Problem Solving Involving Rational Algebraic Expressions

Jonathan R. Bacolod

Sauyo High School

What are Rational Equations?

Rational equations are equations that contain rational algebraic expressions.

Examples

$$\frac{x}{2y}$$

Examples

$$\frac{x}{2y}$$

Rational Expression

Examples

$$\frac{x}{2y}$$

Rational Expression

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

Examples

$$\frac{x}{2y}$$ Rational Expression

$$\frac{3m^2 - 1}{3} = 5$$ Rational Equation

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$$\frac{x}{2y}$$
Rational Expression

$$\frac{3m^2 - 1}{3} = 5$$
Rational Equation

$$\frac{x^2 - 9}{x - 3}$$

Examples

$$\frac{x}{2y}$$ Rational Expression

$$\frac{3m^2 - 1}{3} = 5$$ Rational Equation

$$\frac{x^2 - 9}{x - 3}$$ Rational Expression

Examples

$$\frac{x}{2y}$$

Rational Expression

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

Rational Equation

$$\frac{x^2 - 9}{x - 3}$$

Rational Expression

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

Examples

$$\frac{x}{2y}$$ Rational Expression

$$\frac{3m^2 - 1}{3} = 5$$ Rational Equation

$$\frac{x^2 - 9}{x - 3}$$ Rational Expression

$$\frac{m^2 - 1}{m + 1} = \frac{m^2 - 1}{m - 1}$$ Rational Equation

How to Solve Rational Equations?

1. Find the least common denominator (LCD).

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4. Check each solution to remove any extraneous solutions.

Example

Solve $\dfrac{1}{x-2} + \dfrac{1}{x^2 - 7x + 10} = \dfrac{6}{x-2}$

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$$x - 2 \quad =$$

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Find the LCM:
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Example

$$\frac{1}{x-2} + \frac{1}{x^2 - 7x + 10} = \frac{6}{x-2}$$

Find the LCM:
$$x - 2 = x - 2$$
$$x^2 - 7x + 10 =$$

Example

$$\frac{1}{x-2} + \frac{1}{x^2 - 7x + 10} = \frac{6}{x-2}$$

Find the LCM:
$$x - 2 \;=\; x - 2$$
$$x^2 - 7x + 10 \;=\; (x - 2)$$

Example

$$\frac{1}{x-2} + \frac{1}{x^2 - 7x + 10} = \frac{6}{x-2}$$

Find the LCM:
$$x - 2 = x - 2$$
$$x^2 - 7x + 10 = (x-2)\ (x-5)$$

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Find the LCM:
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$$x - 2 \;=\; x - 2$$
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$$\underline{x - 2 \;=\; x - 2}$$
$$\text{LCM} \;=\;$$

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$$\overline{\text{LCM} = (x-2)}$$

Example

$$\frac{1}{x-2} + \frac{1}{x^2 - 7x + 10} = \frac{6}{x-2}$$

Find the LCM:

$$
\begin{aligned}
x - 2 &= x - 2 \\
x^2 - 7x + 10 &= (x-2)\ (x-5) \\
x - 2 &= x - 2 \\
\hline
\text{LCM} &= (x-2)\ (x-5)
\end{aligned}
$$

How to Solve Rational Equations?

1. Find the least common denominator (LCD).
2. Multiply the entire problem by the LCD.

Example

$$\frac{1}{x-2} + \frac{1}{x^2 - 7x + 10} = \frac{6}{x-2}$$

Example

$$(x-2)(x-5)\left[\frac{1}{x-2} + \frac{1}{x^2-7x+10}\right] = \frac{6}{x-2}$$

Example

$$(x-2)(x-5)\left[\frac{1}{x-2}+\frac{1}{x^2-7x+10}\right] =$$
$$\left[\frac{6}{x-2}\right](x-2)(x-5)$$

Example

$$(x-2)(x-5)\left[\frac{1}{x-2}+\frac{1}{x^2-7x+10}\right]=$$

$$\left[\frac{6}{x-2}\right](x-2)(x-5)$$

$$x-5$$

Example

$$(x-2)(x-5) \left[\frac{1}{x-2} + \frac{1}{x^2 - 7x + 10} \right] =$$

$$\left[\frac{6}{x-2} \right] (x-2)(x-5)$$

$$x - 5 + 1$$

Example

$$(x - 2)(x - 5) \left[\frac{1}{x - 2} + \frac{1}{x^2 - 7x + 10} \right] =$$

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$$x - 5 + 1 = 6(x - 5)$$

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$$x$$

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$$x-5+1=6(x-5)$$

$$x-4=$$

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Example

$$(x-2)(x-5)\left[\frac{1}{x-2}+\frac{1}{x^2-7x+10}\right]=$$

$$\left[\frac{6}{x-2}\right](x-2)(x-5)$$

$$x-5+1=6(x-5)$$

$$x-4=6x-30$$

Example

$$(x-2)(x-5)\left[\frac{1}{x-2}+\frac{1}{x^2-7x+10}\right]=$$

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$$x-4=6x-30$$

$$x-6x-4=6x-6x-30$$

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$$x - 6x - 4 + 4 = 6x - 6x - 30 + 4$$

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$$-5x$$

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$$x - 6x - 4 + 4 = 6x - 6x - 30 + 4$$

$$-5x = -26$$

Example

$$(x-2)(x-5)\left[\frac{1}{x-2}+\frac{1}{x^2-7x+10}\right]=$$

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$$\frac{-5x}{-5} = \frac{-26}{-5}$$

$$x = \frac{26}{5}$$

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$$x - 4 = 6x - 30$$

$$x - 6x - 4 + 4 = 6x - 6x - 30 + 4$$

$$\frac{-5x}{-5} = \frac{-26}{-5}$$

$$x = \frac{26}{5} \checkmark$$

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1. Identify the quantity being asked in the problem.
2. Use the facts of the problem to form an equation.
3. Solve the equation.
4. Check and interpret the answer.

Sample Problem 1

Shaina can clean their house in 3 hours and Ronnie can do it in 4 hours. How long will it take them cleaning if they will work together?

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Given: 3 hours = Shaina can finish cleaning
           4 hours = Ronnie can finish cleaning
Find: x hours = Shaina and Ronnie, working together, can finish cleaning the house

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1. Identify the quantity being asked in the problem.
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1 hour $\dfrac{1}{3}$	

Sample Problem 1

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1 hour	2 hours	
$\dfrac{1}{3}$	$\dfrac{2}{3}$	

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Shaina can clean their house in 3 hours and Ronnie can do it in 4 hours. How long will it take them cleaning if they will work together?

1 hour	2 hours	3 hours
$\dfrac{1}{3}$	$\dfrac{2}{3}$	$\dfrac{3}{3}$ or 1

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Shaina can clean their house in 3 hours and Ronnie can do it in 4 hours. How long will it take them cleaning if they will work together?

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$\dfrac{1}{3}$	$\dfrac{2}{3}$	$\dfrac{3}{3}$ or 1

Therefore, Shaina can clean the house at the rate of $\dfrac{1}{3}$ per hour.

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| 1 hour $\dfrac{1}{4}$ | |

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1 hour	2 hours	
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Shaina can clean their house in 3 hours and Ronnie can do it in 4 hours. How long will it take them cleaning if they will work together?

1 hour	2 hours	3 hours	4 hours
$\dfrac{1}{4}$	$\dfrac{2}{4}$ or $\dfrac{1}{2}$	$\dfrac{3}{4}$	$\dfrac{4}{4}$ or 1

Therefore, Ronnie can clean the house at the rate of $\dfrac{1}{4}$ per hour.

Sample Problem 1

Facts of the problem:

1. $\dfrac{1}{3}$ per hour: Shaina's rate

Sample Problem 1

Facts of the problem:

1. $\dfrac{1}{3}$ per hour: Shaina's rate

2. $\dfrac{1}{4}$ per hour: Ronnie's rate

Sample Problem 1

Facts of the problem:

1. $\frac{1}{3}$ per hour: Shaina's rate

2. $\frac{1}{4}$ per hour: Ronnie's rate

3. Together, they can clean in x hours, then in one hour they can clean $\frac{1}{x}$ of the house.

Sample Problem 1

Facts of the problem:

1. $\frac{1}{3}$ per hour: Shaina's rate

2. $\frac{1}{4}$ per hour: Ronnie's rate

3. Together, they can clean in x hours, then in one hour they can clean $\frac{1}{x}$ of the house.

4. $\frac{1}{3} + \frac{1}{4} =$ their combined rate per hour

Sample Problem 1

Facts of the problem:

1. $\frac{1}{3}$ per hour: Shaina's rate

2. $\frac{1}{4}$ per hour: Ronnie's rate

3. Together, they can clean in x hours, then in one hour they can clean $\frac{1}{x}$ of the house.

4. $\frac{1}{3} + \frac{1}{4} =$ their combined rate per hour

Then, $\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$

How to Solve Problems Involving Rational Algebraic Expressions?

1. Identify the quantity being asked in the problem.
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3. Solve the equation.

Sample Problem 1

Solve $\dfrac{1}{3} + \dfrac{1}{4} = \dfrac{1}{x}$

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$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

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Find the LCM:

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Find the LCM:

3   =

Sample Problem 1

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

Find the LCM:

3 = 3

Sample Problem 1

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

Find the LCM:

3 =   3

4 =

Sample Problem 1

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

Find the LCM:

$$3 = 3$$
$$4 = 2^2$$

Sample Problem 1

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

Find the LCM:

$3 \quad = \qquad 3$

$4 \quad = \quad 2^2$

$x \quad =$

Sample Problem 1

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

Find the LCM:

$$3 = 3$$
$$4 = 2^2$$
$$x = x$$

Sample Problem 1

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

Find the LCM:

$$
\begin{array}{rcl}
3 & = & 3 \\
4 & = & 2^2 \\
x & = & x \\
\hline
\text{LCM} & = &
\end{array}
$$

Sample Problem 1

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

Find the LCM:

$$
\begin{array}{rcl}
3 & = & 3 \\
4 & = & 2^2 \\
x & = & x \\
\hline
\text{LCM} & = & (2^2)
\end{array}
$$

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Find the LCM:

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\begin{array}{rcl}
3 & = & 3 \\
4 & = & 2^2 \\
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\hline
\text{LCM} & = & (2^2) \ (3)
\end{array}
$$

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$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

Find the LCM:

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3 & = & 3 \\
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x & = & x \\
\hline
LCM & = & (2^2)\ (3)\ (x)
\end{array}
$$

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$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

Find the LCM:

$$
\begin{array}{rcl}
3 & = & 3 \\
4 & = & 2^2 \\
x & = & x \\
\hline
\text{LCM} & = & (2^2)\ (3)\ (x) = 12x
\end{array}
$$

How to Solve Rational Equations?

1. Find the least common denominator (LCD).
2. Multiply the entire problem by the LCD.

Sample Problem 1

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

Sample Problem 1

$$(12x)\left[\frac{1}{3} + \frac{1}{4}\right] = \frac{1}{x}$$

Sample Problem 1

$$(12x) \left[\frac{1}{3} + \frac{1}{4} \right] = \left[\frac{1}{x} \right] (12x)$$

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$4x$

Sample Problem 1

$$(12x) \left[\frac{1}{3} + \frac{1}{4} \right] = \left[\frac{1}{x} \right] (12x)$$

$$4x + 3x$$

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$$(12x)\left[\frac{1}{3} + \frac{1}{4}\right] = \left[\frac{1}{x}\right](12x)$$

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How to Solve Rational Equations?

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$$(12x) \left[\frac{1}{3} + \frac{1}{4} \right] = \left[\frac{1}{x} \right] (12x)$$

$$4x + 3x = 12$$

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$$(12x)\left[\frac{1}{3} + \frac{1}{4}\right] = \left[\frac{1}{x}\right](12x)$$

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$$7x = 12$$

Sample Problem 1

$$(12x)\left[\frac{1}{3} + \frac{1}{4}\right] = \left[\frac{1}{x}\right](12x)$$

$$4x + 3x = 12$$

$$\frac{7x}{7} = \frac{12}{7}$$

Sample Problem 1

$$(12x) \left[\frac{1}{3} + \frac{1}{4} \right] = \left[\frac{1}{x} \right] (12x)$$

$$4x + 3x = 12$$

$$\frac{7x}{7} = \frac{12}{7}$$
$$x = \frac{12}{7}$$

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$$x = \frac{12}{7}$$

Sample Problem 1

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

Sample Problem 1

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{\frac{12}{7}}$$

Sample Problem 1

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

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Sample Problem 1

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{\frac{12}{7}}$$

$$\frac{1}{3} + \frac{1}{4} = \frac{7}{12}$$

$$12\left[\frac{1}{3} + \frac{1}{4}\right]$$

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$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{\frac{12}{7}}$$

$$\frac{1}{3} + \frac{1}{4} = \frac{7}{12}$$

$$12\left[\frac{1}{3} + \frac{1}{4}\right] = \left[\frac{7}{12}\right]12$$

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4

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$$12\left[\frac{1}{3} + \frac{1}{4}\right] = \left[\frac{7}{12}\right]12$$

$$4 + 3$$

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$$\frac{1}{3} + \frac{1}{4} = \frac{1}{\frac{12}{7}}$$

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$$12 \left[\frac{1}{3} + \frac{1}{4} \right] = \left[\frac{7}{12} \right] 12$$

$$4 + 3 = 7$$

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$$\frac{1}{3} + \frac{1}{4} = \frac{1}{\frac{12}{7}}$$

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$$12\left[\frac{1}{3} + \frac{1}{4}\right] = \left[\frac{7}{12}\right]12$$

$$4 + 3 = 7$$

$$7 = 7$$

Sample Problem 1

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{\frac{12}{7}}$$

$$\frac{1}{3} + \frac{1}{4} = \frac{7}{12}$$

$$12\left[\frac{1}{3} + \frac{1}{4}\right] = \left[\frac{7}{12}\right]12$$

$$4 + 3 = 7$$

$$7 = 7 \ \checkmark$$

Sample Problem 1

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{x}$$

$$\frac{1}{3} + \frac{1}{4} = \frac{1}{\frac{12}{7}}$$

Therefore, it will take Shaina and Ronnie $\frac{12}{7}$ or $1\frac{5}{7}$ hours to finish cleaning the house.

$$\frac{1}{3} + \frac{1}{4} = \frac{7}{12}$$

$$12 \left[\frac{1}{3} + \frac{1}{4} \right] = \left[\frac{7}{12} \right] 12$$

$$4 + 3 = 7$$

$$7 = 7 \checkmark$$

Sample Problem 2

The ratio of an angle to its complement is $\frac{2}{3}$. Find the angle.

How to Solve Problems Involving Rational Algebraic Expressions?

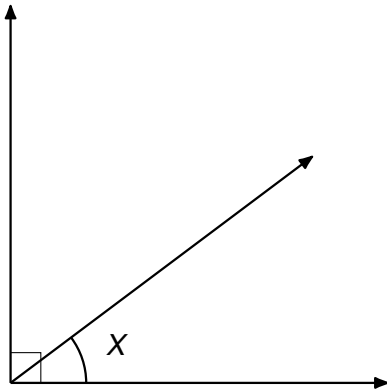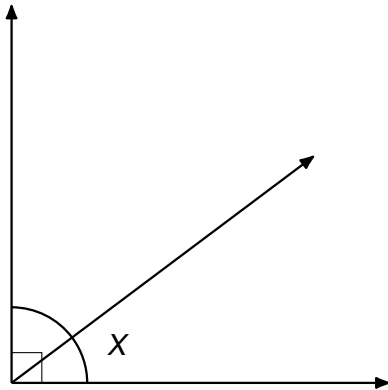1. Identify the quantity being asked in the problem.

Sample Problem 2

The ratio of an angle to its complement is $\dfrac{2}{3}$. Find the angle.

Sample Problem 2

The ratio of an angle to its complement is $\dfrac{2}{3}$. Find the angle.
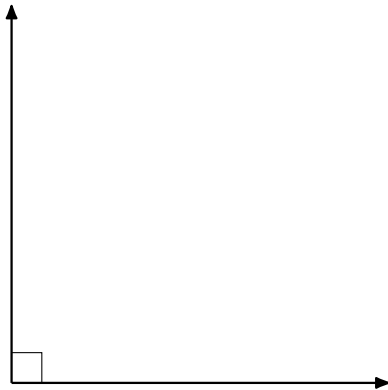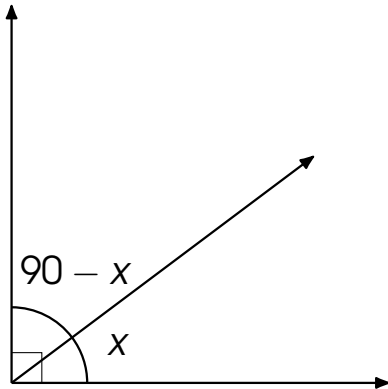
Sample Problem 2

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Sample Problem 2

The ratio of an angle to its complement is $\dfrac{2}{3}$.
Find the angle.

Let: $\quad x \;=\;$ the angle

Sample Problem 2

The ratio of an angle to its complement is $\frac{2}{3}$. Find the angle.

Let: $\quad\quad\quad x \quad = \quad$ the angle

$\quad\quad 90 - x \quad = \quad$ the complement of x

Sample Problem 2

The ratio of an angle to its complement is $\dfrac{2}{3}$.
Find the angle.

Let: $\quad\quad\quad x$ = the angle
$\quad\quad 90 - x$ = the complement of x
Find: $\quad\quad\quad x$

How to Solve Problems Involving Rational Algebraic Expressions?

1. Identify the quantity being asked in the problem.
2. Use the facts of the problem to form an equation.

Sample Problem 2

The ratio of an angle to its complement is $\frac{2}{3}$. Find the angle.

Sample Problem 2

The ratio of an angle to its complement is $\dfrac{2}{3}$. Find the angle.

Facts of the problem:

Sample Problem 2

The ratio of an angle to its complement is $\dfrac{2}{3}$. Find the angle.

Facts of the problem:
1. The angle is x.

Sample Problem 2

The ratio of an angle to its complement is $\dfrac{2}{3}$.
Find the angle.

Facts of the problem:
1. The angle is x.
2. The complement is $90 - x$.

Sample Problem 2

The ratio of an angle to its complement is $\dfrac{2}{3}$. Find the angle.

Facts of the problem:

1. The angle is x.
2. The complement is $90 - x$.
3. The ratio of x to $90 - x$ is $\dfrac{2}{3}$.

Sample Problem 2

The ratio of an angle to its complement is $\dfrac{2}{3}$.
Find the angle.

Facts of the problem:
1. The angle is x.
2. The complement is $90 - x$.
3. The ratio of x to $90 - x$ is $\dfrac{2}{3}$.

Then, $\dfrac{x}{90 - x} = \dfrac{2}{3}$.

How to Solve Problems Involving Rational Algebraic Expressions?

1. Identify the quantity being asked in the problem.
2. Use the facts of the problem to form an equation.
3. Solve the equation.

Sample Problem 2

Solve $\dfrac{x}{90 - x} = \dfrac{2}{3}$.

How to Solve Rational Equations?

1. Find the least common denominator (LCD).

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

Find the LCM:

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

Find the LCM:
$$90 - x \ =$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

Find the LCM:
$$90 - x = 90 - x$$

Sample Problem 2

$$\frac{x}{90-x} = \frac{2}{3}$$

Find the LCM:
$$90 - x \;\; = \;\; 90 - x$$
$$3 \;\; =$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

Find the LCM:

$$90 - x \;\; = \;\; 90 - x$$

$$3 \;\; = \;\; 3$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

Find the LCM:
$$90 - x = 90 - x$$
$$3 = 3$$
$$\overline{\text{LCM} = }$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

Find the LCM:

$$90 - x = 90 - x$$
$$3 = 3$$
$$\overline{LCM = (90 - x)}$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

Find the LCM:

$$
\begin{array}{rcl}
90 - x &=& 90 - x \\
3 &=& 3 \\
\hline
\text{LCM} &=& (90 - x)\ (3)
\end{array}
$$

Sample Problem 2

$$\frac{x}{90-x} = \frac{2}{3}$$

Find the LCM:

$$
\begin{array}{rcl}
90 - x &=& 90 - x \\
3 &=& 3 \\
\hline
\text{LCM} &=& (90-x)\ (3) \quad = 3(90-x)
\end{array}
$$

How to Solve Rational Equations?

1. Find the least common denominator (LCD).
2. Multiply the entire problem by the LCD.

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x)\left[\frac{x}{90 - x}\right] =$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x) \left[\frac{x}{90 - x}\right] = \left[\frac{2}{3}\right] 3(90 - x)$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x)\left[\frac{x}{90 - x}\right] = \left[\frac{2}{3}\right]3(90 - x)$$

$$3x$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x)\left[\frac{x}{90 - x}\right] = \left[\frac{2}{3}\right]3(90 - x)$$

$$3x = 2(90 - x)$$

How to Solve Rational Equations?

1. Find the least common denominator (LCD).
2. Multiply the entire problem by the LCD.
3. Simplify and solve the resulting equation.

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x)\left[\frac{x}{90 - x}\right] = \left[\frac{2}{3}\right]3(90 - x)$$

$$3x = 2(90 - x)$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x)\left[\frac{x}{90 - x}\right] = \left[\frac{2}{3}\right]3(90 - x)$$

$$3x = 2(90 - x)$$

$$3x$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x)\left[\frac{x}{90 - x}\right] = \left[\frac{2}{3}\right]3(90 - x)$$

$$3x = 2(90 - x)$$

$$3x = 180$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x)\left[\frac{x}{90 - x}\right] = \left[\frac{2}{3}\right]3(90 - x)$$

$$3x = 2(90 - x)$$

$$3x = 180 - 2x$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x)\left[\frac{x}{90 - x}\right] = \left[\frac{2}{3}\right]3(90 - x)$$

$$3x = 2(90 - x)$$

$$3x = 180 - 2x$$

$$3x + 2x$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x)\left[\frac{x}{90 - x}\right] = \left[\frac{2}{3}\right]3(90 - x)$$

$$3x = 2(90 - x)$$

$$3x = 180 - 2x$$

$$3x + 2x = 180$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x)\left[\frac{x}{90 - x}\right] = \left[\frac{2}{3}\right]3(90 - x)$$

$$3x = 2(90 - x)$$

$$3x = 180 - 2x$$

$$3x + 2x = 180$$

$$5x$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x)\left[\frac{x}{90 - x}\right] = \left[\frac{2}{3}\right] 3(90 - x)$$

$$3x = 2(90 - x)$$

$$3x = 180 - 2x$$

$$3x + 2x = 180$$

$$5x = 180$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x)\left[\frac{x}{90 - x}\right] = \left[\frac{2}{3}\right]3(90 - x)$$

$$3x = 2(90 - x)$$

$$3x = 180 - 2x$$

$$3x + 2x = 180$$

$$\frac{5x}{5} = \frac{180}{5}$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x)\left[\frac{x}{90 - x}\right] = \left[\frac{2}{3}\right]3(90 - x)$$

$$3x = 2(90 - x)$$

$$3x = 180 - 2x$$

$$3x + 2x = 180$$

$$\frac{5x}{5} = \frac{180}{5}$$

$$x =$$

Sample Problem 2

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$3(90 - x)\left[\frac{x}{90 - x}\right] = \left[\frac{2}{3}\right]3(90 - x)$$

$$3x = 2(90 - x)$$

$$3x = 180 - 2x$$

$$3x + 2x = 180$$

$$\frac{5x}{5} = \frac{180}{5}$$

$$x = 36$$

How to Solve Problems Involving Rational Algebraic Expressions?

1. Identify the quantity being asked in the problem.
2. Use the facts of the problem to form an equation.
3. Solve the equation.
4. Check and interpret the answer.

Sample Problem 2

Checking: Substitute 36 for x.

$$\frac{x}{90 - x} = \frac{2}{3}$$

Sample Problem 2

Checking: Substitute 36 for x.

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$\frac{36}{90 - 36} = \frac{2}{3}$$

Sample Problem 2

Checking: Substitute 36 for x.

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$\frac{36}{90 - 36} = \frac{2}{3}$$

$$\frac{36}{54} = \frac{2}{3}$$

Sample Problem 2

Checking: Substitute 36 for x.

$$\frac{x}{90-x} = \frac{2}{3}$$

$$\frac{36}{90-36} = \frac{2}{3}$$

$$\frac{36}{54} = \frac{2}{3}$$

$$\frac{2}{3} = \frac{2}{3}$$

Sample Problem 2

Checking: Substitute 36 for x.

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$\frac{36}{90 - 36} = \frac{2}{3}$$

$$\frac{36}{54} = \frac{2}{3}$$

$$\frac{2}{3} = \frac{2}{3} \checkmark$$

Sample Problem 2

Checking: Substitute 36 for x.

$$\frac{x}{90 - x} = \frac{2}{3}$$

$$\frac{36}{90 - 36} = \frac{2}{3}$$

$$\frac{36}{54} = \frac{2}{3}$$

$$\frac{2}{3} = \frac{2}{3} \; \checkmark$$

Therefore, the angle measures $36°$.

Thank you for watching.