2.2 End Behavior of Polynomials

2.2 NOTES

ALGEBRA 2

What makes a Polynomial Function?

Degree:

Leading Coefficient:

End Behavior:

Give the ***Degree*** and ***Leading Coefficient*** of the following polynomials:

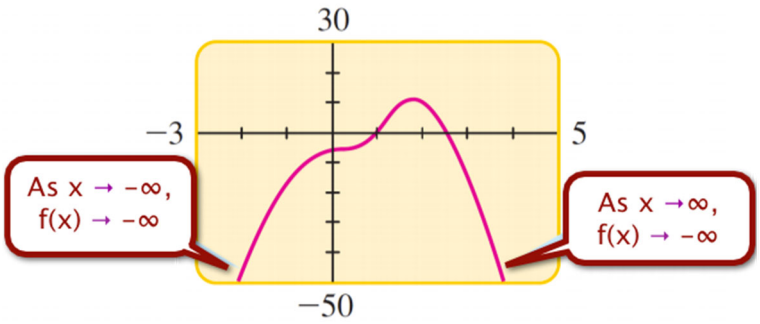
$F(x) = -2x^5 + 3x^3 - 4x^2$ $\qquad$ $R(w) = -0.6w^8 + 3.2w^3 - 4w$

$G(x) = x^{13} - 9x^6 - 4x^2$ $\qquad$ $F(r) = 3r^4(r-4)(r-2)^3$

End Behavior

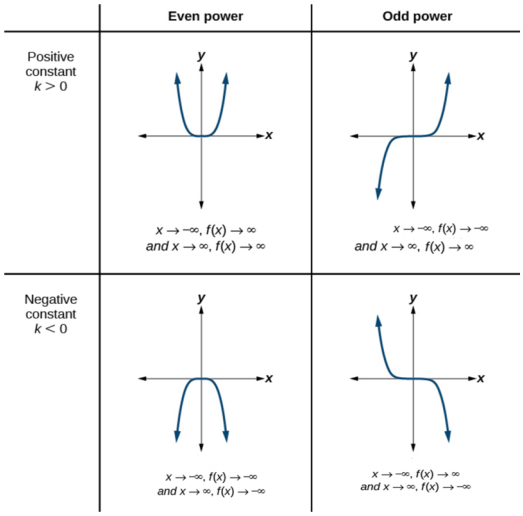
We can see that the **DEGREE** and **LEADING COEFFICIENT** determine what happens on both sides of the graph (left and right).

$$P(x) = -2x^4 + 5x^3 + 4x - 7$$



If the degree is even:

If the degree is odd:



To determine

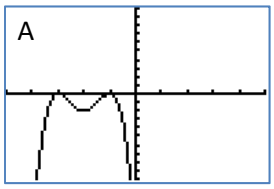
Determine the ***end behavior*** of the following polynomials:

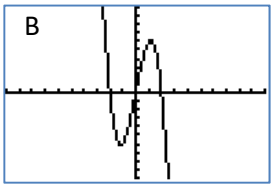
$F(x) = -2x^5 + 3x^3 - 4x^2$ $\qquad$ $R(w) = -0.6w^8 + 3.2w^3 - 4w$

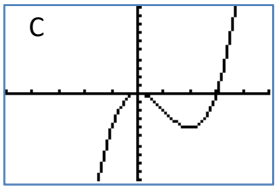
$G(x) = x^{13} - 9x^6 - 4x^2$ $\qquad$ $F(r) = 3r^4(r-4)(r-2)^3$

Match the function to the graph using its ***end behavior***.

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







SUMMARY:

Now, summarize your notes here!

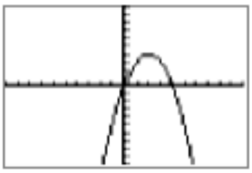
2.2 End Behavior of Polynomials

2.2 PRACTICE

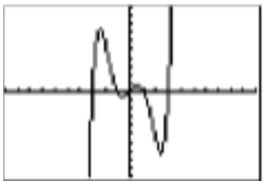
Are the following functions Polynomial Functions? If they are not, explain why. If they are, give the degree of the function.

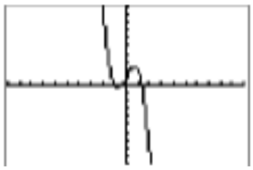
1. $M(s) = -0.55s^5 + 55s^2 - 5$
2. $I(w) = 20w^6 + 12w^2 - 11w^{-2}$
3. $P(x) = 22x^4 - 3x^3 - 2^x$

Give the leading coefficient, the degree and the end behavior (if possible).

4. $F(x) = (x-2)^2$
5. $G(x) = -3x^5 - 3x^2$
6. 

7. $Y(q) = -3q^6 + 12q^2 - 4q$
8. $G(x) = (x+7)^7(x-3)$
9. $Z(d) = 0.003d^5 - 0.0012d^4 - 0.0081d$

10. $T(y) = y(y+1)^7(y-3)$
11. $G(x) = x^5 - 5x^{68}$
12. 

13. 
14. $F(x) = -8x$
15. $D(x) = -2x^2(x-5)(x+5)$

2.2 End Behavior of Polynomials

2.2 PRACTICE

1. Give the end behavior of the following functions:

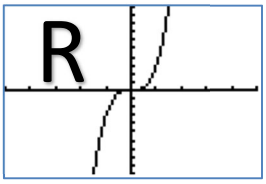
   a. $R(t) = 3t^4 + 12t^2 + 10$

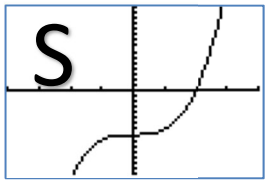
   b. $F(x) = -3(x-1)^{12}(x-3)^{13}$

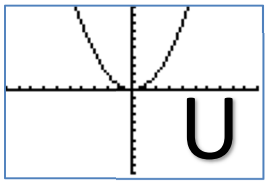
2. Create a polynomial function that satisfies the given criteria:

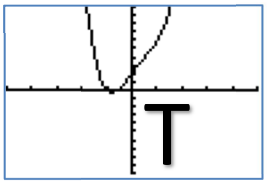
✓ the left and right end behavior is the same ✓ the leading coefficient is negative ✓ the degree is greater than 6. $F(x) =$ _____	✓ the left and right end behavior is opposite ✓ the leading coefficient is negative ✓ the right end behavior is decreasing $F(x) =$ _____

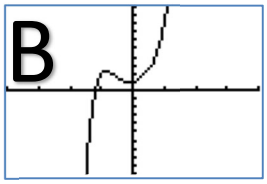
3. Write the letter of the graph that corresponds with each equation on the line above the equation.











_____ $F(x) = 3x^5 - 3x^3 + 4x + 2$

_____ $G(x) = 3x^3$

_____ $F(x) = \frac{1}{2}x^2$

_____ $F(x) = x^3 - 8$

_____ $F(x) = 4x^4 - 3x^3 + 4x + 2$

EXIT TICKET

Explain below how knowing the degree and leading coefficient of a polynomial can help you determine the end behavior. Use a complete sentence.