Name Key Class Date

5 Quiz Review

Lessons 5-1 through 5-2

Write each polynomial function in *standard form*. Then classify it by *degree* and number of *terms*. Then, describe the *end behaviors*.

1. $y = 4x^2 - x + 7x^4$

* $y = 7x^4 + 4x^2 - x$
* quartic
* trinomial
* up & up

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

* $f(x) = 3x^3 + 6x - 7$
* cubic
* trinomial
* down & up

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

* $f(x) = -2x^5 + 5x^3 + 7$
* quintic
* trinomial
* up & down

4. $y = 3n^2 + n^3 - n - 3 - 3n^3$

* $y = -2n^3 + 3n^2 - n - 3$
* cubic
* polynomial
* up & down

5. $y = 6c^2 - 4c + 7 - 8c^2$

* $y = -2c^2 - 4c + 7$
* quadratic
* trinomial
* down & down

6. $y = 7x^5 + 3x^3 - 2x$

* $y = 7x^5 + 3x^3 - 2x$
* quintic
* trinomial
* down & up

Write each polynomial in factored form. Check by multiplication.

7. $x^3 + 5x$

$x^2(x+5)$

8. $x^3 + x^2 - 6x$

$x(x^2 + x - 6)$

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

9. $6x^3 - 7x^2 - 3x$

$x(6x^2 - 7x - 3)$

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

Write a polynomial function in standard form with the given zeros. * factored form

10. $x = 3, 2, -1$

$y = (x-3)(x-2)(x+1)$

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

$y = x^3 - 5x^2 + 6x + x^2 - 5x + 6$

$y = x^3 - 4x^2 + x + 6$

11. $x = 1, 1, 2$

$y = (x-1)^2(x-2)$

$(x^2 - 2x + 1)(x-2)$

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

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

12. $x = -2, -1, 1$

$y = (x+2)(x+1)(x-1)$

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

$x^3 + 3x^2 + 2x - x^2 - 3x -$

$y = x^3 + 2x^2 - x - 2$

13. $x = 0, 0, 2, 3$

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

$x^2(x^2-5x+6)$

$y = x^4 - 5x^3 + 6x^2$

14. $x = -2, 1, 2, 2$

$(x+2)(x-1)(x-2)^2$

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

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

$-4x^3 - 4x^2 + 8x$

$+4x^2 + 4x - 8$

$y = x^4 - 3x^3 - 2x^2 + 12x - 8$

15. $x = 2, 4, 5, 7$

$(x-2)(x-4)(x-5)(x-7)$

$(x^2-6x+8)(x^2-12x+35)$

$x^4 - 6x^3 + 8x^2 - 12x^3 + 72x^2 - 96x$

$+35x^2 - 210x + 280$

$y = x^4 - 18x^3 + 115x^2 - 306x + 280$

Find the *zeros* of each function. State the ~~*multiplicity*~~ of each zero. *Graph*.

16. $y = (x+2)^2(x-5)$

$-2 \rightarrow$ mult 2

$5 \rightarrow$ mut 1

17. $y = (3x+2)^2(x-5)^3$

$-\frac{2}{3} \rightarrow$ mult 2

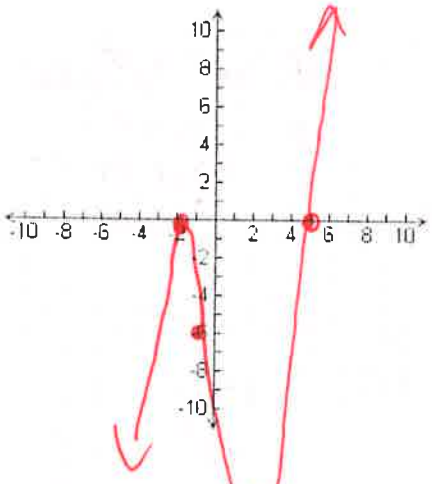
$5 \rightarrow$ mult 3

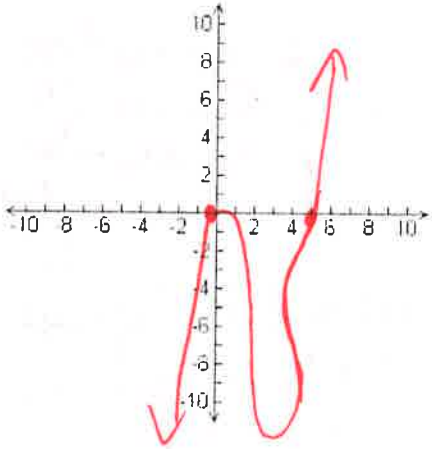
18. $y = x^2(x+4)(x-1)$

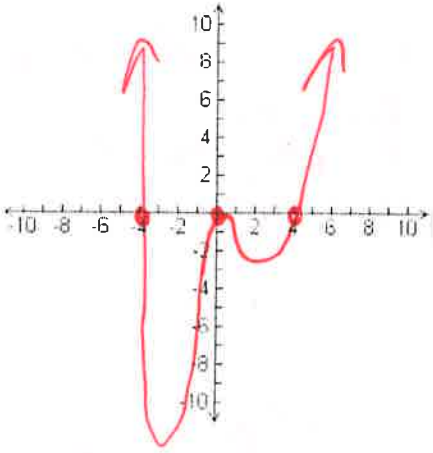
$0 \rightarrow$ mult 2

$-4 \rightarrow$ mult 1

$1 \rightarrow$ mult 1







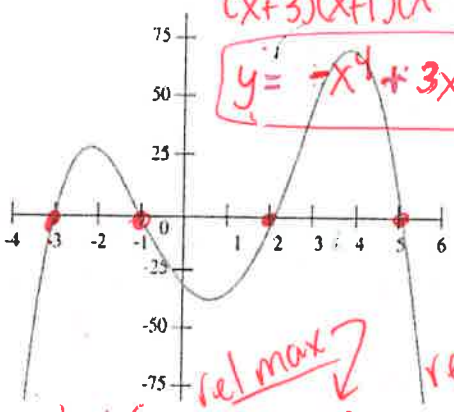
Find *turning points*, intervals of *increasing and decreasing*, relative *maximum* and *minimum* and where they occur, *degree* of the function, *x-intercepts*, and the *equation* of each graph in *standard form*. (round to the nearest hundredths)

19.

a.

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

$y = -x^4 + 3x^3 + 15x^2 - 19x - 30$

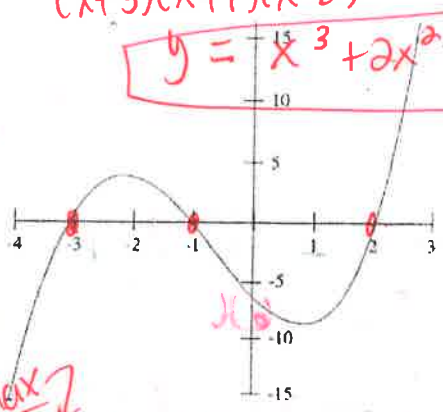


* Turning pts: $(-2.18, 29.04), (.56, -35.51), (3.87, 70.70)$
* increase: $(-\infty, -2.18)\ (.56, 3.87)$
* decrease: $(-2.18, .56)\ (3.87, \infty)$
* degree: 4
* x-intercepts: $(-1, 0)\ (2, 0)\ (5, 0)\ (-3, 0)$

b.

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

$y = x^3 + 2x^2 - 5x - 6$



* Turning pts: $(-2.11, 4.06)\ (.79, -8.21)$
* increase: $(-\infty, -2.11)\ (.79, \infty)$
* decrease: $(-2.11, .79)$
* degree: 3

20. Find the relative maximum and minimum of the following (round to the nearest hundredths if necessary)

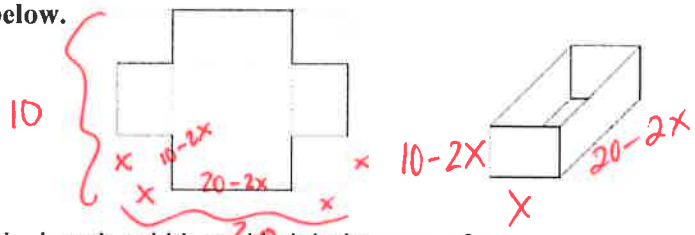
a.) $f(x) = x^3 - 3x^2 + 2$ b.) $f(x) = -4x^3 + 12x^2 + 4x - 12$ c.) $f(x) = x^3 - 7x^2 + 7x + 15$

relative max: (0,2)
relative min: (2,-2)

relative max: (2.15, 12.32)
relative min: (-.15, -12.32)

relative max: (.57, 16.90)
relative min: (4.10, -5.05)

21. A flat sheet of cardboard 20 by 10 inches is being cut at each corner and made into a box as shown below.



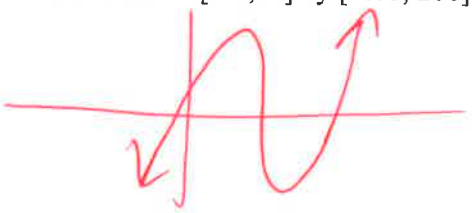
a. Find the length, width, and height in terms of x.

length = (20-2x) width = (10-2x) height = x

b. Write the function that gives the how the volume of the box relates to the dimensions.

$y = (20-2x)(10-2x)(x)$ OR $y = 4x^3 - 60x^2 + 200x$

c. Graph this Function in the window [-10,15] by [-200, 200]



d. What is the maximum volume you can create from this box? What dimensions will give this maximum volume? (round to the nearest hundredths)

max volume: 192.45 in^3

height: 2.11 in
width: 5.78 in
length: 15.78 in

2.11 in x 5.78 in x 15.78 in