

## Directions:

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

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

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

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

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

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

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

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

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

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

d)  $\frac{(x^2+1)\frac{1}{2\sqrt{x}} - \sqrt{x}(2x)}{(x^2+1)^2} =$

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

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

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

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

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

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