

Solve the following equations and be sure to check your answer(s)

1.  $2\log(x+2) = 1 + \log(x^2 - 4)$

$$\log \frac{(x+2)^2}{x^2-4} = 1$$

$$x = 2.44$$

2.  $1 + \log(x^2 - 9) = 2\log(x - 3)$

$$10 = \frac{x-3}{x+3}$$

No Solution

~~$x = 3.667$~~

3.  $2^{x+4} = 3^{2x-3}$

$$x+4 = (2x-3) \left( \frac{\log 3}{\log 2} \right)$$

$$x \approx 4.03$$

4.  $\log(\sqrt[3]{10-5x})^3 = 3$

$$\frac{3}{4} \log(10-5x) = 3$$

$$x = -1998$$

5.  $\ln(9x^2 - 1) = 0$

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

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

$$x \approx \pm .4714$$

6.  $\log_2(y^{-3}) = 12$

$$-3 \log_2 y = 12$$

$$y = \frac{1}{16}$$

7.  $\log(3x^2 + 4) - \log(2x - 2) = \log x + \log 4$

$$\frac{3x^2 + 4}{2x - 2} = 4x$$

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

8.  $\log_5(y^2 + 5y + 6) = \log_5(y + 3) + \log_5 4$

$$y^2 + 5y + 6 = 4y + 12$$

~~$y = -3$~~   $y = 2$

9.  $9^{2-x^2} = \frac{1}{3}$

$$(3^2)^{2-x^2} = (3^{-1})$$

$x = \pm \sqrt{\frac{5}{2}}$  ← rationalize denominator.

$x = \pm \frac{\sqrt{10}}{2} \approx \pm 1.581$

10.  $\frac{2^{x-1}}{2^{3-4x}} = 16$

$$2^{(x-1) - (3-4x)} = 2^4$$

$x = \frac{8}{5}$

11.  $e^{1+6x} = 8$

$$1 + 6x = \ln 8$$

$x \approx .1799$

12.  $\log \sqrt[3]{x} = \sqrt{\log x}$

$$\left(\frac{1}{3} \log x\right)^2 = (\sqrt{\log x})^2$$

$$\frac{1}{9} (\log x)^2 = \log x$$

$$\frac{1}{9} (\log x)^2 - \log x = 0$$

$$\log x \left(\frac{1}{9} \log x - 1\right) = 0$$

GCF Factor

$\log x = 0$  }  $\frac{1}{9} \log x - 1 = 0$

$x = 1$

$x = 10^9$