MATH 118: Quiz 5

Name: key

Directions:

- Show your thought process (commonly called "showing your work") when solving each problem for full credit.
- If you do not know how to solve a problem, try your best and/or explain in English what you would do.
- Good luck!

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1. Suppose

$$f(x) = x^2 - x \qquad g(x) = -2x - 3x^2 \qquad h(x) = 2x - 1 \qquad k(x) = 1 - 2x$$

Evaluate and simplify the following:

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

$= x^2 - x + 4x + 6x^2 = \boxed{7x^2 + 3x}$

(b) $h \circ f$

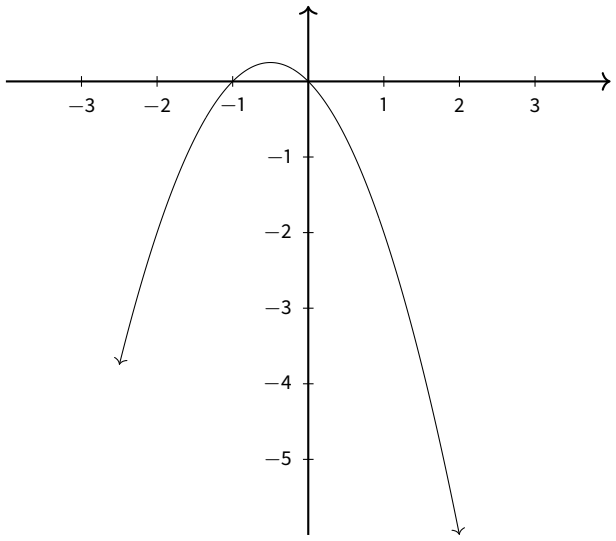
$(h \circ f)(x) = h(f(x)) = h(x^2 - x) = 2(x^2 - x) - 1 = \boxed{2x^2 - 2x - 1}$

(c) $k \circ k$

$(k \circ k)(x) = k(k(x)) = 1 - 2(1 - 2x) = 1 - 2 + 4x = \boxed{4x - 1}$

(d) $\dfrac{-h(x)}{k(x)} = \dfrac{-(2x-1)}{1-2x} = \dfrac{-2x+1}{1-2x} = \dfrac{1-2x}{1-2x} = \boxed{1}$

(e) On what interval is $f(x)$ increasing and decreasing?



increasing : $(-\infty, -\frac{1}{2})$

decreasing : $(-\frac{1}{2}, \infty)$

2. Consider $g(x) = 3 - 2\sqrt{-2x-4}$. Identify each transformation and the order you would apply them in to transform the parent $f(x) = \sqrt{x}$ into $g(x)$.

$g(x) = 3 - 2\sqrt{-2x-4}$

$= 3 - 2\sqrt{-2(x+2)}$

(5) (1) (3) (2) (4) (6)

(1) reflection around x-axis

(2) reflection around y-axis

(3) v stretch by factor of 2

(4) h shrink by factor of $\frac{1}{2}$

(5) v shift up 3 units

(6) h shift left 2 units

3. Write the expression for the average rate of change of $f(x)$ on the interval $(-2, 3)$.

$$\frac{f(3) - f(-2)}{3 - (-2)}$$