Honors Pre-Calculus Name Key

Multiplying and Dividing Rational Expressions

Simplify each expression.

1) $\frac{n^2-11n+24}{n^2+2n-48} \cdot \frac{n^2+14n+48}{n+6}$

$\boxed{\frac{(n-8)(n-3)}{n-6}}$ $\frac{(n-3)(n-8)}{(n+8)(n-6)} \cdot \frac{(n+6)(n+8)}{(n+6)}$

2) $\frac{4x+8}{x^2+4x+4} \cdot \frac{7x^2+14x}{4x+36}$ $\frac{4(x+2)}{(x+2)(x+2)} \cdot \frac{7x(x+2)}{4(x+9)}$

$\boxed{\frac{7x}{x+9}}$

$3(3x^2+4x+1)$

3) $\frac{9x^2+12x+3}{30x^2+30x} \cdot \frac{20x-12}{15x^2-4x-3}$

$\boxed{\frac{2}{5x}}$ $\frac{3(3x+1)(x+1)}{30x(x+1)} \cdot \frac{4(5x-3)}{(5x-3)(3x+1)}$

4) $\frac{25x^2-30x}{2x^2+28x+90} \cdot \frac{2x^2+24x+70}{5x-6}$

$2(x^2+14x+45)$

$\boxed{\frac{5x(x+7)}{x+9}}$ $\frac{5x(5x-6)}{2(x+5)(x+9)} \cdot \frac{(2x+10)(x+7)}{(5x-6)}$

5) $\frac{3p+7}{9p^2+27p+14} \div \frac{1}{3p^2+32p+20}$

$\boxed{p+10}$ $\frac{(3p+7)}{(3p+2)(3p+7)} \cdot \frac{(3p+2)(p+10)}{1}$

6) $\frac{1}{n-10} \div \frac{2n+8}{2n^2+4n-16}$ $\frac{1}{n-10} \cdot \frac{2(n+4)(n-2)}{2(n+4)}$

$2(n^2+2n-8)$

$\boxed{\frac{n-2}{n-10}}$

7) $\frac{5}{\frac{4}{x}-\frac{x}{5}}$ $\frac{\left(\frac{5}{1}\right)}{\frac{20}{5x}-\frac{x^2}{5x}} = \frac{\left(\frac{5}{1}\right)}{\left(\frac{20-x^2}{5x}\right)}$

$\boxed{\frac{25x}{20-x^2}}$ $\frac{5}{1} \cdot \frac{5x}{20-x^2}$

8) $\frac{a-4}{\frac{4}{9}+\frac{1}{3}}$ $\frac{a-4}{\frac{4}{9}+\frac{3}{9}} = \frac{a-4}{\frac{7}{9}} = \frac{a-4}{1} \cdot \frac{9}{7}$

$\boxed{\frac{9a-36}{7}}$

9) $\frac{\frac{9}{x^2}}{\frac{x}{16}+\frac{3}{4}} = \frac{\frac{9}{x^2}}{\frac{x}{16}+\frac{12}{16}} = \frac{\frac{9}{x^2}}{\frac{x+12}{16}}$

$\boxed{\frac{144}{x^3+12x^2}}$ $\frac{9}{x^2} \cdot \frac{16}{x+12}$

** Distribute the minus **

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

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

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