MCR3U - Quiz #4

Full Name: SOL'NS **Per:** 8 / 9

Date: October 12th, 2023

23

- Unless otherwise stated, all variables belong to the real number set
- All restrictions must be stated
- Calculators are permitted

Part A - Multiple Choice ***(1 mark each)***

ANSWER: A

1. For what values of x is the following expression undefined? $\frac{x+5}{x^2-x}$

A) $0, 1$ B) 1 C) -1 D) -5 E) 0 F) $-5, 1, 0$

ANSWER: C

2. How many of the following rational expressions do not have any restrictions on the variable?

$\frac{x^2-1}{x}$ $\frac{x^2+1}{x^2}$ $\frac{x^2+4x+3}{6}$ $\frac{x^2-25}{x-5}$ $\frac{x^2+1}{x^3+1}$ $\frac{x^2-4}{x^4+64}$

A) 0 B) 1 C) 2 D) 3 E) 4 F) 5 G) 6

ANSWER: C

3. Simplify completely $\frac{3x-4}{4-3x}$

A) $1, x \neq \frac{3}{4}$ B) $-1, x \neq \frac{3}{4}$ C) $-1, x \neq \frac{4}{3}$ D) $1, x \neq \frac{4}{3}$ E) $0, x \neq \frac{4}{3}$

ANSWER: A

4. Which of the following is equivalent to $\frac{20xy-8y^2+4y}{4y}$?

A) $5x - 2y + 1$ B) $5xy - 2y + 1$ C) $5xy - 2y$ D) $10xy - 4y^2$ E) $5xy + 1$ F) $5xy - 2y^2$

ANSWER: B

5. When simplified, $\frac{3x^2-5x-12}{x-3} = Ax + B$. What is the value of $A + B$?

A) -7 B) 7 C) -1 D) -6 E) 6 F) None of the above

ANSWER: E

6. Simplify completely $\frac{15a^6}{7b^4} \cdot \frac{28b^6}{3a^8}$

A) $20a^2b^2$ B) $\frac{20}{a^2b^2}$ C) $\frac{a^2}{20b^2}$ D) $\frac{45a^{14}}{196b^{10}}$ E) $\frac{20b^2}{a^2}$ F) $\frac{20a^2}{b^2}$

ANSWER: D

7. For what values of x is the following expression equal to zero? $\frac{x^2-2x-3}{x^2-4x+4}$

A) 2 B) $3, 2, -1$ C) -1 D) $3, -1$ E) 3 F) *None of the above*

ANSWER: A

8. What is the domain for the following rational function? $f(x) = \frac{x^2+4x+3}{x^2+6x+9}$

A) $\{x \in \mathbb{R} | x \neq -3\}$ B) $\{x \in \mathbb{R} | x \neq 3\}$ C) $\{x \in \mathbb{R} | x \neq -1, -3\}$

D) $\{x \in \mathbb{R} | x \neq 1, 3\}$ E) $\{x \in \mathbb{R} | x \neq 6, -9\}$ F) $\{x \in \mathbb{R}\}$

8 marks

Part B – Full Solutions

1. Simplify and state all restrictions:

a) $\frac{-4(x-7)(2x+1)(x+3)}{20(2x+1)(x-7)}$ (−1 / 5)

$= \frac{-(x+3)}{5}$, $x \neq -\frac{1}{2}, 7$ ✓✓

b) $\frac{(x+2)(5-x)}{(x^2+4)(x-5)}$ (−1)

$= -\frac{x+2}{x^2+4}$, $x \neq 5$ ✓✓

12

c) $\frac{x^4-x^2-12}{2x^2+x-10}$

$= \frac{(x^2-4)(x^2+3)}{(2x+5)(x-2)}$; $x \neq -\frac{5}{2}, 2$

$= \frac{(x-2)(x+2)(x^2+3)}{(2x+5)(x-2)}$ 3

$= \frac{(x+2)(x^2+3)}{2x+5}$, $x \neq -\frac{5}{2}, 2$

d) $\frac{2x^3+12x^2+16x}{6x+24} \cdot \frac{x-1}{8x^3+16x^2}$

$= \frac{2x(x^2+6x+8)}{6(x+4)} \cdot \frac{x-1}{8x^2(x+2)}$

$= \frac{2x(x+2)(x+4)}{6(x+4)} \cdot \frac{x-1}{8x^2(x+2)}$, $x \neq -4, 0, -2$ 4

$= \frac{x-1}{24x}$, $x \neq -4, -2, 0$

e) $\frac{100x^2-9}{3x^2-30x+75} \cdot \frac{x^2-15x+50}{-30x+9}$

$= \frac{(10x-3)(10x+3)}{3(x^2-10x+25)} \cdot \frac{(x-5)(x-10)}{-3(10x-3)}$

$= \frac{(10x-3)(10x+3)}{3(x-5)} \cdot \frac{(x-5)(x-10)}{-3(10x-3)}$, $x \neq 5, \frac{3}{10}$ 4

$= -\frac{(10x+3)(x-10)}{9(x-5)}$, $x \neq \frac{3}{10}, 5$

11