

# MATH 150 - WEEK-IN-REVIEW 3

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## PROBLEM STATEMENTS

1. Write the given functions in standard form. Then determine the vertex, whether the vertex is a maximum or minimum, and the axis of symmetry.

a)  $g(x) = -3x^2 - 18x - 2$

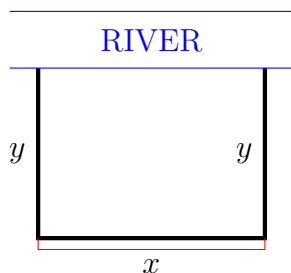
b)  $f(x) = 4x^2 + 2x + 9$

2. Find the  $x$ -intercepts of the following functions.

a)  $h(x) = \frac{1}{3}x^2 - 4x + 3$

b)  $f(x) = 2x^{\frac{5}{2}} - x^{\frac{3}{2}} - x^{\frac{1}{2}}$

3. A farmer decides to enclose a rectangular stall against a river so his horses have water access. The figure below shows the shape he wants to make. If he has 1800 feet of fencing, what values for  $x$  and  $y$  will maximize the enclosed area with no fencing against the river? What is the maximum area he can enclose?



**Exam 1 Review**

1. For the given polynomial functions, determine the end behavior of the graph.

a)  $f(x) = 3x^8 + 7x^5 + 12$

b)  $g(x) = -4x^9 - 3x^5 + 8$

2. Determine the quotient with fractional remainder (if necessary) of the following.

(a)  $(7x^3 - 46x^2 - 14x + 3) \div (7x + 3)$

(b)  $(3x^3 - 2x^2 + 4x - 9) \div (x + 1)$

3. Find the zeros and their multiplicities for the following functions, then determine the end behavior and maximum number of turning points. Roughly sketch the graph.

a)  $k(x) = 2x^3 - 3x^2 - 9x$

b)  $g(x) = -x^4 + 8x^2 - 16$

4. Let  $L_1$  be the line passing through the points  $(2, -1)$  and  $(1, 5)$ , and  $L_2$  be the line passing through the points  $(1, 4)$  and  $(9, 8)$ . Determine whether the lines are parallel, perpendicular, or neither.

5. Solve the inequality  $|9 - 2x| - 2 > -1$ .

6. Solve the quadratic equation  $12x^2 + 12x = 3$  by completing the square.

7. Solve the equation. Check for extraneous solutions.

$$\frac{12}{x^2 + 2x - 3} = \frac{3}{x - 1} + \frac{7}{x + 3}$$

8. Given  $f(x) = \sqrt{2x+1}$ ,  $g(x) = \frac{1}{x}$ , find  $(f \circ g)(x)$  and  $(g \circ f)(x)$  and their domains.

9. Find the intervals where the following inequality is true.

$$\frac{(11-x)^6(2x^2+5x-3)}{x+1} \geq 0$$



10. Antoine stands on a balcony and throws a ball to his dog, who is at ground level. The ball's height (in feet above the ground),  $t$  seconds after Antoine threw it, is modeled by  $h(t) = -2t^2 + 4t + 16$ . What is the height of the ball at the time it is thrown? What is the maximum height of the ball? When does the ball reach its maximum height?
11. Find the quadratic with axis of symmetry  $x = 2$ , a zero at  $(3,0)$ , and a y-intercept of  $(0,16)$ .





12. Consider the function  $g(x) = -\frac{1}{3}\sqrt{-x+2} - 5$ .

a) Identify the parent function  $f$ .

b) Describe the sequence of transformations from  $f$  to  $g$ .

c) Use function notation to write  $g$  in terms of  $f$ .

d) Sketch the graph of  $g$ .

