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MCR3U

MCR3U U1 - Rational Expressions Test

K ___/14 T ___/21 C ___/5

K ___/5

Multiple Choice

Identify the choice that best completes the statement or answers the question.

a 1. Simplify $(11v^2 - 6vw - 3w^2) - (-7v^2 + vw + 13w^2)$.

a. $18v^2 - 7vw - 16w^2$
c. $2(vw)^2 - 7vw$
b. $4v^2 - 5vw + 10w^2$
d. $18v^2 - 5vw + 10w^2$

a 2. Which of the following represents the first step for factoring $g^3 + 5g^2 + 2g + 10$ by grouping?

a. $g^2(g + 5) + 2(g + 5)$
c. $(g + 5)^3$
b. $(g^2 + 5) + (2g + 5)$
d. $(g + 5)(g + 5) + (g + 2)(g + 2)$

d 3. Which of the following are factors for the polynomial $9x^2 - 16$?

a. $(9x - 16)(x + 1)$
c. $(9x + 4)(x - 4)$
b. $(3x - 4)(3x - 4)$
d. $(3x + 4)(3x - 4)$

a 4. Which of the following are factors for the polynomial $2q^2 + 24q + 72$?

a. $2(q + 6)(q + 6)$
c. $(2q + 9)(q + 8)$
b. $2(q + 9)(q + 8)$
d. $2(q + 9)(q + 4)$

$2(q^2 + 12q + 36)$ $36 \to 1, 36, 2, 18, 3, 12, 4, 9, 6, 6$
$= 2(q^2 + 6q + 6q + 36)$
$= 2(q(q+6) + 6(q+6))$
$= 2(q+6)(q+6)$

c 5. What are the restrictions on the variable for $\frac{d^2 + 10d + 25}{5d^2 - 25d}$?

a. $d \neq -5, 0, 5$
c. $d \neq 0, 5$
b. $d \neq 0$
d. No restrictions

$5d(d - 5)$ $d - 5 = 0$, $d \neq +5$; $5d = 0$, $d = \frac{0}{5}$, $d \neq 0$

Full Solution - Write clear and thorough solutions to the following problems. You can receive up to 4 Communication Points for how well your mathematics is presented.

K ___/2

6. Expand and simplify.
$(x + 5)(x - 3) + (x - 6)(x + 1)$

$= (x^2 - 3x + 5x - 15) + (x^2 + x - 6x + 6)$
$= (x^2 + 2x - 15) + (x^2 - 5x + 6)$
$= x^2 + 2x - 15 + x^2 - 5x + 6$
$= 2x^2 - 3x - 9$

K ___/2

7. Factor $f(n) = n^3 + 4n^2 + 3n + 12$ by grouping.

$= (n^3 + 4n^2) + (3n + 12)$
$= n^2(n + 4) + 3(n + 4)$
$= (n + 4)(n^2 + 3)$

8. **Simplify and state any restrictions on the variable.** K ____/2

$3w^4\left(\frac{12w^4}{21w^6}\right)$ Res: $w \neq 0$

$= 3w^4\left(\frac{4}{7w^2}\right)$

9. **Simplify and state any restrictions on the variable.** K ____/3

$\frac{q^2 - 14q + 49}{q^2 - 49}$

$\frac{x}{49} \left| \frac{+}{-14} \right.$ $-7, -7$

$= q^2 - 7q - 7q + 49$

$= q(q-7) - 7(q-7)$

$= (q-7)^2$

$= \frac{(q-7)^2}{(q-7)(q+7)}$

$q - 7 = 0$

$q = +7$

$q + 7 = 0$

$q = -7$

Res: $q \neq -7, 7$

10. **Simplify** $\frac{2x^2 + 7x + 3}{x - 4} \times \frac{x^2 - 16}{x^2 + 8x + 15}$ **and state any restrictions on the variables.** T ____/4

$= \frac{2x^2+7x+3}{x-4} \times \frac{(x-4)(x+4)}{x^2+8x+15}$

$= \frac{(x+3)(2x+1)}{x-4} \times \frac{(x-4)(x+4)}{(x+3)(x+5)}$

$= \frac{(2x+1)(x+4)}{x+5}$

$\frac{x}{6} \left| \frac{+}{7} \right.$ $6, 1$

$= 2x^2 + 6x + x + 3$

$= 2x(x+3) + 1(x+3)$

$= (x+3)(2x+1)$

$\frac{x}{15} \left| \frac{+}{8} \right.$ $5, 3$

$= x^2 + 3x + 5x + 15$

$= x(x+3) + 5(x+3)$

$= (x+3)(x+5)$

Res: $x \neq 4, -3, -5$

11. **Simplify** $\frac{4-x}{3x^2-4x-4} + \frac{5x-20}{6x^2-17x+10}$ **and state any restrictions on the variables.** T ___/4

$= \frac{4-x}{(x-2)(3x+2)} \div \frac{5(x-4)}{(x-2)(6x-5)}$ Res

$= \frac{4-x}{(x-2)(3x+2)} \times \frac{(x-2)(6x-5)}{5(x-4)}$

$= \frac{-1(6x-5)}{5(3x+2)}$

x	+
$-\frac{1}{2}$	-4
$-6, 2$	

$= 3x^2 - 6x + 2x - 4$
$= 3x(x-2) + 2(x-2)$
$= (x-2)(3x+2)$

x	+
60	-17
$-12, -5$	

$= 6x^2 - 12x - 5x + 10$
$= 6x(x-2) - 5(x-2)$
$= (x-2)(6x-5)$

Res: $x \neq 4, 2, -\frac{2}{3}, \frac{5}{6}$

12. **Simplify and state any restrictions on the variable.** T ___/4

$\frac{5k}{k^2-k-6} + \frac{4}{k^2+4k+4}$ CD: $(k+2)^2(k-3)$

$= \frac{5k}{(k+2)(k-3)} + \frac{4}{(k+2)^2}$

$= \frac{5k(k+2)}{(k+2)^2(k-3)} + \frac{4(k-3)}{(k+2)^2(k-3)}$

$= \frac{5k^2+10k+4k-12}{(k+2)^2(k-3)}$

$= \frac{5k^2+14k-12}{(k+2)^2(k-3)}$

x	+
$-\frac{1}{6}$	-1
$-3, 2$	

$= k^2 + 2k - 3k - 6$
$= k(k+2) - 3(k+2)$
$= (k+2)(k-3)$

x	+
-4	-4
$2, 2$	

$= k^2 + 2k + 2k + 4$
$= k(k+2) + 2(k+2)$
$= (k+2)^2$

Res: $k \neq -2, 3$

13. **Simplify and state any restrictions on the variable.** T ___/4

$$\frac{m}{3m^2-9m+6}-\frac{2m+1}{3m^2+3m-6}$$

$$=\frac{m}{3(m^2-3m+2)}-\frac{2m+1}{3(m^2+m-2)}$$

$$=\frac{m}{3(m-1)(m-2)}-\frac{2m+1}{3(m-1)(m+2)}$$

$$=\frac{m(m+2)}{3(m-1)(m-2)(m+2)}\quad\frac{(-2m-1)(m-2)}{3(m-1)(m-2)(m+2)}$$

$$=\frac{m^2+2m-2m^2+3m+2}{3(m-1)(m-2)(m+2)}$$

$$=\frac{-m^2+5m+2}{3(m-1)(m-2)(m+2)}$$

$x\mid +$
$2\mid -3$
$-1,-2$

$=m^2-1m-2m+2$
$=m(m-1)-2(m-1)$
$=(m-1)(m-2)$

$x\mid +$
$-2\mid 1$
$2,-1$

$=m^2-1m+2m-2$
$=m(m-1)+2(m-1)$
$=(m-1)(m+2)$

Res: $m\neq 1, 2, -2$

CD: $3(m-1)(m-2)(m+2)$

14. **Simplify and state any restrictions on the variable. Remember the order of operations.** T ___/5

$$\frac{7x}{5x^2-125}+\frac{4}{3x+15}\div\frac{2x}{x^2+8x+15}$$

$$=\frac{7x}{5(x-5)(x+5)}+\frac{4}{3(x+5)}\div\frac{2x}{(x+3)(x+5)}$$

$$=\frac{7x}{5(x-5)(x+5)}+\frac{4^2}{3(x+5)_1}\times\frac{(x+3)(x+5)^1}{2x^1}$$

$$=\frac{7x}{5(x-5)(x+5)}+\frac{2(x+3)}{3x}$$

$$=\frac{7x(3x)}{15x(x-5)(x+5)}+\frac{2(5(x-5)(x+5))}{15x(x-5)(x+5)}$$

$$=\frac{7x(3x)}{15x(x-5)(x+5)}+\frac{2(5x^2-125)}{15x(x-5)(x+5)}=\frac{21x^2+10x^2-250}{15x(x-5)(x+5)}=\frac{31x^2-250}{15x(x-5)(x+5)}$$

$x\mid +$
$15\mid 8$
$5,3$

$=x^2+3x+5x+15$
$=x(x+3)+5(x+3)$
$=(x+3)(x+5)$

Res: $0, 25, -5, -3$

CD $=15x(x-5)(x+5)$

$5(x^2+5x-5x-25)$
$5(x^2-25)$
$5x^2-125$

C ___/1

15. **In the picture I have made a terrible error. Explain to me the mistake I have made.**

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

$$=\frac{x-2}{2x-5}$$

You reduced but you're only allowed to do this particular kind of reduction in a multiplication/division equasion this is not an equasion thus the only way it