

Solving Equations by Dividing or Multiplying

Division Property of Equality

→ can't ÷ by 0 (not real)

If you divide each side of an equation by the same nonzero number, the two sides remain equal.

Multiplication Property of Equality

If you multiply each side of an equation by the same number, the two sides remain equal.

** You undo multiplication by dividing

** You undo division by multiplying

} Inverses (opposites)

Goal: To isolate the variable

Examples: Solve and check

1) $8x = 56$
 $\frac{8x}{8} = \frac{56}{8}$

Division
Property of
Equality

$x = 7$

2) $4b = 76$
 $\frac{4b}{4} = \frac{76}{4}$

Check

$-4b = 76$
 $-4(-19) = 76$
 $76 = 76$

$b = -19$

3) $5m = 0$
 $\frac{5m}{5} = \frac{0}{5}$

Division
property of
Equality

$m = 0$

*4) $-x = 11$

Check

$-x = 11$
 $-(-11) = 11$
 $11 = 11$

$\frac{-x}{-1} = \frac{11}{-1}$

$x = -11$

5) $-35y = -140$
 $\frac{-35y}{-35} = \frac{-140}{-35}$

Division Property
of equality

$y = 4$

6) $\frac{x}{4} = 5$

Multiplication
property
of
Equality

$4 \cdot \left(\frac{x}{4}\right) = (5) \cdot 4$

$x = 20$

* To get rid of a fraction you must multiply by the reciprocal Check
Flip the
frac

7) $\frac{n}{-2} = 12$

Multiplication
property of
Equality

$(-2) \cdot \left(\frac{n}{-2}\right) = (12) \cdot (-2)$

$n = -24$

8) $10.1 = \frac{s}{-8}$

Check
 $10.1 = \frac{s}{-8}$
 $10.1 = \frac{(-80.8)}{-8}$
 $10.1 = 10.1$

$(-8) \cdot (10.1) = \left(\frac{s}{-8}\right) \cdot (-8)$

$-80.8 = s$ or $s = -80.8$

9) $30 = \frac{1}{15}w$

check

$\left(\frac{15}{1}\right) \cdot (30) = \left(\frac{1}{15}w\right) \cdot \left(\frac{15}{1}\right)$

$30 = \frac{1}{15}w$
 $30 = \frac{1}{5}(450)$
 $30 = 30$

$450 = w$

or
 $w = 450$

10) $\frac{1}{-4}c = -64$

check

$\left(\frac{-4}{1}\right) \cdot \left(\frac{1}{-4}c\right) = (-64) \cdot \left(\frac{-4}{1}\right)$

$\frac{1}{-4}c = -64$
 $\frac{1}{-4}(256) = -64$
 $-64 = -64$

$c = 256$

11) $\frac{2}{3}x = 10$

Mult prop.
of
equality

$\left(\frac{3}{2}\right) \cdot \left(\frac{2}{3}x\right) = (10) \cdot \left(\frac{3}{2}\right)$

$x = 15$

12) $\frac{4}{7}x = 2$

Mult prop.
of
equality

$\left(\frac{7}{4}\right) \cdot \left(\frac{4}{7}x\right) = (2) \cdot \left(\frac{7}{4}\right)$

$x = 3\frac{1}{2}$

13) $-12 = \frac{3}{5}y$

Mult
prop.
of
equality

$\left(\frac{5}{3}\right) \cdot (-12) = \left(\frac{3}{5}y\right) \cdot \left(\frac{5}{3}\right)$

$-20 = y$

or
 $y = -20$

14) $-3 = \frac{5}{6}n$

Check

$\left(\frac{6}{5}\right) \cdot (-3) = \left(\frac{5}{6}n\right) \cdot \left(\frac{6}{5}\right)$

$-3 = \frac{5}{6}n$
 $-3 = \frac{5}{6}(-3\frac{3}{5})$
 $-3 = -3$

$-3\frac{3}{5} = n$

or
 $n = -3\frac{3}{5}$