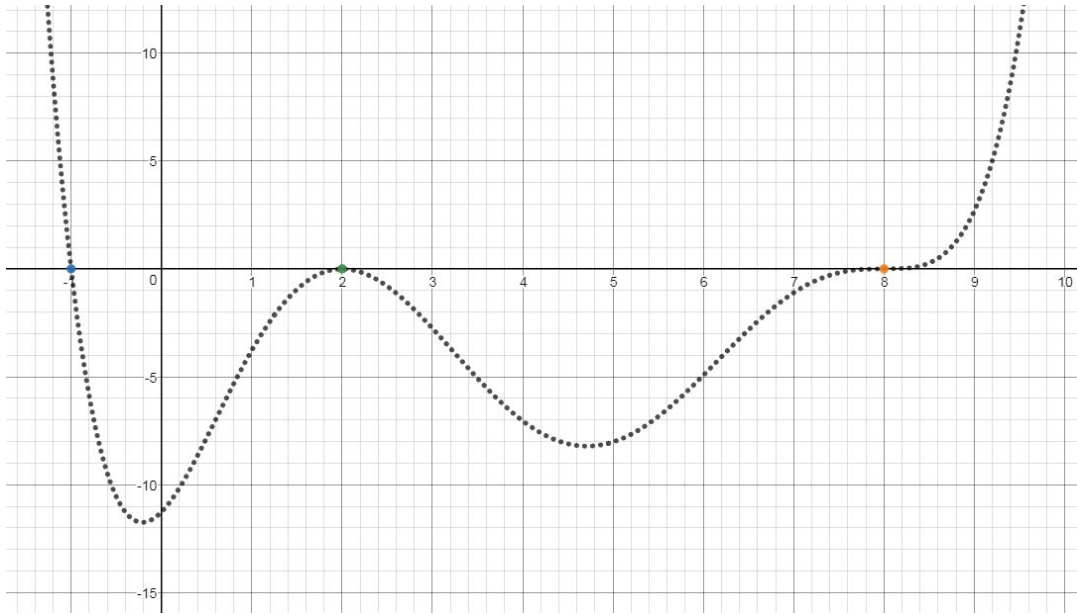
Degree	Leading Coefficient	END BEHAVIOR
ODD	Positive	
ODD	Negative	
EVEN	Positive	
EVEN	Negative	

PART 2: MULTIPLICITY

7. What are the roots of $f(x) = 0.0055(x - 2)^2(x + 1)(x - 8)^3$?

8. What is the MULTIPLICITY of each root from #7?

9. The graph of $f(x) = 0.0055(x - 2)^2(x + 1)(x - 8)^3$ is shown below. The BEHAVIOR AT A ROOT depends on the MULTIPLICITY. Describe what the function looks like AT THE ROOT for each x-intercept. Use the MULTIPLICITY as a reference for your description.



10. Which function best fits the graph shown?
Explain your choice.

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

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

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

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

