Mrs. Stichnote

(1) a) yes b) NO c) yes

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(2) $25^{3x+3} = 125^{x-5}$

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

$2(3x+3) = 3(x-5)$

$6x + 6 = 3x - 15$

$3x = -21$

$\boxed{x = -7}$

✓ $25^{-18} = 125^{-12}$

---

(3) $\log_4(3x-4) = 3$

$4^3 = 3x - 4$

$64 = 3x - 4$

$68 = 3x$

$\boxed{\frac{68}{3} = x}$

✓ $\frac{\log 64}{\log 4} = 3$

$3 = 3.$

---

(4) $f(x) = 8x^3$

$y = 8x^3$

$x = 8y^3$

$\frac{x}{8} = y^3$

$\sqrt[3]{\frac{x}{8}} = y$

$\frac{\sqrt[3]{x}}{2} = y$

$f^{-1}(x) = \frac{\sqrt[3]{x}}{2}$ →

$\boxed{f^{-1}(x) = \frac{\sqrt[3]{x}}{2}}$

✓ $f \circ f^{-1}(x) = 8\left(\frac{\sqrt[3]{x}}{2}\right)^3$

$= 8\left(\frac{x}{8}\right)$

$= x$

$(f^{-1} \circ f)(x) = \frac{\sqrt[3]{8x^3}}{2}$

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

$= x$

Mrs Stichnote

(5)

a.) $\{(3,1), (4,2), (2,6), (7,2)\}$

b) Not one-to-one

c) $\{(3,1), (-3,-1), (6,4), (-7,-4)\}$

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(6) $5^6 = 15,625$

$\log_5 15,625 = 6$

✓ $\frac{\log 15,625}{\log 5}$

---

(7) $5^{x-2} = 3^{2x}$

$\ln 5^{x-2} = \ln 3^{2x}$

$(x-2)\ln 5 = 2x \ln 3$

$x \ln 5 - 2\ln 5 = 2x \ln 3$

$x \ln 5 - 2x \ln 3 = 2\ln 5$

$x(\ln 5 - 2\ln 3) = 2\ln 5$

$x = \frac{2\ln 5}{\ln 5 - 2\ln 3}$

-5.476

-5.476126

✓ $5^{(-5.476-2)} \quad 2(-5.476)$
$= 3$

Mrs. Stichnote

(8) $x = \log_4 \frac{1}{1024}$

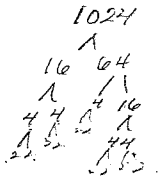
$4^x = \frac{1}{1024}$

$4^x = \frac{1}{2^{10}}$

$2^{2x} = 2^{-10}$

$2x = -10$

$\boxed{x = -5}$



✓ $\frac{\log \frac{1}{1024}}{\log 4}$

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(9) $\log_k W + \log_k P - \log_k C$

$\log_k WP - \log_k C$

$\boxed{\log_k \frac{WP}{C}}$

✓ $k=10 \quad W=1 \quad P=2 \quad C=3$

$\log 1 + \log 2 - \log 3 = \log\left(\frac{2}{3}\right)$

---

(10) $g(x)$ is not the inverse of $f(x)$.

new $g(x)$

x	1	-5	7	-9
y	-10	-6	4	7

Mrs Stichnote

(11) $\log_3 7 = \dfrac{\log 7}{\log 3}$

Round 2 H places, sorry!

$= 1.7712$

$\log_3 7 = x$

$3^x = 7$

$\ln 3^x = \ln 7$

$x \ln 3 = \ln 7$

$x = \dfrac{\ln 7}{\ln 3}$

$x = 1.7712$

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(12) $3\log_k(m-2) + \log_k(4m+1)$

$\log_k(m-2)^3 + \log_k(4m+1)$

$\log_k(m-2)^3(4m+1)$

✓

$m = 3 \quad k = 10$

$\log(1)^3(13) = 3\log(1) + \log(13)$

---

(13) $\ln 3x = 1.5$ ← sorry wrong phrase problem chosen!

$e^{\ln 3x} = e^{1.5}$

$3x = e^{1.5}$

$x = \dfrac{e^{1.5}}{3}$

✓ $\ln\left(3 \cdot \dfrac{e^{1.5}}{3}\right)$

$\ln e^{1.5} = 1.5$

TRUE

Mrs Stichnote

(14) $f(x) = -3x - 5$ $\quad g(x) = \frac{1}{3}x - 5$

$f \circ g(x) = -3\left(\frac{1}{3}x - 5\right) - 5$

$= -x + 15 - 5$

$= -x + 10$

NO

$g \circ f(x) = \frac{1}{3}(-3x - 5) - 5$

$= -x - \frac{5}{3} - 5$

$= -x - \frac{20}{3}$

NO

f(x) and g(x) are not inverses!

---

(15) $f(x) = 3^x$

$f\left(\frac{5}{2}\right) = 3^{\frac{5}{2}}$

$= \sqrt{3^5}$ — $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

$= 9\sqrt{3}$

✓ $3^{\frac{5}{2}} = 9\sqrt{3}$
