Math 1271 Test #2 Review

Section 1: Factoring & Fractions

Find the Greatest Common factor:

1. $8a^3 - 30a^2b + 16ab^2$ $2a(4a^2 - 15ab + 8b^2)$
2. $18a^3c - 3b^2c^3 + 10b^2c^2$ $c(18a^3 - 3b^2c^2 + 10b^2c)$

Factor completely:

3. $x^4 - y^4$ $(x^2 - y^2)(x^2 + y^2)$
4. $16x^2 - 9$ $(4x - 3)(4x + 3)$

Factor the following Trinomials:

5. $A^4 - 20A^2 + 100$

$A^4 - 10A^2 - 10A^2 + 100$

$A^2(A^2 - 10) - 10(A^2 - 10)$

$(A^2 - 10)(A^2 - 10) = \boxed{(A^2 - 10)^2}$

6. $3f^2 - 16f + 5$

$3f^2 - 15f - f + 5$

$3f(f - 5) - 1(f - 5)$

$\boxed{(f - 5)(3f - 1)}$

Perform the indicated operation and simplify as much as possible:

7. $\frac{6x^2-7x-3}{4x^2-8x+3}$

$\frac{6x^2 - 9x + 2x - 3}{4x^2 - 6x - 2x + 3}$

$\frac{3x(2x - 3) + 1(2x - 3)}{2x(2x - 3) - 1(2x - 3)}$

$\frac{(2x - 3)(3x + 1)}{(2x - 3)(2x - 1)}$

$\boxed{\frac{(3x + 1)}{(2x - 1)}}$

8. $\left(\frac{x^4-1}{8x+16}\right)\left(\frac{2x^2-8x}{x^3+x}\right)$

$\frac{(x^2 + 1)(x^2 - 1)}{8(x + 2)} \times \frac{2x(x - 4)}{x(x^2 + 1)}$

$\frac{2x(x^2 + 1)(x^2 - 1)(x - 4)}{8x(x + 2)(x^2 + 1)}$

$\boxed{\frac{(x^2 - 1)(x - 4)}{4(x + 2)}}$

9. $\frac{x^2-8x+16}{x^2-16}$

$\frac{x^2-4x-4x+16}{(x+4)(x-4)} = \frac{x(x-4)-4(x-4)}{(x+4)(x-4)}$

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

10. $\frac{9B^2-16}{B+1} \div (4-3B)$

$\frac{9B^2-16}{B+1} \times \frac{1}{4-3B}$ | $\frac{(3B-4)(3B+4)}{-1(B+1)(3B-4)}$

$\frac{(3B-4)(3B+4)}{(B+1)} \times \frac{1}{-1(3B-4)}$ | $\boxed{\frac{3B+4}{-1(B+1)}}$

11. $\frac{4x+4y}{35x^2} \times \frac{28x}{x^2-y^2}$

$\frac{4(x+y)}{35x^2} \times \frac{28x}{(x+y)(x-y)}$ | $\frac{16}{5x(x-y)}$

$\frac{4 \times 28x \times (x+y)}{35x^2(x+y)(x-y)}$

12. $\frac{\frac{3x}{7x^2+13x-2}}{\frac{6x^2}{x^2+4x+4}}$

$\frac{3x}{7x^2+13x-2} \times \frac{x^2+4x+4}{6x^2}$ | $\frac{3x}{7x(x+2)-1(x+2)} \times \frac{x(x+2)+2(x+2)}{6x^2}$

$\frac{3x}{7x^2+14x-x-2} \times \frac{x^2+2x+2x+4}{6x^2}$ | $\frac{3x}{(x+2)(7x-1)} \times \frac{(x+2)(x+2)}{2 \cdot 3x^2} = \boxed{\frac{x+2}{2x(7x-1)}}$

13. $\frac{x+1}{2x} - \frac{y-3}{4y} - \frac{2-x}{xy}$

Factors for LCD

$2x \Rightarrow 2x$

$4y \Rightarrow 2^2 y$

$xy \Rightarrow xy$

LCD: $2^2xy = 4xy$

$\frac{x+1}{2x} \times \frac{2y}{2y} = \frac{2y(x+1)}{4xy}$

$\frac{y-3}{4y} \times \frac{x}{x} = \frac{x(y-3)}{4xy}$

$\frac{2-x}{xy} \times \frac{4}{4} = \frac{4(2-x)}{4xy}$

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

$\frac{2xy+2y-xy+3x-8+4x}{4xy}$

$\boxed{\frac{xy+2y+7x-8}{4xy}}$

14. $\frac{2}{x+2} - \frac{3-x}{x^2+2x} + \frac{1}{x}$

$x+2 \Rightarrow (x+2)$

$x^2+2x \Rightarrow x(x+2)$

$x \Rightarrow x$

LCD $= x(x+2)$

$\frac{2}{(x+2)} \times \frac{x}{x} = \frac{2x}{x(x+2)}$

$\frac{3-x}{x(x+2)} \times \frac{1}{1} = \frac{(3-x)}{x(x+2)}$

$\frac{1}{x} \times \frac{(x+2)}{(x+2)} = \frac{x+2}{x(x+2)}$

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

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

$\boxed{\frac{4x-1}{x(x+2)}}$

15. $\frac{2}{n^2+4n+4} - \frac{3}{4+2n}$

$n^2+4n+4 = (n+2)^2$

$4+2n = 2(n+2)$

LCD: $2(n+2)^2$

$\frac{2}{(n+2)^2} \times \frac{2}{2} = \frac{4}{2(n+2)^2}$

$\frac{3}{2(n+2)} \times \frac{(n+2)}{(n+2)} = \frac{3(n+2)}{2(n+2)^2}$

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

$\frac{4-3n-6}{2(n+2)^2}$

$\boxed{\frac{-3n-2}{2(n+2)^2}}$

16. Solve the following equations:

a. $\frac{x}{2} - 3 = \frac{x-10}{4}$

LCD = 4

$\frac{2x-12}{4} = \frac{x-10}{4}$

$2x-12 = x-10$

$2x-x = -10+12$

$\boxed{x = 2}$

b. $\frac{2x}{2x^2-5x} - \frac{3}{x} = \frac{1}{4x-10}$

$2x^2-5x = x(2x-5)$

$x = x$

$4x-10 = 2(2x-5)$

LCD: $2x(2x-5)$

$\frac{2x}{x(2x-5)} \times \frac{2}{2} = \frac{4x}{2x(2x-5)}$

$\frac{3}{x} \times \frac{2(2x-5)}{2(2x-5)} = \frac{6(2x-5)}{2x(2x-5)}$

$\frac{1}{2(2x-5)} \times \frac{x}{x} = \frac{x}{2x(2x-5)}$

$\frac{4x-6(2x-5)}{2(2x-5)} = \frac{x}{2x(2x-5)}$

$4x-12x+30 = x$

$-8x+30 = x$

$30 = 9x$

$\boxed{x = \frac{10}{3}}$

17. Solve for y if $k(2-y) = y(2k-1)$

$2k-ky = 2ky-y$

$2k = 2ky-y+ky$

$2k = 3ky-y$

$2k = y(3k-1)$

$\frac{2k}{3k-1} = \frac{y(3k-1)}{(3k-1)}$

$\boxed{y = \frac{2k}{3k-1}}$

18. The speed v of a satellite can be found from the equation $v^2 = \frac{GmM}{r^2} \div \frac{m}{r}$. Simplify the right side of the equation and solve for v.

$v^2 = \frac{GmM}{r^2} \times \frac{r}{m}$

$v^2 = \frac{GM}{r}$

$\sqrt{v^2} = \sqrt{\frac{GM}{r}}$

$\boxed{V = \sqrt{\frac{GM}{r}}}$

19. Solve for m in the following equation: $W = mgh_2 - mgh_1$

$W = m(gh_2 - gh_1)$

$\frac{W}{(gh_2-gh_1)} = \frac{m(gh_2-gh_1)}{(gh_2-gh_1)}$

$\boxed{m = \frac{W}{(gh_2-gh_1)}}$