

Part I - Multiple Choice. Circle the correct answer. (2 pts each)

1. Which expression is the least common multiple of  $x^2 - 1$  and  $x^2 - x$ ?  
 a.  $x^2(x-1)^2(x+1)^2$     b.  $x(x-1)^2(x+1)$     c.  $x-1$     **d.  $x(x-1)(x+1)$**
2. Simplify  $\frac{x^2+5x+4}{x^2+2x+1} \cdot \frac{2x+2}{x+4}$ .  
 a.  $\frac{1}{2}$     b.  $\frac{(x+4)^2}{2(x+1)^2}$     **c. 2**    d.  $\frac{x+4}{2(x+1)}$
- Handwritten work for Q2:  $\frac{(x+4)(x+1)}{x+1} \cdot \frac{2(x+1)}{x+4}$*

Part II - Simplify. Circle answer

3.  $\frac{x^2-4x}{x^2+7x-18} \cdot \frac{x^2-81}{x^2-11x+18}$   
*Handwritten work:  $\frac{x(x-4)}{x+9} \cdot \frac{x-9}{x-2}$   
 $\frac{x(x-4)}{(x-2)^2}$*
4.  $\frac{x+1}{5xy} \div \frac{x+1}{4x^2y}$   
*Handwritten work:  $\frac{4x^2y}{5xy}$   
 $\frac{4x}{5}$*
5.  $\frac{x^2+4x+3}{x^2+6x+9} \cdot \frac{2x+6}{2x+2}$   
*Handwritten work:  $\frac{(x+3)(x+1)}{(x+3)(x+3)} \cdot \frac{2(x+3)}{2(x+1)}$   
**1***
6.  $\frac{3z^2-15z+18}{z^2-4} \div \frac{z^2-2z-3}{z^2+4z+4}$   
*Handwritten work:  $\frac{3(z-2)(z-3)}{(z-2)(z+2)} \cdot \frac{(z+2)(z+2)}{(z+1)(z+2)}$   
 $\frac{3(z-3)(z+2)}{(z+1)(z+2)}$   
 $\frac{3(z-3)}{z+1}$*

Simplify. Addition/Subtraction.

7.  $\frac{5}{x-2} + \frac{-2}{x+3}$   
*Handwritten work:  $\frac{5x+15-2x+4}{x-2} \cdot \frac{x+3}{x+3}$   
 $\frac{3x+19}{x-2} \cdot \frac{x+3}{x+3}$*
8.  $\frac{3}{x^2+3x-10} + \frac{1}{x-2}$   
*Handwritten work:  $\frac{3}{(x+5)(x-2)} + \frac{x+5}{(x+5)(x-2)}$   
 $\frac{x+8}{(x+5)(x-2)}$*

$$9. \frac{x^2}{x^2-x-30} + \frac{4(x+5)}{x-6}$$

$$\frac{x^2+4x+20}{(x-6)(x+5)}$$

$$10. \frac{x}{x^2+4x+4} + \frac{5}{x^2-4}$$

$$\frac{x}{(x+2)^2} + \frac{5}{(x-2)(x+2)}$$

$$\frac{x^2-2x+5x+10}{(x+2)^2(x-2)} = \frac{x^2+3x+10}{(x+2)^2(x-2)}$$

Solve each equation and check your solution.

$$11. \frac{9x}{9} + \frac{1}{x} = \frac{4}{9} \quad 9x$$

$$x + 9 = \frac{4}{9} \cdot 9x$$

$$\cancel{x=27} \quad x=3$$

$$12. \frac{1}{x-4} = \frac{2}{x-2}$$

$$x-2 = 2x-8$$

$$6 = x$$

$$13. \frac{2x}{x-2} - \frac{1}{3} = \frac{1}{3x-6}$$

$$6x - x + 2 = 1$$

$$5x = -1$$

$$x = -\frac{1}{5}$$

$$14. \frac{6}{y+2} + \frac{1}{y-2} = 1$$

$$6y-12 + y+2 = y^2-4$$

$$7y-10 = y^2-4$$

$$y^2-7y+6$$

$$y-6 \quad y-1$$

$$y=6 \quad y=1$$

Simplify

$$16. \frac{\frac{5}{x+3} + \frac{8}{x-2}}{\frac{6}{x+3}}$$

$$\frac{5x-10+8x+24}{x+3 \quad x-2}$$

$$\frac{13x+14}{(x+3)(x-2)} \cdot \frac{x+3}{6}$$

$$\frac{13x+14}{6(x-2)}$$