MATH 10250 Quiz 2 **NAME:**

June 25, 2018

You have **10 minutes** for this quiz. Please show your work and write neatly.
NO CALCULATORS please!

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1. Let f be the function defined by

$$f(x) = \begin{cases} |x| + 1 & \text{if } x < 2 \\ 3\sqrt{x} & \text{if } x \geq 2 \end{cases}$$

Compute the following:

(a) $f(-2) = |-2| + 1 = 2 + 1 = 3$

(b) $f(2) = 3\sqrt{2}$

(c) $f(4) = 3\sqrt{4} = 3 \cdot 2 = 6$

2. (a) Which **one** of the following gives the meaning of $(f \circ g)(x)$?

a. $f(x)g(x)$ **b.** $f(x) + g(x)$ **c.** $f(g(x))$ **d.** $\dfrac{f(x)}{g(x)}$ **e.** $f(x) - g(x)$

(b) Now, given

$$f(x) = 2x + 1 \qquad \text{and} \qquad g(x) = \frac{1}{2x}$$

Compute $(f \circ g)(x)$. Simplify your answer!

$$\begin{aligned}(f \circ g)(x) &= f(g(x)) \\ &= f\left(\frac{1}{2x}\right) \\ &= 2\left(\frac{1}{2x}\right) + 1 \\ &= \frac{1}{x} + 1\end{aligned}$$

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3. Find the values of x that satisfy the inequality

$$\frac{|x-3|}{x-1} \geq 0$$

We must have either: 1. $\frac{|x-3|}{x-1} = 0$, or 2. $\frac{|x-3|}{x-1} > 0$. The first case occurs when $x = 3$, and the second case occurs when $x - 1 > 0$, that is, when $x > 1$ (since $|x-3|$ is always positive). We conclude that the inequality holds when $x > 1$, or in the interval $(1, \infty)$.