

POLYNOMIAL GRAPHS

$$f(x) = 2$$

constant

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

linear

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

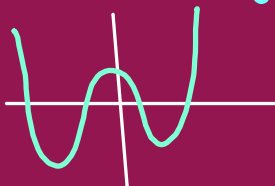
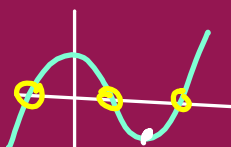
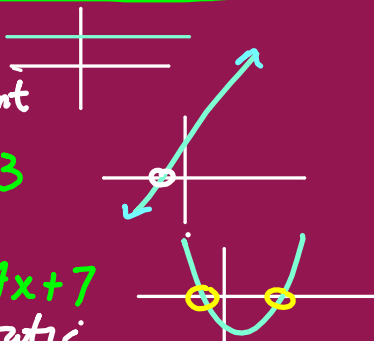
quadratic

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

cubic

$$f(x) = x^4 - 4x^3 - 9x^2 + 16x + 20$$

quartic



- one or more terms
- whole # exponents

Degree — the highest exponent

of x-int $\leq$ degree

of peaks/valleys $\leq$ Degree - 1

odd degree = ends go in opposite directions

even degree — ends go in same direction

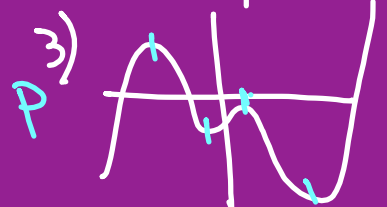
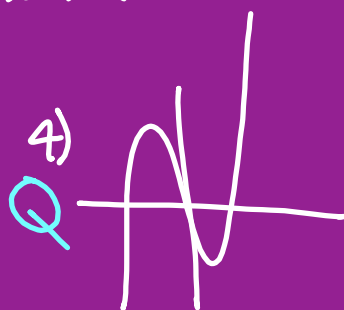
P. $f(x) = x^7 + 3x^5 - 2x^2 + 1$ 

Q. $f(x) = 2x^3 + x$ $\downarrow p/r = 7-1=6$ 

R. $f(x) = -x^6 + 2x^4 - 3x^2 + x + 7$ $\downarrow p/r = 7-1=6$ 

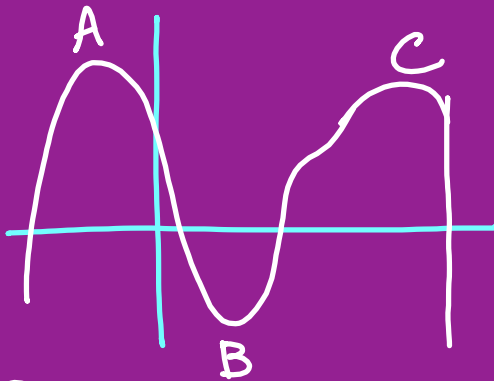
S. $f(x) = -x^3 + 2x^2 - 4$

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



S 2)





Find the real # solutions of the polynomial.

$$f(x) = x^5 - 3x^4 + x^3 + 5x^2 - 6x - 1$$

$$0 =$$

Find zeros.

Relative maximum — any peak = A, C

Relative minimum — any valley = B

Absolute maximum = the highest pt = A

Absolute minimum = the lowest pt. = None

Name _____

POLYNOMIALS HANDOUT

For each function, determine if it is a polynomial and then state the degree, the name, and the leading coefficient.

1. $f(x) = -3x + 5x^3 - 6x + 2$

2. $f(x) = 9x^4 + 8x^3 - 6x^{-2} - 1$

3. $f(x) = 3x^4 = 2x - \frac{5}{x} + 9x^2 - 7$

4. $f(x) = \frac{5}{3}x^2 - \sqrt{7}x^4 + 8x^3 - \frac{1}{2} + x$

Match each function and graph.

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

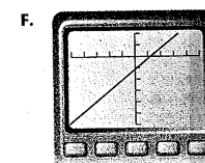
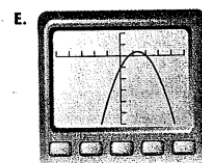
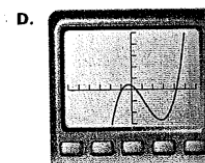
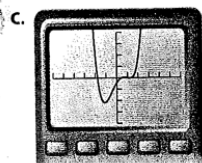
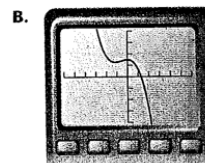
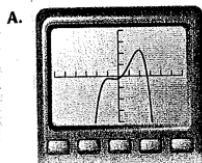
6. $f(x) = -x^4 + x^3 + 4x^2 + 2x - 1$

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

8. $f(x) = 4x - 5$

9. $f(x) = 2x^4 - 2x^3 - 5x^2 + 7x - 2$

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



11. $f(x) = 9x^3 - 4 + x^2$

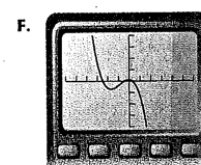
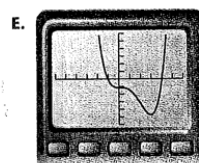
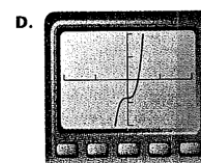
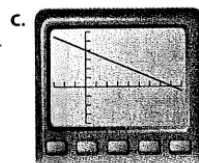
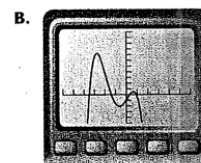
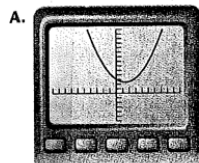
12. $f(x) = 0.4x^2 - x + 3$

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

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

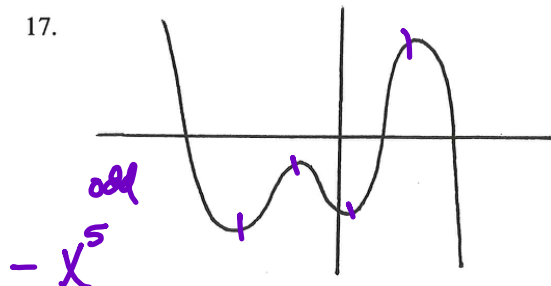
15. $f(x) = 8 - x$

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

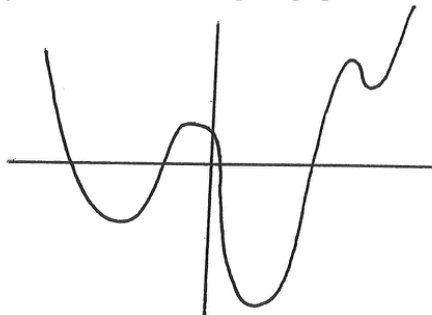


Describe the degree and sign of the leading coefficient of the polynomial function using the graph.

17.

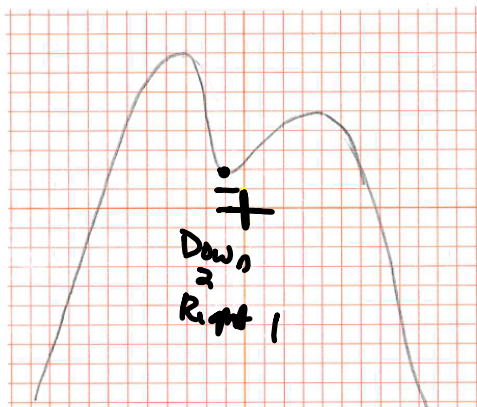


18.



For each function, identify (a) intervals where the function is increasing or decreasing, (b) coordinates of all relative maximums and minimums, and (c) coordinates of all absolute maximums and minimums.

19.



20.



Find the real zeros of each polynomial using your calculator. Round to hundredths.

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

22. $f(x) = -x^5 + 9x^3 - 9x$

POLYNOMIAL OPERATIONS

$$(\underline{4x^3} + \underline{2x^7} + \underline{3x} - \underline{9}) + (\underline{-x^6} + \underline{7x^7} + \underline{4x^3} + \underline{8})$$

$$= -5x^7 - x^6 + 8x^3 + 3x - 17$$

$$(2x+3)(4x-1)(x+5)$$

$$8x^2 - 2x + 12x - 3$$

$$(8x^2 + 10x - 3)(x+5)$$

$$\underline{8x^3} + \underline{10x^2} - \underline{3x} + \underline{40x^2} + \underline{50x} - \underline{15}$$

$$8x^3 + 50x^2 + 47x - 15$$

Special Cases

$$(4x+3)(4x-3) \leftarrow \text{conjugates}$$

$$= 16x^2 - 9$$

FL

$$2 \cdot 3x \cdot -7$$

$$(3x-7)^2 = (3x-7)(3x-7)$$

$$= 9x^2 - 21x - 21x + 49$$

$$9x^2 - 42x + 49$$

$$(2x+5)^2$$

$$= 4x^2 + 20x + 25$$

FACTORING

★ First Step

2 terms

$$a^2 - b^2$$

$$a^2 + b^2$$

$$a^3 - b^3$$

$$a^3 + b^3$$

3 terms
 $x^2 + 2x - 15$

4 terms
 $3x^3 + 15x^2 - 2x - 10$