

Math 195 Quiz 1

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

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) $x^2 - x - 12 = 0$ $x = -3; 4$
 (c) $2x^2 + 4x + 1 = 0$ $x = -1 \pm \sqrt{2}/2$ (d) $3|x-4| = 10$ $x = 2\frac{2}{3}; 2\frac{2}{3}$

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. 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 $2x - 4y = 3$ $y = \frac{1}{2}x - 6$

9. If $f(x) = x^3$, find and simplify $\frac{f(2+h) - f(2)}{h} =$ $12 + 6h + h^2$

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

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

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

12. Find the exact values.

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

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

14. Sketch the graphs of the given functions.

