

Math 105 Exam 3 Nov 15, 2007
Chapters 2.5 – 3.5

Name _____ Instructor name or section # _____

1	2	3	4	5	6	7	8	9	10	11	12	13	total
20	8	5	3	6	6	8	6	6	6	6	12	8	100

Given: Standard form for a quadratic: $y = a(x - h)^2 + k$, QF: $ax^2 + bx + c = 0$, then
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ Odd (origin symmetry): $f(-x) = -f(x)$, Even (y-axis symmetry): $f(x) = f(-x)$

Show All Work for Full Credit!! For all graphs each ticmark is one unit

1. (4 pts ea) Solve the following equations. Check all solutions.

a.) $2x^4 - 32x^2 = 0$

b.) $\sqrt{2x+11} = x + 4$

c.) $7x^{3/2} - 14 = 0$

d.) $(x + 5)^2 + 8(x + 5) + 15 = 0$

e.) $f(x) = 2|4x| + 5$ and $f(x) = 21$

2. (4 pts ea) Use interval notation to express the solution set.

a.) $3 < x + 8 < 8$

b.) $-6|1 - x| \leq -18$

3. (5 pts) Fullahotair Balloon Company allows a maximum capacity of 3185 pounds. If the hot air stove weighs 185 pounds and the average adult weights 150 pounds, how may adults can be safely carried aloft in one trip. (show work, guess and check is worth no points, this is an inequality)

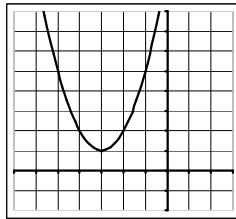
4. (3 pts) The graph of a quadratic function is given. Select the function's equation from the choices.

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

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

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

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



5. (6 pts) Find the vertex and intercepts of the quadratic function $f(x) = x^2 - 2x - 3$

vertex _____ x-intercepts (if any) _____ y-intercept _____

6. (6 pts) Among all the pairs of numbers whose difference is 16, find a pair whose product is as small as possible. What is the pair and what is the minimum product? (show work, guess and check is worth no points)

Pair: _____ product: _____

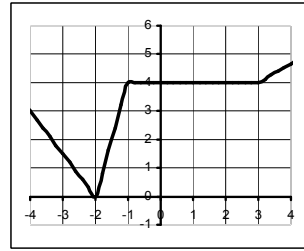
7. (2 pts ea) True or False: Are the following functions polynomials? If true, indicate the degree:

a.) $f(x) = -4x + x^{-9}$ True False degree _____

b.) $g(x) = 4 - \frac{5}{x}$ True False degree _____

c.) $g(x) = \frac{x^2 - 4}{x^4}$ True False degree _____

d.) Graph at right: True False



8. (6 pts) Use the Intermediate Value Theorem to determine if the polynomial function $f(x) = 9x^3 - 1$ has a zero in $[-2, 0]$?

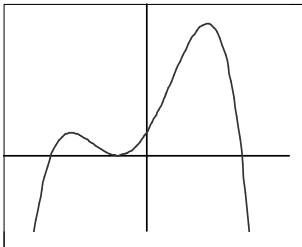
Find $f(-2) =$ _____ Find $f(0) =$ _____ Does a zero exist? Yes No

9. (3 pts ea) Use the end behavior to draw a line connecting each polynomial with its possible graph.

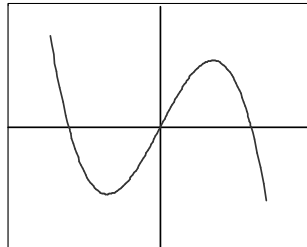
I.) $f(x) = x - 197x^7$

II.) $g(x) = 15x^{10} + 180x$

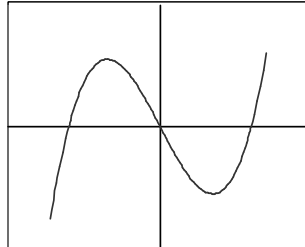
a.



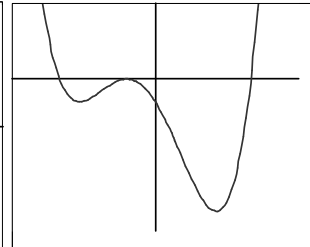
b.



c.



d.



10. (2 pts ea) Given $f(x) = -3(x+3)^2(x-15)(x+15)$:

a.) What are the zeros? _____

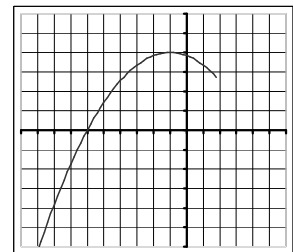
b.) At which zero/s does the graph cross the x-axis? _____

c.) Which zero/s cause the graph to touch and turn? _____

11. (6 pts) Use the graph to determine a solution to the equation, $x^3 + 6x^2 - x - 6 = 0$. Use **division** to verify that this number is a solution and solve the polynomial. (division will give you a second factor)

a.) Solution from graph, $x =$ _____

b.) Remaining solutions, $x =$ _____



12. (12 pts) Given $f(x) = \frac{-3x^2 + 3}{(x-9)(x+4)}$ Identify the following:

- a) Domain of $f(x)$: _____
- b) y-intercept if any: _____,
- c) x-intercept(s), if any: _____
- d) Vertical asymptote(s) if any, $x =$ _____,
- e) Horizontal asymptote(s) if any, $y =$ _____
- f) $f(-1) =$ _____.

13. (8 pts) Use the graph of the rational function at right to complete the following:

- a.) What is the horizontal asymptote?
 $y =$ _____
- b.) What is the vertical asymptote?
 $x =$ _____
- c.) As $x \rightarrow 2^+$, $f(x) \rightarrow$ _____
- d.) As $x \rightarrow 2^-$, $f(x) \rightarrow$ _____
- e.) As $x \rightarrow -\infty$, $f(x) \rightarrow$ _____
- f.) As $x \rightarrow \infty$, $f(x) \rightarrow$ _____

