

Solve:

$$\log_3 x + \log_3 (x-2) = 3$$

$$\log_3 (x(x-2)) = 3$$

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

$$27 = x^2 - 2x$$

$$0 = x^2 - 2x - 27$$

$$\frac{2 \pm \sqrt{4 - 4(1)(-27)}}{2(1)}$$

$$\frac{2 \pm \sqrt{112}}{2}$$

$$\frac{2 + \sqrt{112}}{2}$$

Multiple
logs on
one side:

① Condense





Solve:

$$\log(3x+2) + \log(x+2) = \log(7x+6)$$

$$\log(3x+2)(x+2) = \log(7x+6)$$

$$(3x+2)(x+2) = 7x+6$$

$$3x^2 + 8x + 4 = 7x + 6$$

$$3x^2 + x + 4 = 6$$

$$3x^2 + x - 2 = 0$$

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

$$3x(x+1) - 2(x+1)$$

$$\begin{array}{r} 6 \\ 3 \times -2 \\ 1 \end{array}$$

$$(3x-2)(x+1)$$

$$3x-2=0$$

$$x+1=0$$

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

~~$$x = -1$$~~



Solve:

$$\log_4 x + \log_4 (x - 6) = 2$$

$$\log_4 (x(x-6)) = 2$$

$$4^2 = x(x-6)$$

$$16 = x^2 - 6x$$

$$0 = x^2 - 6x - 16$$

$$(x-8)(x+2)$$

$$x=8, \quad x=-2$$



Solve:

$$\log_3(\underline{x+2}) - \log_3 x = 2$$

$$\log_3 \frac{x+2}{x} = 2$$

$$3^2 = \frac{x+2}{x}$$

$$+9 = \frac{x+2}{x}$$

$$9x = x+2$$

$$8x = 2$$

$$x = \frac{1}{4}$$

Solve:



$$\log_2 (3x - 1) + \log_2 2 = \log_2 4 + \log_2 (x + 3)$$

$$\log_2 (3x - 1) \cdot 2 = \log_2 4(x + 3)$$

$$\cancel{\log_2} 2(3x - 1) = \cancel{\log_2} 4(x + 3)$$

$$2(3x - 1) = 4(x + 3)$$

$$6x - 2 = 4x + 12$$

$$-4x$$

$$2x - 2 = 12$$

$$+2$$

$$2x = 14$$

$$x = 7$$