

Name \_\_\_\_\_  
Algebra 2 & Trig

Master G

Unit 3 Target 1 Remediation

Simplify each expression. Leave no negative exponents in your answers.

1.  $(2x^0)^3(-5x^6)$

$$2^3 \cdot x^0 (-5x^6) \\ 8(-5x^6) = -40x^6$$

2.  $(-3x^{-2}y^4)^2(2x^3y)^3$

$$9x^{-4}y^8 \cdot 8x^9y^3 \\ 72x^5y^{11}$$

3.  $4w^{-2}v^3(2w^4v^2 + 3w^{-2}v^5)$

$$8w^2v^5 + 12w^4v^8 \\ 8w^2v^5 + \frac{12v^8}{w^4}$$

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

$$(-2x^2)^3 - 3(-2x^2) + 4 \\ 8x^6 + 6x^2 - 12$$

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Unit 3 Target 2 Remediation

1. Given that  $(x + 2)$  is a factor of  $x^3 + 7x^2 + 12x + 4$ , what is the remainder when  $x^3 + 7x^2 + 12x + 4$  is divided by  $(x + 2)$ ?  $0!$

$$\begin{array}{r|rrrr} -2 & 1 & 7 & 12 & 4 \\ & \downarrow & -2 & -10 & -4 \\ \hline & 1 & 5 & 2 & 0! \end{array}$$

2. Find the quotient using <sup>synthetic</sup> long division.  $(9x^3 - 24x^2 + 8x + 3) \div (x - 2)$

$$\begin{array}{r|rrrr} 2 & 9 & -24 & 8 & 3 \\ & \downarrow & 18 & -12 & -8 \\ \hline & 9 & -6 & -4 & -5 \end{array}$$

$9x^2 - 6x - 4 - \frac{5}{x-2}$

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Unit 3 Target 3 Remediation

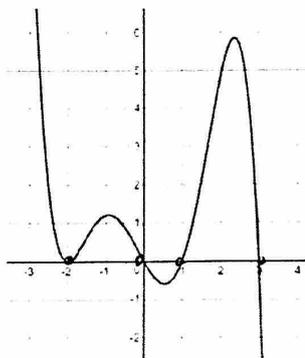
1. What is the maximum number of turns for a function of the form:

$$f(x) = ax^5 + bx^3 + cx^2 + dx + e$$

- a. 6
- b. 5
- c. 4
- d. 3

always the degree minus 1

2.

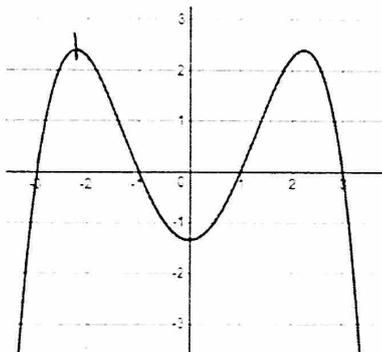


5  
4 real zeros

The function has a minimum degree of 5

The leading coefficient is: positive or negative (circle)

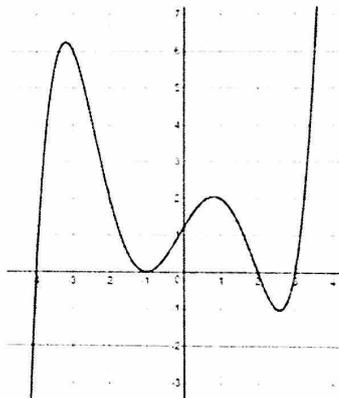
3.



Circle all the intervals that are decreasing:

(0, 2.2) (2.2, ∞) (-∞, -2.2) (-2.2, 0)

4.



Describe the end behavior of the function:

As  $x \rightarrow -\infty$   $f(x) \rightarrow -\infty$

As  $x \rightarrow \infty$   $f(x) \rightarrow +\infty$

5. Use the graph on the right to answer each question.

a. Is the function of even or odd degree? How do you know?

It is going to  $+\infty$  in the end

b. Is the leading coefficient positive or negative? How do you know?

Positive, both arrows are in same direction

c. Estimate the value of each of the real zeros of the function.

-1, 1, 1, 4, 4, 4

d. Does there appear to be any zeros of even multiplicity? How do you know?

Yes 1 is a tangent

e. Does there appear to be any zeros of odd multiplicity? How do you know?

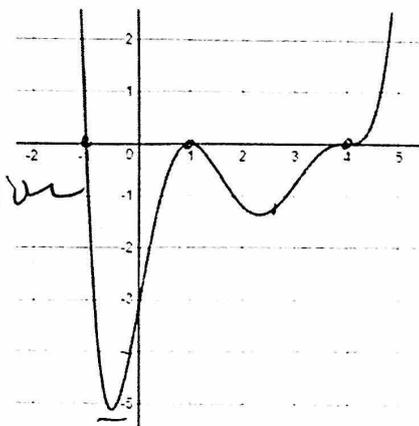
Yes 4 is a terrace

f. What is the **minimum** degree of the function? How do you know? 6 real zeroes

g. Describe the behavior of the function on the interval (1, 2.3). decreasing

h. State the domain and range of the function using interval notation (estimate).

D:  $(-\infty, \infty)$   
R:  $[-5, \infty)$



6. Use the equation to answer each question.

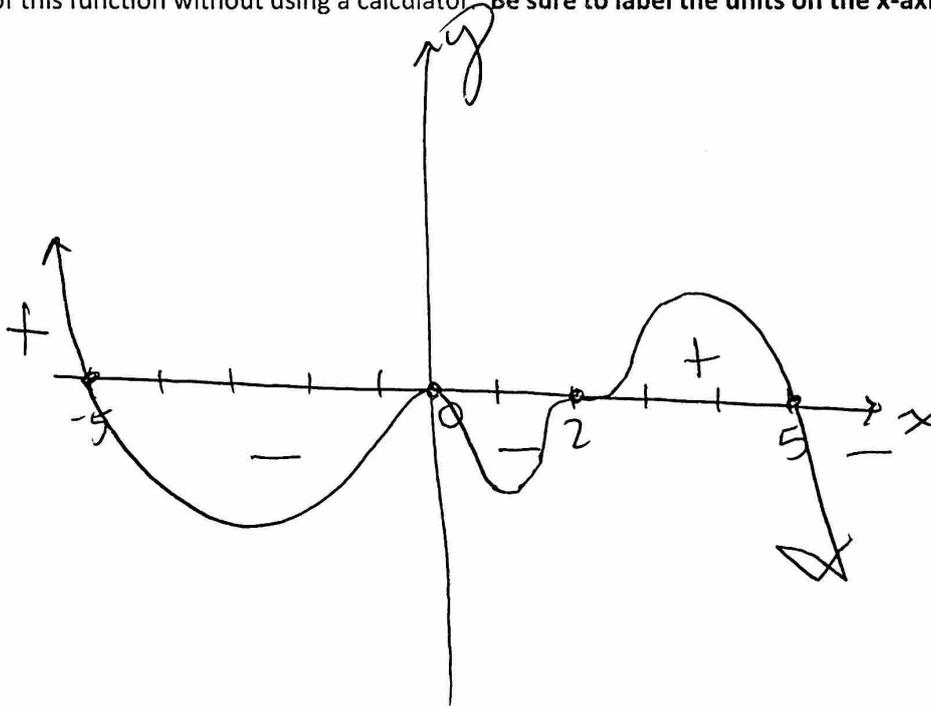
$$f(x) = -x^2(x-2)^3(x^2-25) = -x^2(x-2)^3(x+5)(x-5)$$

- a. What is the degree of this function?  $7$
- b. What is the **maximum** number of turns in this function?  $6$
- c. How many roots does this function have?  $7$
- d. What are the zeros of this function?  $0, 0, 2, 2, 2, -5, 5$
- e. Are there any points of tangency to the x-axis? If so, where?  $Yes, 0$
- f. Are there any terrace points at the x-axis? If so, where?  $Yes, 2$
- g. As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow -\infty$  and as  $x \rightarrow \infty$ ,  $f(x) \rightarrow -\infty$

h. Complete the sign change chart for the function.

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

i. *Sketch* the graph of this function without using a calculator. Be sure to label the units on the x-axis.



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Unit 3 Target 4 Remediation

1. Which defines a polynomial function with zeros -2, 1, 0, and 3?

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

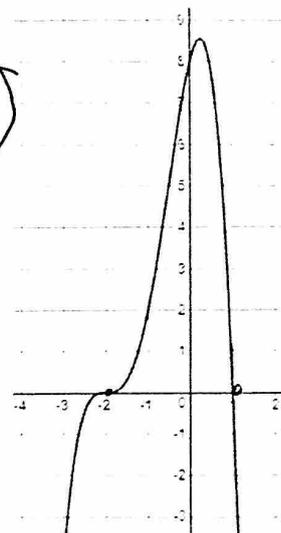
b.  $f(x) = x(x-2)(x-1)(x-3)$

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

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

2. Assuming  $a = -1$ , write a function of least degree in factored form for the graph.

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

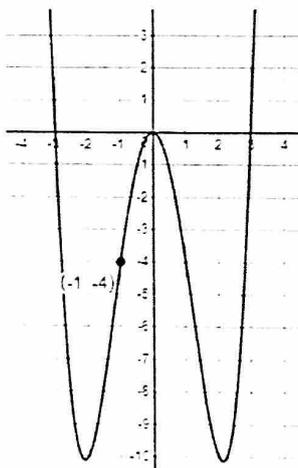


Write the polynomial function in factored form for the given features or graph.

3. This fifth-degree polynomial function has  $a = 4$ , a terrace point at 3, and other roots of  $\pm 3i$  and  $\frac{1}{5}$ .

$f(x) = 4(x-3)^3(x^2+9)(5x-1)$

4.



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

$-4 = a(-1+3)(-1)^2(-1-3)$

$-4 = a(2)(1)(-4)$

$-4 = -8a$

$\frac{1}{2} = a$

$f(x) = \frac{1}{2}(x+3)x^2(x-3)$

Name Master Gy  
 Algebra 2 & Trig

Unit 3 Target 5 Remediation

1. Factor completely:  $x^3 - 125$

$(x-5)(x^2+5x+25)$

2. Solve by factoring:  $x^4 - 29x^2 + 100 = 0$

a. -5, -2, 2i, 5i

b. 2, 5, 2i, 5i

c. -25, -4, 4, 25

d. -5, -2, 2, 5

$(x^2 - 25)(x^2 - 4) = 0$   
 $x^2 = 25 \quad x^2 = 4$   
 $\pm 5 \quad \pm 2$

**SOLVE** each polynomial over the set of complex numbers by **FACTORING**. Provide exact solutions only. Irrational solutions must be in simplified form (no rounded decimals).

3.  $3x^3 = 24$

Factored Form:  $3(x-2)(x^2+2x+4) = 0$

Solutions:  $2, -1 \pm i\sqrt{3}$

$3x^3 - 24 = 0$

$3(x^3 - 8) = 0$

$3(x-2)(x^2+2x+4)$

$\frac{-2 \pm \sqrt{4-4(4)}}{2}$   
 $\frac{-2 \pm \sqrt{-12}}{2}$   
 $\frac{-2 \pm 2i\sqrt{3}}{2}$

4.  $5x^4 - 80x^2 = 0$

Factored Form:  $5x^2(x+4)(x-4) = 0$

Solutions:  $0, 0, -4, 4$

$5x^2(x^2 - 16) = 0$

$5x^2(x+4)(x-4) = 0$

5.  $3x^3 + 2x^2 - 12x = 8$

Factored Form:  $(3x+2)(x^2-4) = 0$

Solutions:  $-\frac{2}{3}, \pm 2$

$3x^3 + 2x^2 - 12x - 8 = 0$

$x^2(3x+2) - 4(3x+2) = 0$

$(3x+2)(x^2-4) = 0$

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Unit 3 Target 6 Remediation

1. Which describes the number and type of roots of the equation  
 $3x^4 - 2x^3 - 8x^2 - 26x - 3 = 0$

- A. 4 real roots
- B. 3 real roots and 1 imaginary root
- C. 2 real and 2 imaginary roots**
- D. 1 real root and 3 imaginary roots

2. Find the solution set for the equation

$$x^4 + 4x^3 - 5x^2 = 0$$

$$x^2(x^2 + 4x - 5) = 0$$

$$x^2(x-5)(x+1) = 0$$

$$\{0, 0, 5, -1\}$$

Find all of the roots of each function by depressing the polynomial. Provide exact solutions only. Irrational solutions must be in simplified form (no rounded decimals).

3.  $f(x) = x^4 + 2x^3 + x^2 + 8x - 12$      1, -3

$$\begin{array}{r|rrrr|r} 1 & 1 & 2 & 1 & 8 & -12 \\ & \downarrow & & & & \\ -3 & 1 & 3 & 4 & 12 & 0 \\ & \downarrow & -3 & 0 & -12 & \\ & 1 & 0 & 4 & 0 & \end{array}$$

$$(x-1)(x+3)(x^2+4) = 0$$

$$x = 1, -3, \pm 2i$$

4.  $f(x) = x^3 + 4x^2 + x - 26$      2

$$\begin{array}{r|rrr|r} 2 & 1 & 4 & 1 & -26 \\ & \downarrow & & & \\ & 1 & 6 & 13 & 0 \end{array}$$

$$(x-2)(x^2+6x+13) = 0$$

$$x^2+6x+9 = -13+9$$

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

$$x+3 = \pm 2i$$

$$x = -3 \pm 2i$$

$$x = 2, -3 \pm 2i$$