y varies directly with \( z \). Find the equation of variation given that \( y = 4 \) when \( x = 2.5 \)
1. \( y = kx \)
2. \( y = k(2.5) \)
3. Solve for constant of variation \( k \)
   \( \frac{x}{2.5} = k \)
   \( \frac{2}{2.5} = k \)
4. \( y = \frac{16}{x} \) Equation of variation

y varies inversely
1. \( y = \frac{k}{x} \) Given that \( y \) is \( 8 \) when \( x = \frac{1}{4} \)
2. \( 8 = \frac{k}{\frac{1}{4}} \)
   \( 8 = 4k \)
   \( k = 2 \)
3. \( y = \frac{2}{x} \)

If \( y \) varies jointly with \( x \) and \( z \)
1. \( y = kxz \) write “joint equation”
2. \( 15 = k(15) \)
   \( k = 1 \)
3. \( y = 2xz \) Write equation of variation

Given that \( y \) varies inversely with the square of \( x \)
1. \( y = \frac{k}{x^2} \)
2. \( 32 = \frac{k}{(2)^2} \)
   \( 32 = \frac{k}{4} \)
   \( 128 = k \)
3. \( y = \frac{128}{x^2} \)
I = \frac{k}{y d^2}

What happens if d is doubled?

What happens to I?

I = \frac{k}{(2d)^2} = \frac{I_1}{4} \quad \text{if} \quad d = 12

\frac{I}{I_1} = \frac{1}{4} \quad \text{if} \quad d = 12

Weight varies jointly as width w
square of height.

W = k \cdot w \cdot h^2

12 = \frac{k}{10} \cdot \left(\frac{1}{2}\right)^2 \cdot \frac{1}{10}

12 = k \cdot \frac{1}{4} \cdot \frac{1}{10} \cdot \frac{1}{10} = \frac{k}{160}

(12)(160) = k = 2160 = \frac{2880 \cdot w \cdot k^2}{2}

Use eq. to find weight.

\text{(weight)} = \frac{2160 \cdot \left(\frac{1}{2}\right) \cdot \left(\frac{1}{2}\right)}{160} = \frac{22.5 \text{ tons}}{}

What is on MOO 4 test?

1. Finding Domain of rational function

\text{domain: } x \neq 3

f(x) = \frac{1}{x+3} = \frac{x+3+0}{x+3} = \frac{3}{3}

\text{error: } (x+3)^2 \cdot \left(\frac{1}{3}\right)

Simplifying Rational Expressions

1. Adding a rational Exp.

\frac{x^2-y}{x-3} \div \frac{x+3}{x+3}

\text{Common denominator}

\text{add numerators}

\text{factor (common)}

\text{multiply every term (even)}

\text{Rational Eq.