# Math 201 Quiz 3A

September 5, 2014

Name: ANSWERS

Instructions: No calculators. Use your own scrap. Write your fully simplified answers in the space provided.

1. Let $f(x) = 2x^3$, find and simplify the following:

   (a) $f(2) =$ 16   (b) $f(a^2) =$ $2a^6$   (c) $f(x+h) =$ $2h^3 + 6h^2x + 6hx^2 + 2x^3$

   (d) $\frac{f(x+h)-f(x)}{h} =$ $2h^2 + 6hx + 6x^2$   (e) $\frac{f(x)-f(a)}{x-a} =$ $2a^2 + 2ax + 2x^2$

2. Now suppose $f(x) = \frac{1}{x}$, find and simplify $\frac{f(x+h)-f(x)}{h} =$ $-\frac{1}{xh + x^2}$

3. Using interval notation, state the domain of $f(t) = \frac{1}{\sqrt{3-t}-\sqrt{2+t}}$. $D$: $[-2, \frac{1}{2}) \cup (\frac{1}{2}, 3]$

4. Even, odd or neither?: (a) $f(x) = x|x|$ odd (b) $y = x^3 - x^5 + 1$ neither (c) $y = \frac{x^3}{x^4+1}$ odd

5. If $f(x) = 2x^2 - x$ and $g(x) = 3x - 1$, find:

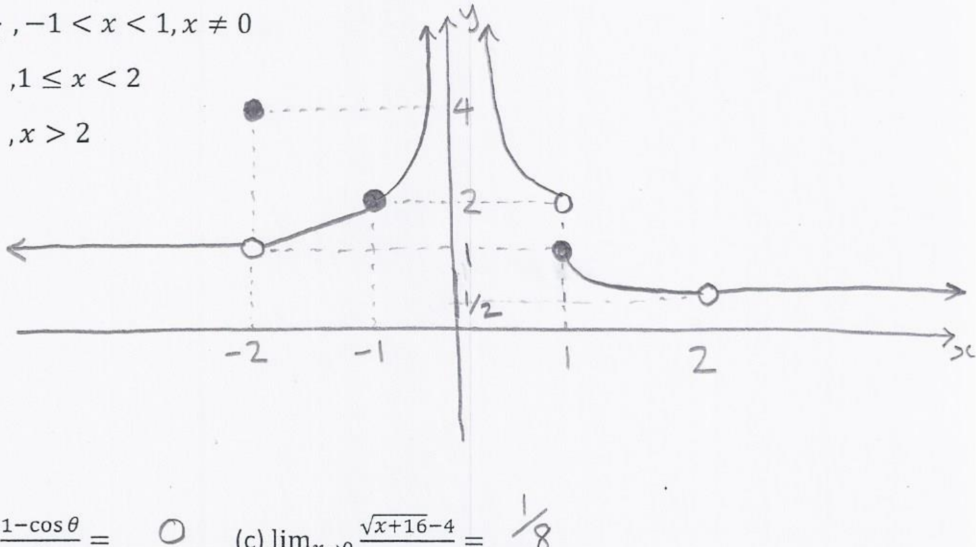
   (a) $f \circ g$ $18x^2 - 15x + 3$   (b) $fg$ $6x^3 - 5x^2 + x$   (c) $\frac{f}{g}$ $\frac{2x^2 - x}{3x - 1}$

   (d) $dom\left(\frac{f}{g}\right) =$ $(-\infty, \frac{1}{3}) \cup (\frac{1}{3}, \infty)$   (e) $f - g$ $2x^2 - 4x + 1$   (f) $dom(f-g)$ $(-\infty, \infty)$

6. Find the exact values.

   (a) $\sin\frac{5\pi}{3} =$ $-\sqrt{3}/2$   (b) $\cos\left(\frac{7\pi}{4}\right) =$ $1/\sqrt{2} = \sqrt{2}/2$   (c) $\csc\frac{5\pi}{4} =$ $-\sqrt{2}$

7. Sketch the graph of $f(x) = \begin{cases} 1 & , x < -2 \\ 4 & , x = -2 \\ x+3 & , -2 < x \leq -1 \\ 1 + \frac{1}{x^2} & , -1 < x < 1, x \neq 0 \\ \frac{1}{x} & , 1 \leq x < 2 \\ \frac{1}{2} & , x > 2 \end{cases}$




**Bonus problems:**

(a) $\lim_{t\to 0}\frac{\sin t}{t} =$ 1   (b) $\lim_{\theta\to 0}\frac{1-\cos\theta}{\theta} =$ 0   (c) $\lim_{x\to 0}\frac{\sqrt{x+16}-4}{x} =$ $1/8$

(d) For $f(x)$ in problem 7 above, find $\lim_{x\to -2} f(x) =$ 1