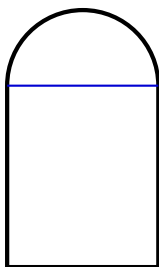


MATH 120
SPRING 2017
EXAM 2

NAME:

1. 5 pts. each Determine algebraically whether the function is even, odd, or neither.
 - (a) $f(x) = 7 - 3x^2 + 19x^4$
 - (b) $g(x) = 2x - |x|$
2. 10 pts. each Write an equation for a function that has a graph with the given characteristics.
 - (a) The shape of $y = \sqrt{x}$, but shifted left 6 units and down 2 units.
 - (b) The shape of $y = x^2$, but reflected across the x -axis and shifted right 3 units and up 8 units.
3. 10 pts. each Simplify, writing the answer in the form $a + bi$ for real numbers a and b . Here $i = \sqrt{-1}$.
 - (a) $\sqrt{-49} \cdot \sqrt{-9}$
 - (b) $3i(6 - 5i)$
 - (c) $(5 - 4i)^2$
 - (d) $\frac{i}{2 + i}$
4. 10 pts. Solve by factoring: $3t^3 + 2t = 5t^2$.
5. 10 pts. Solve by completing the square: $x^2 = 8x - 9$.
6. 10 pts. Solve by using the quadratic formula: $x^2 + 1 = x$.
7. 10 pts. Find all solutions to $y^4 - 15y^2 - 16 = 0$.
8. 10 pts. By setting up an algebraic equation, find the dimensions of a rectangular Persian rug whose perimeter is 28 ft and whose area is 48 ft².
9. 5 pts. each Let $f(x) = -3x^2 + 24x - 49$.
 - (a) Find the vertex of the function
 - (b) Determine whether there is a maximum or minimum value, and find that value.
 - (c) Find the range.
 - (d) Find the intervals on which the function is increasing, and the intervals on which it's decreasing.

10. 15 pts. A Norman window is a rectangle with a semicircle on top (see figure below). Wunderfenster is designing a Normal window that will require 24 ft of trim on the outer edges. What must the dimensions of the rectangular part of the window be in order to let in the maximum amount of light?



11. 10 pts. each Solve each equation algebraically.

(a) $\frac{2}{x^2 - 9} + \frac{5}{x - 3} = \frac{3}{x + 3}$

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

(c) $\sqrt{3x - 5} + \sqrt{2x + 3} + 1 = 0$

(d) $|4x - 3| - 3 = 8$

12. 10 pts. Solve for t :

$$\frac{1}{t} = \frac{1}{a} + \frac{1}{b}.$$

13. 10 pts. each Solve and write the solution set in interval notation.

(a) $|3x + 4| < 13$

(b) $|x + 6| \geq 4$

(c) $|3x - 1| > 5x + 2$