

Solving Log & Exp Equations Worksheet

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

$$3^2 = 3x - 2$$

$$11 = 3x$$

$$x = \frac{11}{3} \checkmark$$

4. $\log_5(x^2+x+4) = 2$

$$5^2 = x^2 + x + 4 - 25$$

$$0 = x^2 + x - 21$$

$$x = \frac{-1 \pm \sqrt{1 - 4(1)(-21)}}{2}$$

$$x = \frac{-1 \pm \sqrt{85}}{2} < \frac{5}{17}$$

$$x = \frac{-1 + \sqrt{85}}{2} \checkmark \quad x = \frac{-1 - \sqrt{85}}{2}$$

6. $-2\log_4 X = \log_4 9$

$$\log_4 X^{-2} = \log_4 9$$

$$X^{-2} = 9$$

$$\frac{1}{x^2} = 9$$

$$9x^2 = 1$$

$$x^2 = \frac{1}{9}$$

$$x = \pm \frac{1}{3} \quad \left\{ \begin{array}{l} \frac{1}{3} \checkmark \\ \frac{1}{3} \checkmark \\ \frac{1}{3} \checkmark \\ \frac{1}{3} \checkmark \end{array} \right.$$

8. $3\log_2 X = -\log_2 27$

$$\log_2 X^3 = \log_2 \frac{1}{27}$$

$$X^3 = \frac{1}{27}$$

$$\boxed{X = \frac{1}{3}} \checkmark$$

10. $2\log_3(x+4) - \log_3 9 = 2$

$$\log_3 \left(\frac{(x+4)^2}{9} \right) = 2$$

$$9 = \frac{(x+4)^2}{9}$$

$$81 = (x+4)^2$$

$$\pm 9 = x+4$$

$$\boxed{X = 5} \quad \cancel{X = -13}$$

12. $\log_4 X + \log_4(x-3) =$

$$\log_4(x^2 - 3x) = 1$$

$$x^2 - 3x = 4$$

$$x^2 - 3x - 4 = 0$$

$$(x-4)(x+1) = 0$$

$$\boxed{X = 4} \quad \cancel{X = -1}$$