Algebra practice Name

Directions:
Show all work on a separate piece of paper. Place your final answer on this sheet.

1. Given $g(x) = \dfrac{3}{x-1}$

a. Evaluate and simplify completely

i) $g(-2) =$ ii) $g(0) =$ iii) $g(1) =$ iv) $g(4) =$ v) $g(x+3) =$

b. Solve algebraically for exact x

i) $g(x) = 5$ $x =$

ii) $g(x+2) = 4$ $x =$

iii) $g(x) + 2 = 4$ $x =$

2. Simply the difference quotient for the following functions [different quotient $\dfrac{f(x+h)-f(x)}{h}$]

a) $f(x) = x^2 + 2x + 3$ $\dfrac{f(x+h)-f(x)}{h} =$

b) $f(x) = x^3 - 5$ $\dfrac{f(x+h)-f(x)}{h} =$

c) $f(x) = \dfrac{4}{x}$ $\dfrac{f(x+h)-f(x)}{h} =$

3. Simplify the following completely with a common denominator. Your final answer will not contain any negative exponents.

a) $\dfrac{4x}{x-1} - \dfrac{5x+2}{2x} =$

b) $\dfrac{(b+2)^x}{(b+2)^{4x-2}} =$

c) $\dfrac{1+2t}{\sqrt{t+3}} + 2\sqrt{t+3} =$

d) $\dfrac{\left(x^2+1\right)\dfrac{1}{2\sqrt{x}} - \sqrt{x}(2x)}{\left(x^2+1\right)^2} =$

e) $\dfrac{2}{x+5} - \dfrac{3}{x-5} =$

f) $\dfrac{4(z+2)^{1/2} - 2z(z+2)^{-1/2}}{z+2} =$

g) $\dfrac{a^n 3^{n+1}}{3^n a^{n+1}} =$

h) $e^x e^{1-x} =$

i) $\dfrac{\left(x^3+1\right)^2 - 6x^3\left(x^3+1\right)}{\left(x^3+1\right)^4} =$

j) $\dfrac{5}{\sqrt{1-z^2}} - 3\sqrt{1-z^2} =$

k) $\dfrac{2x\cdot\left(x^2+5\right)^{1/2}-x^2\left(x^2+5\right)^{-1/2}\cdot 2x}{x^2+5}=$

l) $\dfrac{\dfrac{1}{(x+h)^2}-\dfrac{1}{x^2}}{h}=$

m) $\dfrac{\dfrac{1}{x}-\dfrac{1}{y}}{\dfrac{1}{x^2}-\dfrac{1}{y^2}}=$

n) $\dfrac{3}{\dfrac{3}{x-1}-1}=$

4. Solve algebraically for the exact solution(s). Solve for the indicated variable. Assume all other variables are constants.

$x=$ _____ $e^{5x}+e^{5x}=1$

$x=$ _____ $\dfrac{1+ax}{x-2}=4b$

$x=$ _____ $\log(x)+\log(x-21)=2$

$x=$ _____ $\dfrac{a}{x}+\dfrac{b}{2x}=1$

$y=$ _____ $6y^{-2}+y=0$

$t=$ _____ $10te^{3t}+2t^2e^{3t}=0$

$p=$ _____ $\dfrac{(p-1)(p^2-11)}{(p-2)(p+3)}=0$

$t=$ _____ $3^t=12(.8)^t$

$x=$ _____ $\ln(t+2)-\ln(t)=\ln(7)$

$x=$ _____ $\sqrt{x-1}-10=2$

$y=$ _____ $x^2y-x^3=2(2y+3)$

$x=$ _____ $(3-x)^3=-13$

$x=$ _____ $3(ax+1)-2x=4(a-ax)$

$x=$ _____ $9xe^{ax}-3x^2e^{ax}=0$

$x=$ _____ $(x+1)(x+3)=15$

$x=$ _____ $\ln(\ln(x))=1$

$x=$ _____ $\log(x)-\log(x-1)=1$

$x=$ _____ $A(.83)^x=B(b)^x$

$x=$ _____ $\dfrac{3x}{5}-\dfrac{2}{x}=\dfrac{1}{5}$

$x=$ _____ $(x-4)(x+2)=7$

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

$x=$ _____ $4xe^x-3e^x=0$

$x=$ _____ $4(x+1)^2-5=0$

$y=$ _____ $\dfrac{5y-2}{y-2}=0$

$z=$ _____ $0=4z^3+6z^2-24z-36$

$y=$ _____ $\dfrac{1-4y}{1+2y}+2=0$

$t=$ _____ $t^2-t-6=14$

$t=$ _____ $2t-(3t+4)=5(t+2)$

$y =$ _____ $x^2 + \frac{2y}{x} = y + 3$

$y =$ _____ $Ax + By + C = 0$

$t =$ _____ $t^3 - 16t^{-1} = 0$

$t =$ _____ $\ln(t+2) - \ln(t) = \ln(\pi)$

$p =$ _____ $\frac{3p^2 + p - 2}{p - 7} = 0$

$R =$ _____ $\frac{1}{R} = \frac{1}{a} + \frac{1}{b}$

5. Determine if each statement is **C**orrect or **I**ncorrect. Circle the correct answer.

C I $\sqrt{x^2 + 121} = x + 11$

C I $\sqrt{4} = \pm 2$

C I $\frac{\frac{x+3}{3}}{3} = \frac{x+3}{9}$

C I $\frac{\frac{w+1}{2}}{w+1} = \frac{1}{2}$ for $w \neq -1$

C I $\ln\left(e^x e^y\right) = x + y$

C I $e^{\ln(x)+5} = xe^5$

C I $\ln(M) - \ln(B) = \frac{\ln(M)}{\ln(B)}$

C I $\ln\left(\sqrt{a}\right) = \frac{1}{2}\ln(a)$

C I $2^{x+y} = 2^x + 2^y$

C I $\log\left(ab^t\right) = t\log(ab)$

C I $\ln\left(e^x + e^y\right) = x + y$

C I $\sqrt[3]{r^3 - 64} = r - 4$

C I $\frac{x^{-1} + 2}{x} = \frac{2}{x^2}$

C I $\frac{x^2 + 3x + 1}{x^2} = 3x + 1$

C I $e^{-3^2} = e^9$

C I $8(2t+1)^3 = (4t+2)^3$

C I $\left(e^x\right)^2 = e^{2x}$

C I $\frac{1}{x-4} = \frac{-1}{4-x}$

C I $(x+1)^2 + 2(x+1) = (x+1)(x+3)$

C I $\frac{1}{3t^4} = (3t)^{-4}$

C I $\ln(1) = e$

C I $\frac{1}{\sqrt[3]{(z-8)^2}} = (z-8)^{-2/3}$

C I $\frac{1}{a^{-1} + b^{-1}} = \frac{ab}{a+b}$

C I $2^t = t\ln(2)$

C I $\frac{1}{x+2} = \frac{1}{x} + \frac{1}{2}$

C I $\frac{\log(x)}{\log(t)} = \frac{\ln(x)}{\ln(t)}$

C I $\frac{Ax^2 + B}{x} = Ax + B$

C I $\log(x + y) = \log(x)\log(y)$

C I $e^{4\ln(x)} = 4x$

C I $(1 + y)^3 = 1 + y^3$

C I If $f(x) = 5^x$, then $f(x+4) = 5^x + 4$