

## Test Review - Rational Operations

Date \_\_\_\_\_ Period \_\_\_\_\_

**Simplify each expression.**

1)  $\frac{10n^2 - 30n - 40}{n^2 - n - 12}$

2)  $\frac{9x^2 + 36x - 45}{x^2 + 9x + 20}$

3)  $\frac{r^2 + 6r + 9}{r^2 + r - 6}$

4)  $\frac{b^2 + 5b - 6}{3b^2 + 6b - 9}$

**Simplify each and state the excluded values.**

5)  $\frac{2n - 18}{n^2 - 12n + 27} \cdot \frac{n^2 - 6n + 9}{n^2 - 7n + 12}$

6)  $\frac{3r + 3}{2r^2 + 2r} \cdot \frac{r^2 - 5r - 24}{3r - 24}$

7)  $\frac{4}{7a^2 + 49a} \cdot \frac{a^2 + a - 30}{4a - 20}$

8)  $\frac{9x^2 + 72x}{x^2 + x - 56} \cdot \frac{x^2 + x - 20}{x - 4}$

9)  $\frac{9r^2 - 63r}{9r^2 + 45r} \div \frac{r - 7}{r - 6}$

10)  $\frac{1}{n - 10} \div \frac{n + 1}{9n + 9}$

11)  $\frac{a^2 + 19a + 90}{5a^3 + 45a^2} \div \frac{a + 10}{a - 1}$

12)  $\frac{7}{n^2 + 12n + 20} \div \frac{9}{9n + 90}$

**Simplify each expression. State Excluded values.**

$$13) \frac{2r}{r+5} + \frac{2}{r+4}$$

$$14) \frac{4}{n-5} + \frac{3}{n+1}$$

$$15) \frac{6}{5p-20} + \frac{2}{p+4}$$

$$16) \frac{4k}{k-1} - \frac{6k}{k-3}$$

$$17) \frac{6n-3}{n+3} - \frac{n-4}{n+6}$$

$$18) \frac{5}{v+1} - \frac{2}{v-4}$$

**Solve each equation. Remember to check for extraneous solutions.**

$$19) \frac{1}{a-2} = \frac{6}{a+4} + \frac{1}{a^2+2a-8}$$

$$20) \frac{1}{x+1} = \frac{x-5}{x^2+2x+1} + \frac{x+4}{x^2+2x+1}$$

$$21) \frac{3}{b^2-8b+12} + \frac{1}{b-2} = \frac{1}{b^2-8b+12}$$

$$22) \frac{1}{m^2+5m} - \frac{m+1}{m} = \frac{5}{m^2+5m}$$

$$23) \frac{x^2-3x+2}{x^2+2x-24} = \frac{1}{x-4} + \frac{1}{x+6}$$

$$24) \frac{3}{a-4} + \frac{1}{a-4} = \frac{a^2-11a+30}{a^2-16}$$

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**Simplify each expression.**

1)  $\frac{10n^2 - 30n - 40}{n^2 - n - 12}$

$$\frac{10(n+1)}{n+3}$$

2)  $\frac{9x^2 + 36x - 45}{x^2 + 9x + 20}$

$$\frac{9(x-1)}{x+4}$$

3)  $\frac{r^2 + 6r + 9}{r^2 + r - 6}$

$$\frac{r+3}{r-2}$$

4)  $\frac{b^2 + 5b - 6}{3b^2 + 6b - 9}$

$$\frac{b+6}{3(b+3)}$$

**Simplify each and state the excluded values.**

5)  $\frac{2n - 18}{n^2 - 12n + 27} \cdot \frac{n^2 - 6n + 9}{n^2 - 7n + 12}$

$$\frac{2}{n-4}; \{9, 3, 4\}$$

6)  $\frac{3r + 3}{2r^2 + 2r} \cdot \frac{r^2 - 5r - 24}{3r - 24}$

$$\frac{r+3}{2r}; \{0, -1, 8\}$$

7)  $\frac{4}{7a^2 + 49a} \cdot \frac{a^2 + a - 30}{4a - 20}$

$$\frac{a+6}{7a(a+7)}; \{0, -7, 5\}$$

8)  $\frac{9x^2 + 72x}{x^2 + x - 56} \cdot \frac{x^2 + x - 20}{x - 4}$

$$\frac{9x(x+5)}{x-7}; \{7, -8, 4\}$$

9)  $\frac{9r^2 - 63r}{9r^2 + 45r} \div \frac{r-7}{r-6}$

$$\frac{r-6}{r+5}; \{0, -5, 6, 7\}$$

10)  $\frac{1}{n-10} \div \frac{n+1}{9n+9}$

$$\frac{9}{n-10}; \{10, -1\}$$

11)  $\frac{a^2 + 19a + 90}{5a^3 + 45a^2} \div \frac{a+10}{a-1}$

$$\frac{a-1}{5a^2}; \{0, -9, 1, -10\}$$

12)  $\frac{7}{n^2 + 12n + 20} \div \frac{9}{9n+90}$

$$\frac{7}{n+2}; \{-10, -2\}$$

**Simplify each expression. State Excluded values.**

$$13) \frac{2r}{r+5} + \frac{2}{r+4}$$
$$\frac{2r^2 + 10r + 10}{(r+5)(r+4)}$$

$$14) \frac{4}{n-5} + \frac{3}{n+1}$$
$$\frac{7n-11}{(n-5)(n+1)}$$

$$15) \frac{6}{5p-20} + \frac{2}{p+4}$$
$$\frac{16p-16}{5(p-4)(p+4)}$$

$$16) \frac{4k}{k-1} - \frac{6k}{k-3}$$
$$\frac{-2k^2 - 6k}{(k-3)(k-1)}$$

$$17) \frac{6n-3}{n+3} - \frac{n-4}{n+6}$$
$$\frac{5n^2 + 34n - 6}{(n+6)(n+3)}$$

$$18) \frac{5}{v+1} - \frac{2}{v-4}$$
$$\frac{3v-22}{(v-4)(v+1)}$$

**Solve each equation. Remember to check for extraneous solutions.**

$$19) \frac{1}{a-2} = \frac{6}{a+4} + \frac{1}{a^2+2a-8}$$
$$\{3\}$$

$$20) \frac{1}{x+1} = \frac{x-5}{x^2+2x+1} + \frac{x+4}{x^2+2x+1}$$
$$\{2\}$$

$$21) \frac{3}{b^2-8b+12} + \frac{1}{b-2} = \frac{1}{b^2-8b+12}$$
$$\{4\}$$

$$22) \frac{1}{m^2+5m} - \frac{m+1}{m} = \frac{5}{m^2+5m}$$
$$\{-3\}$$

$$23) \frac{x^2-3x+2}{x^2+2x-24} = \frac{1}{x-4} + \frac{1}{x+6}$$
$$\{0, 5\}$$

$$24) \frac{3}{a-4} + \frac{1}{a-4} = \frac{a^2-11a+30}{a^2-16}$$
$$\{14, 1\}$$