

Math 201 Quiz 1

August 28, 2019

Name: ANSWERS

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

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) $x^3y - 4xy = xy(x-2)(x+2)$

4. Simplify the rational expression.

(a) $\frac{x^2+3x+2}{x^2-x-2} = \frac{x+2}{x-2}$

(b) $\frac{x^2}{x^2-4} - \frac{x+1}{x+2} = \frac{1}{x-2}$

(c) $\frac{\frac{y}{x} \cdot \frac{x}{y}}{\frac{1}{y} \cdot \frac{1}{x}} = -(x+y)$

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) $\frac{2x}{x+1} = \frac{2x-1}{x}$ $x = 1$

(b) $x^2 - x - 12 = 0$ $x = -3, 4$

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

(a) $x(x-1)(x+2) > 0$ $x \in (-2, 0) \cup (1, \infty)$

(b) $|x-4| < 3$ $x \in (1, 7)$

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

9. 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) $g(x) = \frac{\sqrt[3]{x}}{x^2+1}$ $D: (-\infty, \infty)$

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

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

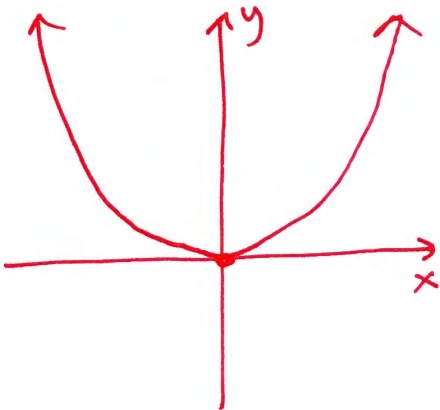
11. Find the exact values.

(a) $\tan \frac{\pi}{3} = \sqrt{3}$ (b) $\sin \left(\frac{7\pi}{6}\right) = -\frac{1}{2}$ (c) $\sec \frac{5\pi}{3} = 2$

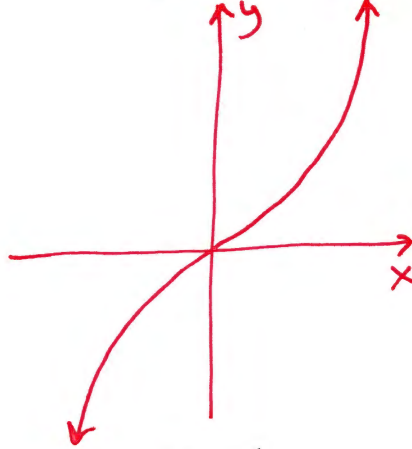
12. Find all values of x such that $\sin 2x = \sin x$ for $0 \leq x \leq 2\pi$. $x = 0, \frac{\pi}{3}, \pi, \frac{5\pi}{3}, 2\pi$

13. Sketch the graphs of the given functions.

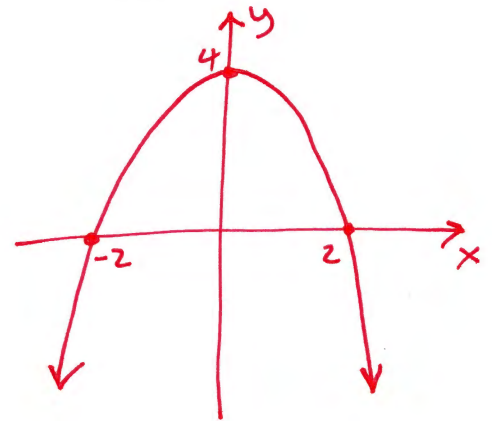
(a) $y = x^2$



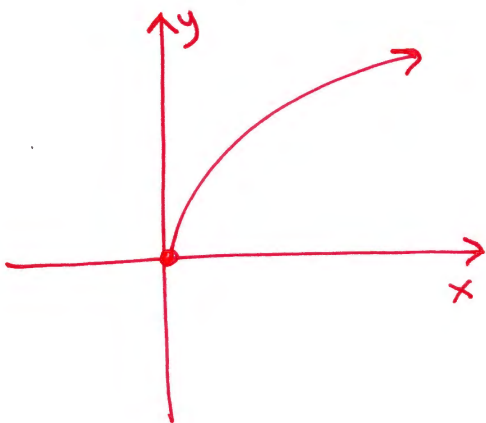
(b) $y = x^3$



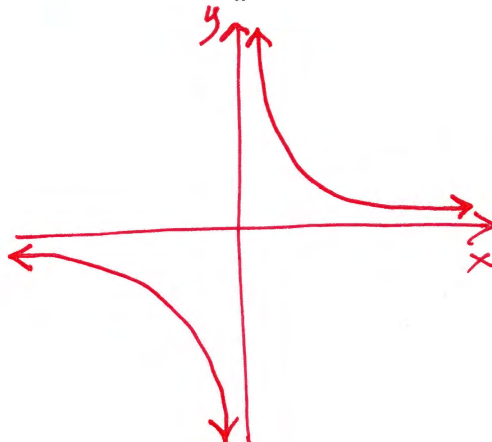
(c) $y = 4 - x^2$



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



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



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

