Solving Log & Exp Equations Worksheet

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

$3^2 = 3x-2$

$11 = 3x$

$x = \frac{11}{3}$ ✓

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

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

$0 = x^2+x-21$

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

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

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

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

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

$x^{-2} = 9$

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

$9x^2 = 1$

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

$x = \pm\frac{1}{3}$ — $\frac{1}{3}$ ✓ ~~$-\frac{1}{3}$~~

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

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

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

$\boxed{x = \frac{1}{3}}$ ✓

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

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

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

$81 = (x+4)^2$

$\pm 9 = x+4$

$\boxed{x=5}$ ~~$x=-13$~~

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

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

$x^2-3x = 4$

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

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

$\boxed{x=4}$ ~~$x=-1$~~