

ASSIGNMENT 10

DYLAN ZWICK'S MATH 1010 CLASS

6.6 SOLVING RATIONAL EQUATIONS

Determine whether each value of x is a solution of the equation.

6.6.1: $\frac{x}{3} - \frac{x}{5} = \frac{4}{3}$

(a) $x = 0$ (b) $x = -2$ (c) $x = \frac{1}{8}$ (d) $x = 10$

Solve the equation.

6.6.5: $\frac{x}{6} - 1 = \frac{2}{3}$

6.6.7: $\frac{1}{4} = \frac{z+1}{8}$

6.6.11: $\frac{z+2}{3} = 4 - \frac{z}{12}$

6.6.12: $\frac{2y-9}{6} = 3y - \frac{3}{4}$

$$\mathbf{6.6.14:} \quad \frac{4x-2}{7} - \frac{5}{14} = 2x$$

$$\mathbf{6.6.15:} \quad \frac{t}{2} = 12 - \frac{3t^2}{2}$$

$$\mathbf{6.6.18:} \quad \frac{z-4}{9} - \frac{3z+1}{18} = \frac{3}{2}$$

$$\mathbf{6.6.20:} \quad \frac{u-2}{6} + \frac{2u+5}{15} = 3$$

$$\mathbf{6.6.22:} \quad \frac{2x-7}{10} - \frac{3x+1}{5} = \frac{6-x}{5}$$

$$\mathbf{6.6.23:} \quad \frac{9}{25-y} = -\frac{1}{4}$$

$$\mathbf{6.6.25:} \quad 5 - \frac{12}{a} = \frac{5}{3}$$

$$\mathbf{6.6.28:} \quad \frac{5}{3} = \frac{6}{7x} + \frac{2}{x}$$

$$\mathbf{6.6.30:} \quad \frac{7}{8} - \frac{16}{t-2} = \frac{3}{4}$$

$$\mathbf{6.6.32:} \quad \frac{10}{x+4} = \frac{15}{4(x+1)}$$

$$\mathbf{6.6.35:} \quad \frac{3}{x+2} - \frac{1}{5} = \frac{1}{5x}$$

$$\mathbf{6.6.39:} \quad \frac{t}{4} = \frac{4}{t}$$

$$\mathbf{6.6.45:} \quad \frac{4}{x(x-1)} + \frac{3}{x} = \frac{4}{x-1}$$

$$\mathbf{6.6.47:} \quad \frac{2x}{5} = \frac{x^2 - 5x}{5x}$$

$$\mathbf{6.6.49:} \quad \frac{y+1}{y+10} = \frac{y-2}{y+4}$$

$$\mathbf{6.6.50:} \quad \frac{x-3}{x+1} = \frac{x-6}{x+5}$$

$$\mathbf{6.6.55:} \quad \frac{4}{2x+3} + \frac{17}{5x-3} = 3$$

$$\mathbf{6.6.57:} \quad \frac{2}{x-10} - \frac{3}{x-2} = \frac{6}{x^2-12x+20}$$

$$\mathbf{6.6.61:} \quad \frac{x}{x-2} + \frac{3x}{x-4} = -\frac{2(x-6)}{x^2-6x+8}$$

6.6.65: $\frac{x}{3} = \frac{1 + \frac{4}{x}}{1 + \frac{2}{x}}$

6.6.83 *Painting*: A painter can paint a fence in 4 hours, while his partner can paint the fence in 6 hours. How long would it take to paint the fence if both worked together?

6.7 APPLICATIONS AND VARIATIONS

Write a model for the statement.

6.7.1: l varies directly as V .

6.7.2: C varies directly as r .

6.7.3: V directly proportional to t

6.7.4: A is directly proportional to w .

6.7.5: u is directly proportional to the square of v .

6.7.6: s varies directly as the cube of t .

6.7.7: p varies inversely as d .

6.7.8: S varies inversely as the square of v .

6.7.10: P is inversely proportional to the square root of $1 + r$

6.7.13 Boyle's Law: If the temperature of a gas is not allowed to change, its absolute pressure P is inversely proportional to its volume V .

6.7.14 Newton's Law of Universal Gravitation: The gravitational attraction F between two particles of masses m_1 and m_2 is directly proportional to the product of the masses and inversely proportional to the square of the distance r between the particles.

Write a verbal sentence using variation terminology to describe the formula.

6.7.18 Volume of a Sphere: $V = \frac{4}{3}\pi r^3$

Find the constant of proportionality and write an equation that relates the variables.

6.7.21: s varies directly as t , and $s = 20$ when $t = 4$.

6.7.25: n varies inversely as m , and $n = 32$ when $m = 1.5$

6.7.32: z is directly proportional to x and inversely proportional to the square root of y , and $z = 720$ when $x = 48$ and $y = 81$.

6.7.43: *Average Speeds* You and a friend jog for the same amount of time. You jog 10 miles and your friend jogs 12 miles. Your friend's average speed is 1.5 miles per hour faster than yours. What are the average speeds of you and your friend?

6.7.47: *Working Rate* It takes a lawn care company 60 minutes to complete a job using only a riding mower, or 45 minutes using the riding mower and a push mower. How long does the job take using only the push mower.

6.7.52: *Learning Curve* A psychologist observes that the number of lines N of a poem that a four-year-old child can memorize depends on the number x of short sessions spent on the task, according to the mode $N = \frac{20x}{x+1}$.

(a) What is the domain of the function?

(b) Use a graphing calculator to graph the function.

(c) Use the graph to determine the number of sessions needed for a child to memorize 15 lines of poem.

(d) Verify the result of part(c) algebraically.

6.7.69: Revenue The weekly demand for a company's frozen pizzas varies directly as the amount spent on advertising and inversely as the price per pizza. At \$5 per pizza, when \$500 is spent each week on ads, the demand is 2000 pizzas. If advertising is increased to \$600, what price will yield a demand of 2000 pizzas? Is this increase worthwhile in terms of revenue?

7.1 RADICALS AND RATIONAL EXPONENTS

Find the root if it exists.

7.1.1: $\sqrt{64}$

7.1.4: $\sqrt{-25}$

7.1.7: $\sqrt{-1}$

7.1.2: $-\sqrt{100}$

7.1.5: $\sqrt[3]{-27}$

7.1.8: $-\sqrt{-1}$

State whether the number is a perfect square, a perfect cube, or neither.

7.1.9: 49**7.1.13:** 96**7.1.14:** 225

Find all of the square roots of the perfect square.

7.1.15: 25**7.1.16:** 121

Evaluate the radical expression without using a calculator. If not possible, state the reason.

7.1.39: $\sqrt{8^2}$ **7.1.62:** $(\sqrt[3]{-6})^3$ **7.1.42:** $\sqrt{(-12)^2}$

Evaluate without using a calculator.

7.1.75: $-36^{1/2}$ **7.1.78:** $81^{-3/4}$ **7.1.86:** $(8^2)^{3/2}$

Rewrite the expression using rational exponents.

7.1.91: $x\sqrt[3]{x^6}$ **7.1.99:** $\sqrt[3]{x^2} \cdot \sqrt[3]{x^7}$ **7.1.95:** $\frac{\sqrt{x}}{\sqrt{x^3}}$ **7.1.105:** $z^2\sqrt{y^5z^4}$

Simplify the expression.

7.1.107: $3^{1/4} \cdot 3^{3/4}$ **7.1.125:** $\frac{(x+y)^{3/4}}{\sqrt[4]{x+y}}$