Math 1203 Quiz 1
January 16, 2019

Name: ANSWERS

Instructions: Answer all problems in the space provided! No calculators! Use your own scrap paper.

1. Evaluate each expression without a calculator.

(a) $(-3)^4 =$ 81 (b) $-3^4 =$ -81 (c) $3^{-4} =$ $\frac{1}{81}$

(d) $\frac{5^{23}}{5^{21}} =$ 25 (e) $\left(\frac{2}{3}\right)^{-2} =$ $\frac{9}{4}$ (f) $16^{-3/4} =$ $\frac{1}{8}$

2. Expand and simplify.

(a) $(x+3)(4x-5) =$ $4x^2+7x-15$ (b) $(\sqrt{a}+\sqrt{b})(\sqrt{a}-\sqrt{b}) =$ $a-b$

(c) $(2x+3)^2 =$ $4x^2+12x+9$

3. Factor each expression.

(a) $4x^2-25 =$ $(2x-5)(2x+5)$ (b) $2x^2+5x-12 =$ $(2x-3)(x+4)$

(c) $x^3-3x^2-4x+12 =$ $(x-3)(x-2)(x+2)$ (d) $x^4+27x =$ $x(x+3)(x^2-3x+9)$

(e) $3x^{3/2}-9x^{1/2}+6x^{-1/2} =$ $3x^{-1/2}(x-1)(x-2)$ (f) $x^3y-4xy =$ $xy(x-2)(x+2)$

4. Simplify the rational expression.

(a) $\frac{x^2+3x+2}{x^2-x-2} =$ $\frac{x+2}{x-2}$ (b) $\frac{2x^2-x-1}{x^2-9}\cdot\frac{x+3}{2x+1} =$ $\frac{x-1}{x-3}$

(c) $\frac{x^2}{x^2-4}-\frac{x+1}{x+2} =$ $\frac{1}{x-2}$ (d) $\frac{\frac{y}{x}-\frac{x}{y}}{\frac{1}{y}-\frac{1}{x}} =$ $-(x+y)$

5. Rationalize the expression and simplify.

(a) $\frac{\sqrt{10}}{\sqrt{5}-2} =$ $5\sqrt{2}+2\sqrt{10}$ (b) $\frac{\sqrt{4+h}-2}{h} =$ $\frac{1}{\sqrt{4+h}+2}$

6. Solve the equations for all real solutions.

(a) $2x^2+4x+1=0$ $x =$ $-1\pm\frac{\sqrt{2}}{2}$ (b) $x^2-x-12=0$ $x =$ $-3;4$

7. Solve each inequality. Write your answer in interval notation.

(a) $-4<5-3x\le 17$ $x\in$ $[-4,3)$ (b) $x^2<2x+8$ $x\in$ $(-2,4)$

(c) $|x-4|<3$ $x\in$ $(1,7)$ (d) $\frac{2x-3}{x+1}\le 1$ $x\in$ $(-1,4]$

8. State whether each equation is true or false by writing "T" or "F", respectively.

(a) $(p+q)^2 = p^2+q^2$ F (b) $\sqrt{ab} = \sqrt{a}\sqrt{b}$ T (c) $\sqrt{a^2+b^2} = a+b$ F

(c) $\frac{1+TC}{C} = 1+T$ F (e) $\frac{1}{x-y} = \frac{1}{x} - \frac{1}{y}$ F (f) $\frac{\frac{1}{x}}{\frac{a}{x}-\frac{b}{x}} = \frac{1}{a-b}$ T

9. Find an equation for the line that passes through the point $(2,-5)$ and

(a) has slope -3 $y = -3x+1$ (b) is parallel to the x-axis $y = -5$

(c) is parallel to the y-axis $x = 2$ (d) is parallel to $2x-4y=3$ $y = \frac{1}{2}x - 6$

10. Find the equation of the line that contains $A(-7,4)$ and $B(5,-12)$. $y = -4/3\,x - 16/3$

11. If $f(x) = x^2$, find and simplify $\frac{f(2+h)-f(2)}{h} =$ $4+h$

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

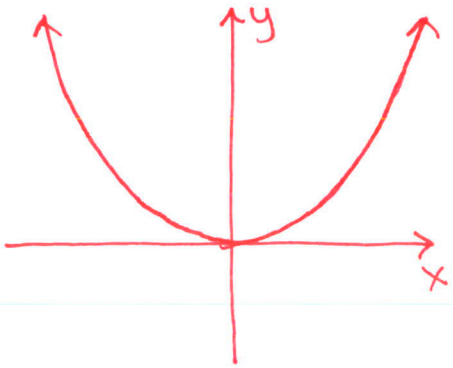
(a) $f(x) = \frac{2x+1}{x^2+x-2}$ $D: (-\infty,-2)\cup(-2,1)\cup(1,\infty)$ (b) $g(x) = \frac{\sqrt[3]{x}}{x^2+1}$ $D: (-\infty,\infty)$

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

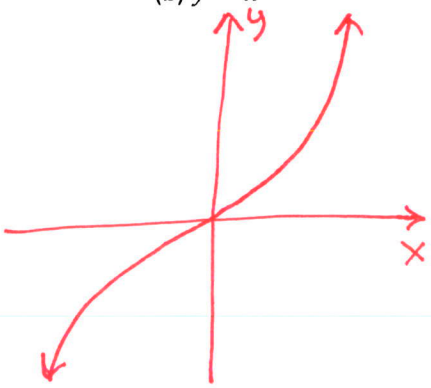
(a) $f \circ g$ $4x^2-8x+2$ (b) $g \circ f$ $2x^2+4x-5$

14. Sketch the graphs of the given functions.

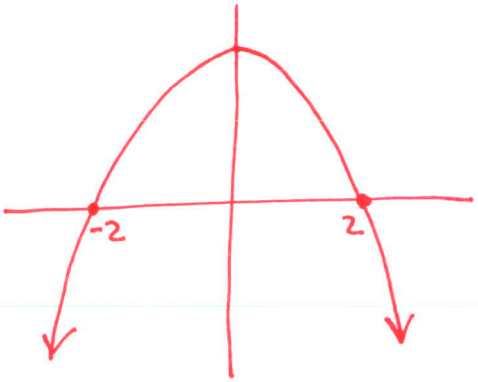
(a) $y = x^2$



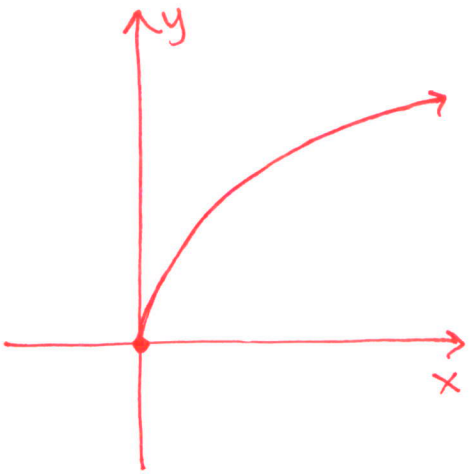
(b) $y = x^3$



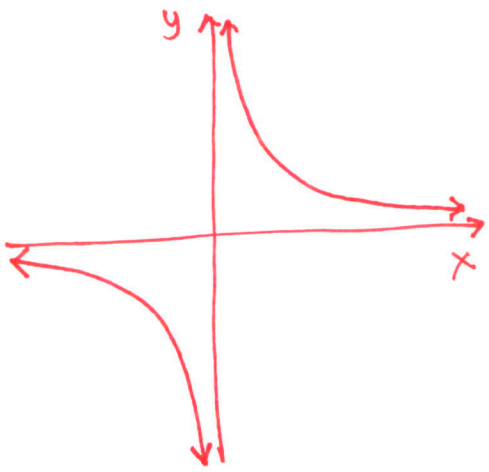
(c) $y = 4 - x^2$



(c) $y = \sqrt{x}$



(e) $y = \frac{1}{x}$



(f) $2x+3y=6$