

**Math 100 Review Unit 1**

**Find the domain of the rational expression.**

$$1) f(x) = \frac{x^2 - 63x}{7x}$$

$$2) f(x) = \frac{1 - 2x}{x^2 - 16x + 60}$$

**Find the product and simplify.**

$$3) \frac{9x^4 - 72x}{3x^2 - 12} \cdot \frac{x^2 + x - 2}{4x^3 + 8x^2 + 16x}$$

$$4) \frac{2z^3}{3} \cdot \frac{18}{z^2}$$

$$5) \frac{x^2 + x}{2} \cdot \frac{10}{x + 1}$$

$$6) \frac{(z - r)^2}{z + r} \cdot \frac{z}{z^2 - zr}$$

**Find the quotient and simplify.**

$$7) \frac{(y - 6)^2}{10} \div \frac{10y - 60}{100}$$

$$8) \frac{9x^7}{2x^2} \div \frac{45x}{10x^4}$$

$$9) \frac{x - 5}{-9 - x} \div \frac{x^2 - 3x - 40}{x^2 + 14x + 45}$$

**Multiply or divide as indicated.**

$$10) \frac{x^2 - 49}{7y} \div \frac{7 - x}{21xy}$$

**Perform the indicated operation. Simplify if possible.**

$$11) \frac{2}{5x - 15} + \frac{x}{x^2 - 9}$$

$$12) \frac{3}{y^2 - 3y + 2} + \frac{7}{y^2 - 1}$$

$$13) \frac{1}{3x} + \frac{6}{7x}$$

$$14) \frac{x + 5}{x^2 + 14x + 48} + \frac{3x - 2}{x^2 + 10x + 16}$$

$$15) \frac{4y^2}{y - 1} - \frac{4y}{y - 1}$$

$$16) \frac{8a}{b} + \frac{6b}{7}$$

$$17) \frac{2}{x + 3} - \frac{4}{x - 3}$$

$$18) \frac{9}{m + 9} + \frac{m}{m + 9}$$

$$19) \frac{3}{15 + x} + \frac{x + 4}{15 + x}$$

**Rewrite the rational expression as an equivalent rational expression with the given denominator.**

$$20) \frac{5}{3x} = \frac{\quad}{12x^2}$$

$$21) \frac{a}{a + 6b} = \frac{\quad}{a^2 - 36b^2}$$

**Simplify the rational expression.**

$$22) \frac{4x + 2}{12x^2 + 14x + 4}$$

$$23) \frac{3x - 12}{2x - 8}$$

$$24) \frac{x^2 - xy + 9x - 9y}{x + 9}$$

**Simplify.**

$$25) \frac{\frac{x + 9}{4}}{\frac{x - 7}{x}}$$

$$26) \frac{4 + \frac{2}{x}}{\frac{x}{3} + \frac{1}{6}}$$

$$27) \frac{m^{-1} + z^{-1}}{m^{-1} - z^{-1}}$$

$$28) \frac{\frac{36y^2 - 16x^2}{xy}}{\frac{6}{x} - \frac{4}{y}}$$

**Solve the equation.**

$$29) \frac{x}{2} + \frac{5x}{9} = \frac{x}{18}$$

$$30) \frac{1}{x + 7} + \frac{3}{x + 4} = \frac{-3}{x^2 + 11x + 28}$$

$$31) \frac{13}{x} = 7 - \frac{1}{x}$$

$$32) \frac{9}{y + 4} - \frac{4}{y - 4} = \frac{13}{y^2 - 16}$$

**Solve the proportion.**

$$33) \frac{1}{x+3} = \frac{3}{5x}$$

$$34) \frac{1}{2} = \frac{x}{17}$$

**Solve.**

35) Two times the reciprocal of a number equals 20 times the reciprocal of 25. Find the number.

36) A painter can finish painting a house in 3 hours. Her assistant takes 5 hours to finish the same job. How long would it take for them to complete the job if they were working together?

## Answer Key

Testname: MTH100R1SUM2010

- 1)  $\{x \mid x \text{ is a real number and } x \neq 0\}$
- 2)  $\{x \mid x \text{ is a real number and } x \neq 10, x \neq 6\}$
- 3)  $\frac{3(x-1)}{4}$
- 4)  $12z$
- 5)  $5x$
- 6)  $\frac{z-r}{z+r}$
- 7)  $y-6$
- 8)  $x^8$
- 9)  $-\frac{x-5}{x-8}$
- 10)  $-3x(x+7)$
- 11)  $\frac{7x+6}{5(x+3)(x-3)}$
- 12)  $\frac{10y-11}{(y-1)(y+1)(y-2)}$
- 13)  $\frac{25}{21x}$
- 14)  $\frac{4x^2+23x-2}{(x+8)(x+6)(x+2)}$
- 15)  $4y$
- 16)  $\frac{56a+6b^2}{7b}$
- 17)  $\frac{-2x-18}{(x+3)(x-3)}$
- 18)  $1$
- 19)  $\frac{x+7}{15+x}$
- 20)  $\frac{20x}{12x^2}$
- 21)  $\frac{a^2-6ab}{a^2-36b^2}$
- 22)  $\frac{1}{3x+2}$
- 23)  $\frac{3}{2}$
- 24)  $x-y$
- 25)  $\frac{x(x+9)}{4(x-7)}$
- 26)  $\frac{12}{x}$
- 27)  $\frac{z+m}{z-m}$
- 28)  $4x+6y$

## Answer Key

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29) 0

30) no solution

31) 2

32) 13

33)  $\frac{9}{2}$

34)  $\frac{17}{2}$

35)  $\frac{5}{2}$

36)  $1\frac{7}{8}$  hr