

Justifying the Steps in Solving an Equation EMI 2.4
* Optional

1. Which property justifies the second line in the following solution?

- | | | |
|---|-----------------------------------|----------------------|
| (1) Multiplicative Property of Equality | (3) Distributive | $3x + 2 = 8$ |
| (2) Associative | (4) Additive Property of Equality | $3x + 2 - 2 = 8 - 2$ |

2. What is the solution to the following equation? Show all work.

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

- (1) No Solutions (2) Infinite Solutions (3) $x = 2$ (4) $x = -3$

*3. Give a property of real numbers (associative, commutative, or distributive) or a property of equality (addition or multiplication) that justifies each step in the following equation:

$$3x + 1 + 2x - 7 = x + 22$$

(1) $3x + 2x + 1 - 7 = x + 22$ (1) _____

(2) $x(3 + 2) - 6 = x + 22$ (2) _____
 $5x - 6 = x + 22$

(3) $5x - 6 + 6 = x + 22 + 6$ (3) _____
 $5x = x + 28$

(4) $5x - x = x + 28 - x$ (4) _____

(5) $x(5 - 1) = 28$ (5) _____
 $4x = 28$

(6) $\frac{1}{4} \cdot 4x = \frac{1}{4} \cdot 28$ (6) _____
 $x = 7$

4. Without solving the following equations decide whether there will be **one solution**, **no solutions** or **infinitely many solutions** and explain why you think so.

- (a) $3x - 2 = 3x - 2$ (b) $2x - 4 = 2x - 7$ (c) $3x - 5 = 6x - 5$
-

R1. Think about the equation $4(3x + 2) = -16$.

- (a) Solve this equation by reversing what has been done to x .
(b) Solve this equation by first distributing the multiplication by 4.

*R2. Use the distributive property to find the product of $(x-3)$ and (x^2+2x-5)

R3. Write $x(x-2)+3(2-x)$ as a product of binomials. Check to see if you have written an equivalent expression by testing $x=5$.

*R4. The cost of a gallon of milk, m , is \$0.50 more than five times the cost of a gallon of water, w . Write an equation in terms of m and w . If a gallon of milk costs \$3.75, find the cost of a gallon of water.

*R5. A bread slicer runs for 20 hours each day. After 30 days, it has sliced 144,000 loaves of bread. How many loaves are sliced per hour?

1. (4)

R1. (a) $x = -2$

2. (2)

(b) $x = -2$

3. (1) Commutative

R2. $x^3 - x^2 - 11x + 15$

(2) Distributive

R3. $x^2 - 5x + 6$

(3) Additive Property of Equality

$$x(x-2)+3(2-x) = x^2 - 5x + 6$$

(4) Additive Property of Equality

$$5(5-2)+3(2-5) = 5^2 - 5(5) + 6$$

(5) Distributive

$$5(3)+3(-3) = 25 - 25 + 6$$

(6) Multiplicative Property of Equality

$$15 - 9 = 0 + 6$$

4. (a) Infinite

$$6 = 6$$

(b) No

R4. $m = 5w + .5$

(c) one

$w = \$0.65$

R5. 240 loaves