

1.

Solve for x : $32^{x-1} = 8^{3x-1}$

A. -2

B. $-\frac{1}{2}$

C. $\frac{1}{2}$

D. 2

$$2^{5(x-1)} = 2^{3(3x-1)}$$

$$5x - 5 = 9x - 3$$

$$\frac{-2}{4} = \frac{4x}{4}$$

$$x = -\frac{1}{2}$$

2.

Solve: $27^{x+2} = \left(\frac{1}{3}\right)^{3-6x}$

A. $-\frac{1}{3}$

B. $\frac{1}{7}$

C. $\frac{5}{3}$

D. 3

$$3^{3(x+2)} = 3^{-1(3-6x)}$$

$$3x+6 = -3+6x$$

$$\frac{9}{3} = \frac{3x}{3}$$

$$3 = x$$

3.

Solve: $\log(3x-1) + \log 4 = \log(4x+5)$

A. -2

B. $-\frac{21}{13}$

C. $\frac{3}{4}$

D. $\frac{9}{8}$

$$4(3x-1) = 4x+5$$

$$12x-4 = 4x+5$$

$$8x = 9$$

$$x = \frac{9}{8}$$

4.

Solve: $\log_2(3-x) + \log_2 x = 1$

A. 1

B. 2

C. $1, 2$

D. no solution

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

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

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

$$(x-2)(x-1) = 0$$

$$x = 2, 1$$

5. Solve for x (to the nearest thousandths)

(a) $10^x = 6$

$$x = \log 6$$

$x = 0.778$

(b) $\log_5 x = 3$

$$5^3 = x$$

$x = 125$

(c) $\log_x 85 = 7$

$$x^7 = 85$$

$$x = \sqrt[7]{85}$$

$x = 1.886$

(d) $\log_3 x + \log_3(x-8) = 2$

$$x(x-8) = 9$$

$$x^2 - 8x - 9 = 0$$

$$(x-9)(x+1) = 0$$

$$x = 9, x = -1$$

-0.5 if
 $x = -1$ not needed

$$\boxed{x = 9}$$

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

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

$$x\log 4 - 2\log 4 = x\log 3 + \log 3$$

$$x\log 4 - x\log 3 = \log 3 + \log 16$$

$$x = \frac{\log(3 \times 16)}{\log(4/3)}$$

$$= \frac{\log 48}{\log(4/3)}$$

$$\boxed{x = 13.457}$$

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(f) $2\log_2 x - \log_2 5x = 4$

$$\textcircled{1} \left[\begin{aligned} \log_2 \left(\frac{x^2}{5x} \right) &= 4 \\ \frac{x}{5} &= 2^4 \end{aligned} \right.$$

$$\textcircled{1} \left[\begin{aligned} \frac{x}{5} &= 16 \\ x &= 16 \cdot 5 \\ \boxed{x} &= \boxed{80} \end{aligned} \right.$$

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(g) $5(4)^x = 16^{x-1}$

$$\textcircled{1} \left[\begin{aligned} \log 5(4)^x &= \log 16^{x-1} \\ \text{or } \log 5 + \log 4^x &= (x-1)\log 16 \end{aligned} \right.$$

$$\log 5 + x\log 4 = x\log 16 - \log 16$$

$$x\log 4 - x\log 16 = -\log 16 - \log 5$$

$$\textcircled{1} \left[x = \frac{-\log 16 - \log 5}{\log 4 - \log 16} \right.$$

$$\boxed{x = 3.161}$$

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