# M8 - 10.6 - "$a(x + b) = c, \dfrac{a}{x+b} = c$" Distribution Notes

**Solve for $x$, by Distributing $a$ into $x + b$.**

$-4(x - 3) = -8$

$-4(x - 3) = -8$    Distribute

$-4x + 12 = -8$

$-4x + 12 = -8$
$\quad -12 \quad -12$

$-4x = -20$

$\dfrac{-4x}{-4} = \dfrac{-20}{-4}$

$x = \dfrac{-20}{-4}$

$\boxed{x = 5}$

**Distribution**

$-4(x - 3) = -4x + 12$

Multiply the number in front of the brackets into both numbers inside the brackets.

**Check Answer**

$-4(x - 3) = -8$
$-4(5 - 3) = -8$
$\quad -4(2) = -8$
$\quad\quad -8 = -8$ ✓

*OR*

**Divide 1st**

$-4(x - 3) = -8$

$\dfrac{-4(x - 3)}{-4} = \dfrac{-8}{-4}$

$x - 3 = 2$

$x - 3 = 2$
$\quad +3 \quad +3$

$\boxed{x = 5}$

**Short Forms**

$-4(x - 3) = -8$
$x - 3 = 2$
$4x = 20$
$\boxed{x = 5}$

$-4(x - 3) = -8$
$-4x + 12 = -8$
$-4x = -20$
$\boxed{x = 5}$

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**Solve for $x$, by Distributing $a$ into $x + b$.**

$\dfrac{1}{2}(x + 4) = 6$

$\dfrac{x}{2} + \dfrac{4}{2} = 6$   Distribute

$\dfrac{x}{2} + 2 = 6$
$\quad\quad -2 \quad -2$

$\dfrac{x}{2} = 4$

$2 \times \dfrac{x}{2} = 4 \times 2$

$\boxed{x = 8}$

**Check Answer**

$\dfrac{1}{2}(x + 4) = 6$
$\dfrac{1}{2}(8 + 4) = 6$
$\dfrac{1}{2}(12) = 6$
$\quad\quad 6 = 6$ ✓

*OR*

**Multiply 1st**

$\dfrac{1}{2}(x + 4) = 6$

$2 \times \dfrac{1}{2}(x + 4) = 6 \times 2$

$x + 4 = 12$
$\quad\; -4 \quad -4$

$\boxed{x = 8}$

**Short Forms**

$\dfrac{1}{2}(x + 4) = 6$
$x + 4 = 12$
$\boxed{x = 8}$

$\dfrac{1}{2}(x + 4) = 6$
$\dfrac{x}{2} + 2 = 6$
$\dfrac{x}{2} = 4$
$\boxed{x = 8}$

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**Solve for $x$, by multiplying to both sides by $x + b$.**

$\dfrac{14}{x - 3} = 2$

$(x - 3) \times \dfrac{14}{x - 3} = 2 \times (x - 3)$    Multiply $x - 3$ to both sides

$(x - 3) \times \dfrac{14}{x - 3} = 2 \times (x - 3)$    Cross it off

$14 = 2x - 6$    Distribute
$+6 \qquad + 6$
$20 = 2x$
$\dfrac{20}{2} = \dfrac{2x}{x}$
$10 = x$

$\boxed{x = 10}$

**Check Answer**

$\dfrac{14}{x - 3} = 2$
$\dfrac{14}{10 - 3} = 2$
$\dfrac{14}{7} = 2$
$\quad 2 = 2$ ✓

**Short Form**

$\dfrac{14}{x - 3} = 2$
$14 = 2(x - 3)$
$14 = 2x - 6$
$20 = 2x$
$\boxed{x = 10}$