Math 201 Quiz 2B

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) $(\sqrt{x}-2)^2 =$ $x - 4\sqrt{x} + 4$ (b) $(x-3)^3 =$ $x^3 - 9x^2 + 27x - 27$

2. Factor each expression.

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

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

3. Complete the square: $3x^2 + 12x + 7 =$ $3(x+2)^2 - 5$

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

   Answer: $x \in$ $(-\infty, -6) \cup (-6, 5] \cup (6, \infty)$

5. Find an equation for the line that passes through the point $(2, -5)$ and (i) has slope -4 $y = -4x + 3$ 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) $g(x) = \frac{\sqrt{2-x}}{\sqrt{1-x^2}}$ $D:$ $(-1, 1)$

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

   (a) $f \circ g$ $12x^2 - 14x + 8$ (b) $g \circ f$ $6x^2 - 2x + 7$

9. Find the exact values.

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

10. Find all values of x such that $\cos 2x = \cos x$ for $0 \leq x \leq 2\pi$. $x =$ $0, 2\pi/3, 4\pi/3, 2\pi$

11. Sketch the graphs of the given functions.

    (a) $y = \cos x$ (b) $y = x^2 + 4$ (c) $4x - 6y = 24$ (d) $y = \sqrt{x-1}$