

Name KEY

Do not use calculators. Show your work on all problems, and leave your solutions in the simplest form possible.

Perform the operations (if any), and simplify if possible.

$$\frac{a^2 - 16}{a^2 - 8a + 16} = \frac{(a-4)(a+4)}{(a-4)(a-4)} \quad [8 \text{ points}]$$

$$= \boxed{\frac{a+4}{a-4}}$$

$$\frac{x-7}{2x^3 - 3x^2} \cdot \frac{4x^3 - 9x}{7x - 49} \quad [16 \text{ points}]$$

$$= \frac{x-7}{x^2(2x-3)} \cdot \frac{x(4x^2-9)}{7(x-7)}$$

$$= \frac{1}{x^2(2x-3)} \cdot \frac{x(2x-3)(2x+3)}{7}$$

$$= \boxed{\frac{2x+3}{7x}}$$

$$\frac{x^2}{x-3} + \frac{9}{x-3} = \frac{x^2+9}{x-3}$$

[8 points]

$$\frac{3}{y+4} - \frac{y}{y-1} + \frac{y^2+3}{y^2+3y-4}$$

[16 points]

$$y+4 = y+4$$

$$y-1 = y-1$$

$$y^2+3y-4 = (y+4)(y-1)$$

Rem
y-1
y+4
1

$$\text{LCM} = (y+4)(y-1)$$

$$\frac{3(y-1) - y(y+4) + y^2+3}{(y+4)(y-1)}$$

$$= \frac{3y-3 - y^2-4y + y^2+3}{(y+4)(y-1)}$$

$$= \boxed{\frac{-y}{(y+4)(y-1)}}$$

$$\frac{\frac{5}{x} - 5}{\frac{7}{x} - 7} = \frac{\frac{5}{x} - \frac{5x}{x}}{\frac{7}{x} - \frac{7x}{x}} \quad [12 \text{ points}]$$

$$= \frac{\frac{5-5x}{x}}{\frac{7-7x}{x}} = \frac{x(5-5x)}{x(7-7x)} = \frac{5-5x}{7-7x} = \frac{5(1-x)}{7(1-x)} = \frac{5}{7}$$

$$N \left\{ \frac{5}{x^2-9} - \frac{3}{x+3} \right. \\ D \left\{ \frac{4}{x^2+6x+9} + \frac{2}{x-3} \right. \quad [16 \text{ points}]$$

$$N = \frac{5}{x^2-9} - \frac{3}{x+3} = \frac{5-3(x-3)}{(x-3)(x+3)} = \frac{-3x+14}{(x-3)(x+3)}$$

$x^2-9 = (x-3)(x+3)$	Rem
$x+3 = x+3$	1
LCM = $(x-3)(x+3)$	$x-3$

$x^2+6x+9 = (x+3)(x+3)$	Rem
$x-3 = x-3$	$(x-3)$
LCM = $(x-3)(x+3)(x+3)$	$(x+3)(x+3)$

$$D = \frac{4(x-3) + 2(x+3)(x+3)}{(x-3)(x+3)(x+3)}$$

$$= \frac{4x-12 + 2(x^2+6x+9)}{(x-3)(x+3)(x+3)}$$

$$= \frac{2x^2 + 16x + 6}{(x-3)(x+3)(x+3)}$$

$$N \div D = \frac{-3x+14}{(x-3)(x+3)} \cdot \frac{(x-3)(x+3)(x+3)}{2x^2+16x+6}$$

$$= \frac{(-3x+14)(x+3)}{2x^2+16x+6}$$

Solve for x

$$\frac{4x+6}{x+2} = \frac{-2}{x+2} \quad [8 \text{ points}]$$

$$4x+6 = -2$$

$$4x = -8 \Rightarrow x = -2$$

No Solution

$$\frac{t+11}{t^2-t-12} + \frac{1}{t-4} = \frac{4}{t+3} \quad [16 \text{ points}]$$

$$t^2-t-12 = (t-4)(t+3)$$

$$t-4 = t-4$$

$$t+3 = t+3$$

$$\text{LCM} = (t-4)(t+3)$$

$$(t+11) + t+3 = 4(t-4)$$

$$2t+14 = 4t-16$$

$$-2t-14 = -2t-14$$

$$0 = 2t-30$$

$$2t = 30$$

$$t = 15$$