**Properties**

**Commutative Property of Addition a + b = b + a (where a and b are real numbers)**

**(does NOT work with subtraction)**

**Commutative Property of Multiplication a x b = b x a (does NOT work with division)**

**Associative Property of Addition a + (b + c) = (a + b) + c (does NOT work with subtraction)**

**Associative Property of Multiplication a x (b x c) = (a x b) x c (does NOT work with division)**

**Distributive Property a (b + c) = ab + ac**

**Additive Identity Property a + 0 = a 0 + a = a**

**Additive Inverse Property a + -a = 0 -a + a = 0**

**Multiplicative Identity Property a x 1 = a 1 x a = a**

**Multiplicative Inverse Property a x = 1 a = 1**

**Additive Property of Equality If a=b then a + c = b + c   
(you can add or subtract the same quantity from both sides and retain the equality).**

**Multiplicative Property of Equality If a=b then (a)(c) = (b)(c)**

**(you can multiply or divide by the same quantity on both sides and retain the equality).**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Solve for x and justify each step with a reason: **3(x - 2) + 5x = 9x - 24**   |  |  | | --- | --- | | **Steps:** | **Justification (Reasons):** | | 3(*x* - 2) + 5*x* = 9*x* - 24 | Given | | 3*x* - 6 + 5*x* = 9*x* - 24 | Distributive Property | | 3*x* + 5*x* - 6 = 9*x* - 24 | Commutative Property of Addition | | 8*x*- 6 = 9*x* - 24 | Combine Like Terms | | 8*x* - 8*x* - 6 = 9*x* - 8*x* - 24 | Subtraction Property of Equality | | 0 - 6 = *x* - 24 | Additive Inverse Property (left) Combine Like Terms (right) | | -6 = *x* - 24 | Additive Identity Property | | -6 + 24 = *x* - 24 + 24 | Addition Property of Equality | | 18 = *x* + 0 | Addition (left) Additive Inverse Property (right) | | 18 = *x* | Additive Identity Property | |  |  | |