

Math 205 Quiz 1

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

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

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

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

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

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

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) $\frac{\frac{1}{x}}{\frac{a-b}{x}} = \frac{1}{a-b}$ 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.

