Simplying multiplying and dividing rational numbers

1. $\frac{n^2+7n}{4n^2+28n} = \frac{n^2+7n}{n^2+7n}\left[\frac{1}{4}\right] = \frac{1}{4}$

2. $\frac{1-9w^2}{12w-4} = \frac{(1-3w)(1+3w)}{12w-4} = \frac{(1-3w)(1+3w)}{-4(1-3w)} = \frac{1+3w}{-4}$

3. $\frac{x^2-10x-24}{(x+2)} = \frac{x^2-12x+2x-24}{x+2} = \frac{x(x-12)+2(x-12)}{x+2}$

$= \frac{(x+2)(x-12)}{(x+2)} = x-12$

4. $\frac{y^2-36}{5y^2-26y-24} = \frac{(y-6)(y+6)}{5y^2-30y+4y-24} = \frac{(y-6)(y+6)}{5y(y-6)+4(y-6)}$

$= \frac{(y-6)(y+6)}{(5y+4)(y-6)} = \frac{y+6}{5y+4}$

5. $\frac{32x^3y}{5xy^2} \cdot \frac{15y}{8x^2y^4} = \frac{480x^3y^2}{40x^3y^6} = \frac{12}{y^4}$

6. $\frac{m^2-6m+8}{2m-2} \cdot \frac{10}{m-4} = \frac{(m-2)(m-4)10}{(2m-2)(m-4)} = \frac{10m-20}{2m-2}$.

$= \frac{5m-10}{m-1}$

7. $\frac{28n+40}{35n+50} \cdot \frac{12n+24}{8n+16}$

$= \frac{4(7n+10)}{5(7n+10)} \cdot \frac{12(n+2)}{8(n+2)} = \frac{4}{5} \cdot \frac{12}{8} = \frac{6}{5}$

8. $\frac{6c^2+13c-63}{6c^2-17c+7} \cdot \frac{2c^2-9c+4}{12c+54} = \frac{(3x-7)(2x+9)}{(2x-1)(3x-7)} \cdot \frac{(2x-1)(x-4)}{3(4c+18)}$

$= \frac{2x+9 \cdot (2x-1)(x-4)}{2x-1 \cdot (12x+54)} = \frac{(2x+9)(x-4)}{3(4c+18)}$

$= \frac{(2c+9)(x-4)}{6(2c+9)} = \frac{x-4}{6}$

9. $\frac{14m^4}{3m} \div \frac{7m^2}{18m^5} = \frac{12m^4}{3m} \times \frac{6m^5}{7m^2} = \frac{12m^9}{m^3} = 12(m^{9-3}) = 12m^6$

10. $\frac{2a^2+14a}{8a^2} \div 10a+70$

$= \frac{2a^2+14a}{8a^2(10a+70)} = \frac{2a(a+7)}{8a^2(10)(a+7)} = \frac{2a}{80a^2} = \frac{1}{40a}$

11. $\frac{1-h^2}{2h^2-14h-12} \div \frac{2h-2}{6} = \frac{(1+h)(1-h)}{2(1+h)(h-6)} \cdot \frac{6}{2(h-1)}$

$= \frac{-6(h-1)}{2(h-6) \cdot 2(h-1)} = \frac{-6}{4(h-6)}$

12. $\frac{2r+2}{r+2} \div \frac{4r^2+8r+4}{12r+12} = \frac{2(r+1)}{(r+2)} \times \frac{12(r+1)}{4(r+1)^2} = \frac{2 \cdot 6(r+1)^2}{4(r+2)(r+1)^2}$

$= \frac{6}{r+2}$.