

$$\textcircled{2} 5^{3w} = 38$$

rewrite as a log!

$$\log_5 38 = 3w$$

now divide!

$$\frac{\log_5 38}{3} = w$$

$$\boxed{.753 = w}$$

$$\textcircled{1} \log_5 x = 3$$

rewrite as exponential!

$$5^3 = x$$

$$\boxed{125 = x}$$

$$\textcircled{5} \log_{10}(3x+4) = 2$$

rewrite as exponential!

$$10^2 = 3x+4$$

$$100 = 3x+4$$

$$96 = 3x$$

$$\boxed{x = 32}$$

$$\textcircled{2} 5^{3w} = 38$$

Take log of both sides!

$$\ln(5^{3w}) = \ln(38)$$

property - power down!

$$3w \ln 5 = \ln 38$$

now divide!

$$\cancel{3w \ln 5} = \frac{\ln 38}{\cancel{3 \ln 5}}$$

$$\boxed{w = \frac{\ln 38}{3 \ln 5} \approx .753}$$

$$\textcircled{3} 12^{2k} + 3 = 100$$

$$12^{2k} = 97$$

Take ln of both sides!

$$\ln(12^{2k}) = \ln(97)$$

power down + solve!

$$\cancel{2k \ln 12} = \frac{\ln 97}{\cancel{2 \ln 12}}$$

$$\boxed{k = \frac{\ln 97}{2 \ln 12}}$$

$$\boxed{\approx .920}$$

$$\textcircled{8} \log_6(4x+9) = \log_6(2x+19)$$

$$4x+9 = 2x+19$$

$$2x = 10$$

$$\boxed{x = 5}$$

$$\textcircled{3} \log_5 2 + \log_5 x = 3$$

condense!

$$\log_5(2x) = 3$$

rewrite + solve!

$$5^3 = 2x$$

$$125 = 2x$$

$$\boxed{x = \frac{125}{2} = 62.5}$$

$$\textcircled{6} 6^{2x+1} = 5^{4x-5}$$

take log both sides,
power down + solve!

$$\ln(6^{2x+1}) = \ln(5^{4x-5})$$

$$(2x+1)\ln 6 = (4x-5)\ln 5$$

Distribute!

$$2x\ln 6 + 1\ln 6 = 4x\ln 5 - 5\ln 5$$

$-2x\ln 6 + 5\ln 5$ $-2x\ln 6 + 5\ln 5$
Get x onto the same side!

$$\ln 6 + 5\ln 5 = 4x\ln 5 - 2x\ln 6$$

Factor out the x!

$$\ln 6 + 5\ln 5 = x(4\ln 5 - 2\ln 6)$$

now divide
divide by the ()!

$$\frac{\ln 6 + 5\ln 5}{4\ln 5 - 2\ln 6} = \frac{x(4\ln 5 - 2\ln 6)}{4\ln 5 - 2\ln 6}$$

$$\frac{\ln 6 + 5\ln 5}{4\ln 5 - 2\ln 6}$$

$$= x \approx 3.447$$

$$\textcircled{8} \log_2 x + \log_2 (x+6) = 4$$

use property to combine!

$$\log_2 (x(x+6)) = 4$$

$$\log_2 (x^2 + 6x) = 4$$

turn into exponential eqn!

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

$$16 = x^2 + 6x$$

set = 0 and solve!

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

$$0 = (x+8)(x-2)$$

$$x+8=0$$

$$x-2=0$$

$$\boxed{\cancel{x=-8}}$$

$$\boxed{x=2}$$

extraneous
solution