

MATH 111
EXAM 02

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Answer the questions in the spaces provided on the question sheets and turn them in at the end of the class period. If you require extra space, use the back of the page and indicate that you have done so.

Unless otherwise stated, all supporting work is required. Unsupported or otherwise mysterious answers will **not receive credit**. You may use a calculator, but you may **not** use a Computer Algebra System (CAS) or any other electronic device whatsoever, **including cell phones**.

Name: _____

Problem	Points Earned	Points Possible
1		4
2		6
3		5
4		3
5		2
6		16
7		16
8		16
9		16
10		16
Bonus		5
Survey Bonus		5
Total		100

1. DEFINITIONS

1 (4 Points). (a) *State the Point-Slope form of a line passing through the point (x_1, y_1) with slope m .*

(b) *State the Slope-Intercept form of a line with slope m and y -intercept b .*

2 (6 Points). *Let $f(x)$ be a function. State the average rate of change of f between $x = a$ and $x = b$.*

3 (5 Points). *If $f(x)$ is an exponential function with growth/decay factor a , express the growth/decay rate, r , in terms of the growth/decay factor.*

4 (3 Points). *(a) State the general form of an exponential function.*

(b) When does such a function model exponential growth?

(c) When does such a function model exponential decay?

5 (2 Points). *Consider the two lines $f(x) = m_1x + b_1$ and $g(x) = m_2x + b_2$.*

(a) When are f and g parallel?

(b) When are f and g perpendicular?

2. PROBLEMS

6 (16 Points). *In the following problems, use the given information to find the equation of the line in slope-intercept form.*

(a) *The line passing through the points $(3, 17)$ and $(6, 2)$.*

(b) *The line passing through the point $(2, 4)$ and parallel to the line $3y - 12x = 15$.*

(c) *The line passing through the origin (that is, the point $(0, 0)$) and perpendicular to the line $3y - 12x = 15$.*

7 (16 Points). *Consider the two lines $f(x) = 2x + 9$ and $g(x) = -x + 3$. Find the point (that is, the (x, y) pair) where these two lines intersect.*

8 (16 Points). Let $f(x) = x^2 - 1$.

(a) Compute the average rate of change for f between $x = 3$ and $x = 5$.

(b) Give the Point-Slope form of the line that passes through $(3, f(3))$ and $(5, f(5))$.

(c) Give the Slope-Intercept form of the line that passes through $(3, f(3))$ and $(5, f(5))$.

9 (16 Points). *Bob is hosting an event. He is renting a facility, which costs \$200, and providing refreshments, which cost \$6 per guest.*

(a) Find a function, C , that models the total cost of the event if x people attend.

(b) Sketch a graph of C .

(c) Evaluate $C(10)$ and $C(15)$. What do these numbers represent?

(d) If the total cost for the event was \$500, how many people attended?

10 (16 Points). *A population of size 16 grows by 25% every day.*

(a) Give the daily growth factor for this population.

(b) Give an exponential model for the size of the population after t days.

(c) Determine the size of the population after 2 days. [Hint: Express the growth factor as a fraction, rather than a decimal, and this will be very easy to compute.]

11 (Bonus - 5 Points). *Let $f(x) = x^2 - 1$. Show that the average rate of change of f between $x = a$ and $x = b$ is always $a + b$.*