Math 1111 Sample Test 3 Name _____

3.1 - 3.4, 4.1(class) Date _____

Directions: To receive partial credit you must show your work on a problem.
Circle final answers. All problems are 5 points each.

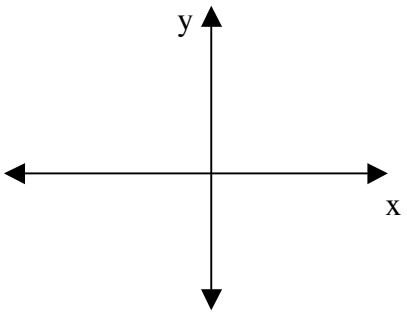
For the quadratic function $y = -2x^2 - 12x - 16$ find the following.

1. Vertex = _____

2. x and y intercepts
x-int = _____ y-int = _____

For the quadratic function $y = -2x^2 - 12x - 16$ find the following.

3. Graph



4. Domain and Range

D = _____ R = _____

Divide the following polynomials.

5. $\left(2x^2 + 10x + 12\right) \div \left(x + 3\right)$

Divide the following polynomials.

6. $\left(4x^3 - 7x^2 - 11x + 5\right) \div \left(4x + 5\right)$

Divide the following polynomials.

7. $\left(5x^3 - 6x^2 + 8\right) \div (x - 4)$

Divide the following polynomials.

8. $(7x + 3) \div (x + 2)$

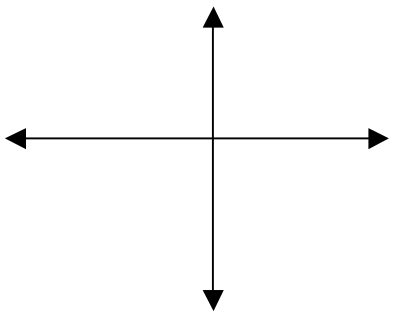
Use synthetic division and the factor theorem to determine whether the second polynomial is a factor of the first. State **YES** or **NO**

9. $f(x) = x^4 - 25x^2 + 144$; $x + 3$

Describe the transformation that occurs in the function. Remember to find the basic function first. Also sketch the graph.

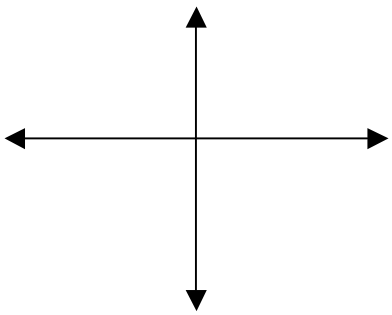
10. $f(x) = -x^4 + 4$

Description: _____
_____
_____
_____
_____



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

Description: _____
_____
_____
_____
_____



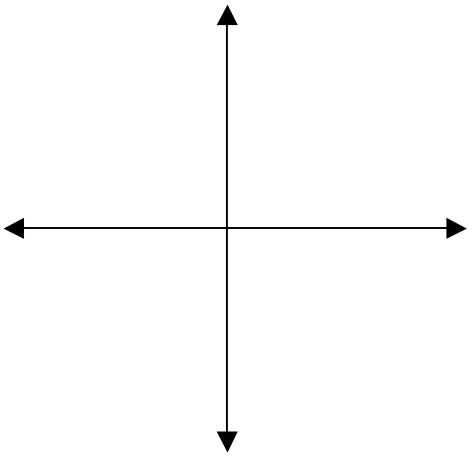
Graph the polynomial function. **SHOW ALL** the steps we discussed in class.

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

12. Find the x and y intercepts.

13. Find the test point information for the x-intercepts.

14. Use the previous work(#12 and #13) to graph the polynomial.



Find the zeros of the polynomial and state the multiplicity of each.

15. $P(x) = x^2(x^2-4)(x+3)^2$

Use the Rational Zero Theorem to list possible rational zeros for the polynomial.

16. $P(x) = 2x^3 + x^2 - 25x + 12$

Use the Rational Zero Theorem to list possible rational zeros for the polynomial.

17. $P(x) = x^5 - 32$

Factor each polynomial into linear factors and/or quadratic factors that are irreducible over the reals.

18. $P(x) = x^3 - x^2 - 2x$

Find the zeros of the polynomial.

19. $P(x) = 2x^4 - 17x^3 + 4x^2 + 35x - 24$

Find the zeros of the polynomial.
Hint: Find the rational zeros first.

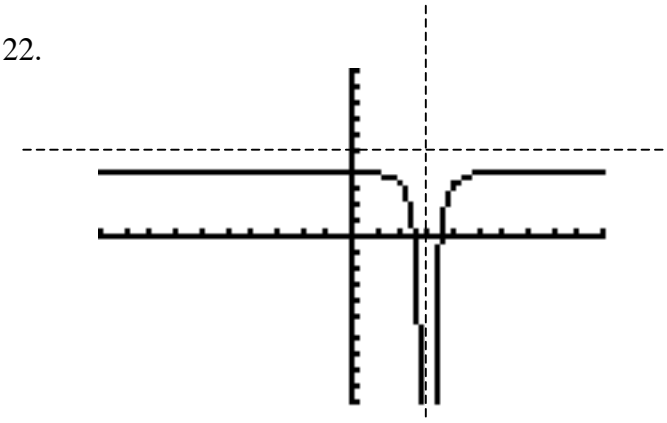
20. $P(x) = x^4 + x^3 - 2x^2 + 4x - 24$

Find the zeros of the polynomial.

21. $P(x) = 6x^4 + 23x^3 + 19x^2 - 8x - 4$

Use stretching/shrinking, reflecting and shifting rules to give an equation of the following graphs.

22.

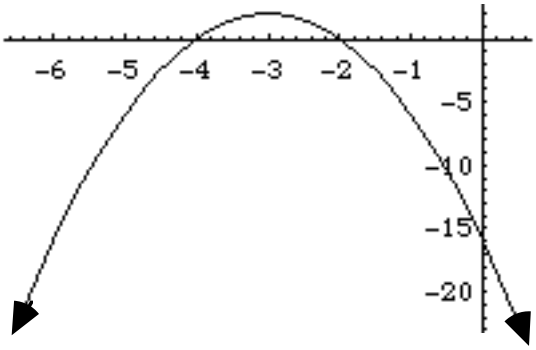


Answers Sample Test 3

1. vertex: (–3, 2)

2. x - int.: (–4, 0), (–2, 0)
y - int.: (0, –16)

3.



4. Domain= $(-\infty, \infty)$

Range = $(-\infty, 2]$

5) $2x + 4$

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

7) $5x^2 + 14x + 56 + \dfrac{232}{x-4}$

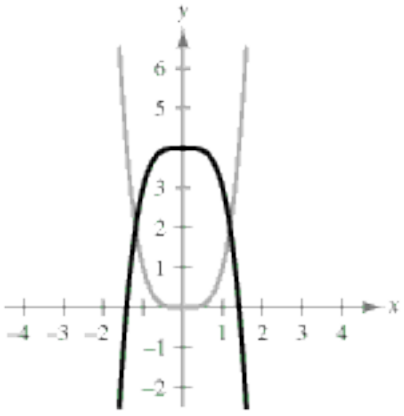
8) $7 - \dfrac{11}{x+2}$

9) Yes! Remainder is zero!

12) x-int: x = –2, x = 1, x = 2, x = –2
y-int: y = 8

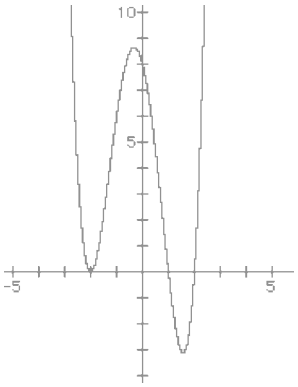
13) Answers may vary.
x = –3, y = 20 above x-axis
x = 0, y = 8 above x-axis
x = 1.5, y = –3.06 below x-axis
x = 3, y = 50 above x-axis

10.

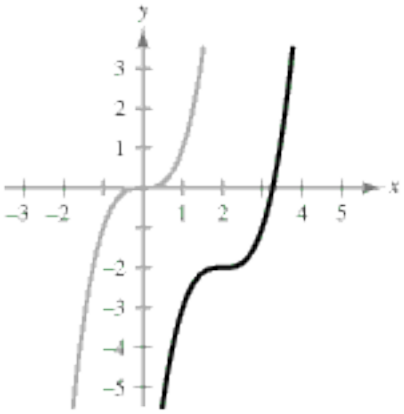


Reflection in the x-axis and then a vertical shift four units upward.

14)



15) 0 is a zero of multiplicity two
2 is a zero of multiplicity one
–2 is a zero of multiplicity one
–3 is a zero of multiplicity two

11.  Horizontal shift two units to the right and a vertical shift two units downward.	16) $\frac{p}{q} = \pm1, \pm2, \pm3, \pm4, \pm6, \pm12, \pm\frac{1}{2}, \pm\frac{3}{2}$ 17) $\frac{p}{q} = \pm1, \pm2, \pm4, \pm8, \pm16, \pm32$ 18) factors are: $x(x-2)(x+1)$ 19) zeros are: $x = 8, x = 1, x = 1, x = \frac{-3}{2}$ 20) zeros are: $x = -3, x = 2, x = +2i, x = -2i$ 21) zeros are: $x = \frac{1}{2}, x = -2, x = -2, x = \frac{-1}{3}$
22) $\frac{-1}{(x-3)^2} + 5$	23) V.A. x = 4 H.A. None S.A. y= 2x+8
24) V.A. x = –2 & x = 3/5 H.A. y = 6/5 S.A. None	25) x-int x = 0 , y-int y = 0
26) x-int x = 5 & x = 2 , y-int y = 10/9	27) see attached sheet. (next page)