Name: _____

Instructor: _____

MATH 10250, Practice Exam 1
June 29, 2018

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- No calculators.
- The exam lasts for 1 hour and 20 minutes.
- Be sure that your name is on every page in case pages become detached.
- Be sure that you have all 13 pages of the test.

PLEASE MARK YOUR ANSWERS WITH AN X, not a circle!

1.	(a)	(b)	(c)	(d)	(e)
2.	(a)	(b)	(c)	(d)	(e)
3.	(a)	(b)	(c)	(d)	(e)
4.	(a)	(b)	(c)	(d)	(e)
5.	(a)	(b)	(c)	(d)	(e)

Please do NOT write in this box.

Multiple Choice_____

6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____

Total _____

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Multiple Choice

1.(4 pts) Which formula below is the equation of a circle of radius $\frac{1}{2}$ and center at $(-1, 0)$?

(a) $(x+1)^2 + y^2 = \frac{1}{4}$

(b) $x^2 + (y+1)^2 = \frac{1}{4}$

(c) $(x-1)^2 + y^2 = \frac{1}{4}$

(d) $(x+1)^2 + (y+1)^2 = \frac{1}{2}$

(e) $(x+1)^2 + y^2 = \frac{1}{2}$

2.(4 pts) Write the slope intercept form of the line through $(1, 2)$ and $(-3, 4)$.

(a) $y = 2x + 10$

(b) $y = x + 1$

(c) $y = \frac{1}{2}x$

(d) $y = \frac{1}{2}x + \frac{3}{2}$

(e) $y = -\frac{1}{2}x + \frac{5}{2}$

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3.(4 pts) Which of the following limits **do not** exist?

(a) $\lim_{x\to 0} \dfrac{x^2+2x}{x}$ (b) $\lim_{x\to 3} \dfrac{x-3}{x^2+2}$ (c) $\lim_{x\to 1} \dfrac{3}{x-1}$

(d) $\lim_{x\to 0^+} \sqrt{x}$ (e) $\lim_{x\to 1} |x-2|$

4.(4 pts) The population of a certain bacteria culture is modeled by the function

$$f(t) = t^3 + 3t^2 + 2.$$

Which of the following is the average growth rate of the bacteria between $t = 1$ and $t = 2$?

(a) 16 (b) 15 (c) 24 (d) 9 (e) 18

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5.(4 pts) If

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
2	0	2	6	6
3	4	2	-2	2

which of the following is $(f \circ g)'(3)$?

(a) 24 (b) 8 (c) 4 (d) 12 (e) -4

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Partial Credit

You must show your work on the partial credit problems to receive credit!

6.(x pts.)The equation for the line L is given by

$$4x + 2y = 4$$

(a) What is the **slope** and y**-intercept** of line L?

(b) Which of the following line below is parallel to line L? Explain why.

$-y + 1 = -2x$ $\quad \frac{1}{2}y = x$ $\quad y - 1 = \frac{1}{2}x$ $\quad y = -\frac{1}{2}x$ $\quad$ none

(c) Does the point $(0, 1)$ lie on line L?

(d) Suppose line L' is perpendicular to line L, what is the slope of line L'?

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7.(x pts.) Evaluate

$$\lim_{x \to 4} \frac{x^2 + x - 20}{3x - 12}$$

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8.(x pts.) Compute the derivative of f from **its limit definition**.

$$f(x) = x^2 - 1$$

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9.(x pts.)Given $f(x) = \begin{cases} \dfrac{x}{x+x^2} & \text{if } x < 0 \\ \\ x^2 - 1 & \text{if } x \geq 0 \end{cases}$

Find

(a) $\lim\limits_{x \to 0^-} f(x) =$

(b) $\lim\limits_{x \to 0^+} f(x) =$

(c) $\lim\limits_{x \to 0} f(x) =$

(d) $f(0) =$

(e) Is f continuous at $x = 0$? Justify your answer.

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10.(x pts.) The cost in dollars incurred by a record company in pressing x CDs is given by

$$C(x) = 1.8x + 2300$$

(a) What are the fixed costs of production?

(b) Find a formula for the average cost per disk, $\bar{C}(x)$, in pressing x CDs.

(c) Evaluate $\lim_{x\to\infty} \bar{C}(x)$

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11.(x pts.)Let $f(x) = (2x - 1)^3$.

(a) Find the **slope** of the tangent line to the graph of f at $x = 1$.

(b) Write the **equation** of the tangent line to the graph of f at $x = 1$.

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12.(x pts.)

(a) Given $f(x) = (x^2 + 1)^3(2x^3 - x)$, compute $f'(x)$

(b) Given $g(x) = \dfrac{2x - 1}{x^4 + 1}$, compute $g'(x)$

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13.(x pts.) Let $f(x) = \sqrt{1-x}$, find $f''(0)$

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14.(x pts.) A coffee company will make 6400 bags of coffee when the price per bag is \$10, and 10000 bags of coffee when the price per bag is \$14. The supply function is known to have the form

$$p(x) = a\sqrt{x} + b$$

where x is the number of bags made, p is the price per bag, and a, b are real numbers.

(a) Determine the supply function.

(b) What unit price will induce the company to make 4900 bags of coffee?

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