NAME_____

MATH 2401   PRACTICE QUIZ 1

1.   Circle one correct answer for each problem.
        (1)   Which one of the following equations defines y as a function of x?
                (a) $xy = \sqrt{3}$ (b) $|y - 7| = x$ (c) $y^2 + x = y$
                (d) $x = 3$ (e) None of these

        (2)   Find the domain of the function $y = |12x - 3|$.
                (a) $\left(-\infty, \frac{1}{4}\right) \cup \left(\frac{1}{4}, \infty\right)$ (b) $(-\infty, \infty)$
                (c) $\left(\frac{1}{4}, \infty\right)$ (d) $x = \frac{1}{4}$ (e) None of these

        (3)   Let $f(x) = cos x + sin x$. Find $f(\pi)$.
                (a) Undefined   (b) -1 (c) 0
                (d) 1 (e) None of these

2.   Find the **domain** the function.
        $$y = \sqrt{3 - 7x}$$

3.   Find the **range** of the function.
        $$y = \frac{x}{x + 8}$$

4.   Let $f(x) = \sqrt{x + 2} - 5$. Find $\dfrac{f(x + h) - f(x)}{h}$.
        Don't forget to rationalize the numerator.

5. Evaluate each limit, if it exists. If the limit does not exist, state that it does not exist.

(1) $\lim\limits_{x \to -3} (2x^2 - x + 1)$

$$\boxed{}$$

(2) $\lim\limits_{x \to -5} \dfrac{x-5}{x^2 - 25}$

$$\boxed{}$$

(3) $\lim\limits_{x \to \frac{1}{3}} |1 - 9x|$

$$\boxed{}$$

(4) $\lim\limits_{x \to 4} \dfrac{x-4}{x^2 - 6x + 8}$

$$\boxed{}$$

(5) $\lim\limits_{x \to 1} \dfrac{x+1}{x^2 + 1}$

$$\boxed{}$$

(6) $\lim\limits_{x \to 49} \dfrac{49 - x}{7 - \sqrt{x}}$

$$\boxed{}$$

Click here for the answers

1.   Circle one correct answer for each problem.
      (1)   Which one of the following equations defines y as a function of x?
             (a) $xy = \sqrt{3}$ (b) $|y - 7| = x$ (c) $y^2 + x = y$
             (d) $x = 3$ (e) None of these
                    The correct answer is (a)
      (2)   Find the domain of the function $y = |12x - 3|$.
             (a) $\left(-\infty, \frac{1}{4}\right) \cup \left(\frac{1}{4}, \infty\right)$ (b) $(-\infty, \infty)$

             (c) $\left(\frac{1}{4}, \infty\right)$ (d) $x = \frac{1}{4}$ (e) None of these
                    The correct answer is (b)
      (3)   Let $f(x) = cosx + sinx$. Find $f(\pi)$.
             (a) Undefined   (b) -1 (c) 0
             (d) 1 (e) None of these
                    The correct answer is (b)

2.   Find the **domain** the function.
            $y = \sqrt{3 - 7x}$
                    Solve $3 - 7x \geq 0$ *to find the domain* :
                          $-7x \geq -3$
                          $x \leq 3/7$
                    The domain : $(-\infty, 3/7]$

3.   Find the **range** of the function.
            $y = \dfrac{x}{x + 8}$ *First solve the equation for y* :

                                            $y(x + 8) = x$
                                            $yx + 8y = x$
                                            $8y = x - yx$
                                            $8y = (1 - y)x$
                                            $8y/(1 - y) = x$
                                    Now examine the expression in y :
                                          $1 - y \neq 0,\ so\ 1 \neq y$
                                    The range : $(-\infty, 1) \cup (1, \infty)$

4.   Let $f(x) = \sqrt{x + 2} - 5$. Find $\dfrac{f(x + h) - f(x)}{h}$.

      Don't forget to rationalize the numerator.

$$\frac{[\sqrt{(x + h) + 2} - 5] - [\sqrt{x + 2} - 5]}{h} = \frac{\sqrt{x + h + 2} - 5 - \sqrt{x + 2} + 5}{h} =$$

$$\frac{\sqrt{x + h + 2} - \sqrt{x + 2}}{h} = \frac{\sqrt{x + h + 2} - \sqrt{x + 2}}{h} \cdot \frac{\sqrt{x + h + 2} + \sqrt{x + 2}}{\sqrt{x + h + 2} + \sqrt{x + 2}} =$$

$$\frac{x + h + 2 - (x + 2)}{h(\sqrt{x + h + 2} + \sqrt{x + 2})} = \frac{x + h + 2 - x - 2}{h(\sqrt{x + h + 2} + \sqrt{x + 2})} =$$

$$\frac{h}{h(\sqrt{x + h + 2} + \sqrt{x + 2})} = \frac{1}{\sqrt{x + h + 2} + \sqrt{x + 2}}$$

5.   Evaluate each limit, if it exists. If the limit does not exist, state that it does not exist.

(1) $\lim\limits_{x\to-3}(2x^2 - x + 1) = 2(-3)^2 - (-3) + 1 = 18 + 3 + 1 = 22$

(2) $\lim\limits_{x\to-5}\dfrac{x - 5}{x^2 - 25} = \lim\limits_{x\to-5}\dfrac{x - 5}{(x + 5)(x - 5)} = \lim\limits_{x\to-5}\dfrac{1}{x + 5} = \dfrac{1}{-5 + 5} = \dfrac{1}{0}$ is

        $undefined,\ and\ so\ the\ limit\ does\ not\ exist.$

(3) $\lim\limits_{x\to\frac{1}{3}}|1 - 9x| = |1 - 9\cdot 1/3| = |1 - 3| = |-2| = 2$

(4) $\lim\limits_{x\to4}\dfrac{x - 4}{x^2 - 6x + 8} = \lim\limits_{x\to4}\dfrac{x - 4}{(x - 2)(x - 4)} = \lim\limits_{x\to4}\dfrac{1}{x - 2} = \dfrac{1}{4 - 2} = \dfrac{1}{2}$

(5) $\lim\limits_{x\to1}\dfrac{x + 1}{x^2 + 1} = \dfrac{1 + 1}{1^2 + 1} = \dfrac{2}{2} = 1$

(6) $\lim\limits_{x\to49}\dfrac{49 - x}{7 - \sqrt{x}} = \lim\limits_{x\to49}\dfrac{(7 + \sqrt{x})(7 - \sqrt{x})}{7 - \sqrt{x}} = \lim\limits_{x\to49}(7 + \sqrt{x}) = 7 + \sqrt{49} =$
        $7 + 7 = 14$