Math 201 Quiz 2A

September 2, 2014

Name: ANSWERS

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

1. Expand and simplify.

   (a) $(\sqrt{x}+3)^2 =$ $x + 6\sqrt{x} + 9$ (b) $(x-2)^3 =$ $x^3 - 6x^2 + 12x - 8$

2. Factor each expression.

   (a) $4x^2 - 11xy - 3y^2 =$ $(4x+y)(x-3y)$ (b) $3x^4 + 10x^2 + 3 =$ $(3x^2+1)(x^2+3)$

   (c) $81a^4 - 16b^4 =$ $(3a-2b)(3a+2b)(9a^2+4b^2)$ (d) $x^4 + 8x =$ $x(x+2)(x^2-2x+4)$

3. Complete the square: $3x^2 + 6x + 7 =$ $3(x+1)^2 + 4$

4. Solve the inequality (Write your solution in interval notation): $\frac{x+7}{2x+12} + \frac{6}{x^2-36} \leq 0$.

   Answer: $x \in$ $[5, 6)$

5. Find an equation for the line that passes through the point $(3, -5)$ and (i) has slope -4 $y = -4x + 7$ or (ii) is perpendicular to $2x - 4y = 3$ $y = -2x + 1$

6. If $f(x) = \sqrt{x}$, find, rationalize and simplify $\frac{f(x+h)-f(x)}{h} =$ $\frac{1}{\sqrt{h+x} + \sqrt{x}}$

7. Find the domain of the following functions. Write in interval notation.

   (a) $f(x) = \frac{2x+1}{x^2-x-2}$ $D:$ $(-\infty, -1) \cup (-1, 2) \cup (2, \infty)$ (b) $g(x) = \frac{\sqrt{3-x}}{\sqrt{1-x^2}}$ $D:$ $(-1, 1)$

8. If $f(x) = 2x^2 - x + 4$ and $g(x) = 3x - 1$, find:

   (a) $f \circ g$ $18x^2 - 15x + 7$ (b) $g \circ f$ $6x^2 - 3x + 11$

9. Find the exact values.

   (a) $\sin\frac{\pi}{3} =$ $\sqrt{3}/2$ (b) $\cos\left(\frac{7\pi}{6}\right) =$ $-\sqrt{3}/2$ (c) $\sec\frac{5\pi}{4} =$ $-\sqrt{2}$

10. Find all values of x such that $\cos 2x = \sin x$ for $0 \leq x \leq 2\pi$. $x =$ $\pi/6, 5\pi/6, 3\pi/2$

11. Sketch the graphs of the given functions.

    (a) $y = \sin x$ (b) $y = x^2 + 1$ (c) $3x - 5y = 30$ (d) $y = \sqrt{x-3}$