Simplify—state any excluded values ← $denominator\ cannot\ be\ 0!$
**SHOW ALL WORK TO RECEIVE CREDIT!!

1) $\dfrac{64-x^2}{x^2-5x-24}$

$\dfrac{(8+x)(8-x)}{(x-8)(x+3)} = \dfrac{-(x-8)(8+x)}{(x-8)(x+3)}$

$= \dfrac{-(8+x)}{x+3} = \boxed{\dfrac{-x-8}{x+3}}$

$x+3 \neq 0 \rightarrow \boxed{x \neq -3}$

2) $\dfrac{5x^2+35x}{3x^3+36x^2+105x} * \dfrac{3x^2+5x}{20}$

$\dfrac{5x(x+7)\cdot x(3x+5)}{3x(x^2+12x+35)\cdot 20} = \dfrac{5x(x+7)\cdot x(3x+5)}{3x(x+5)(x+7)\cdot 4\cdot 5}$

$= \dfrac{x(3x+5)}{3(x+5)\cdot 4} = \boxed{\dfrac{3x^2+5x}{12x+60}}$

$\boxed{x \neq -5}$

$\begin{array}{r} 12x+60 \neq 0 \\ -60 \quad -60 \\ \hline 12x \neq -60 \\ \frac{12x}{12} \quad \frac{12}{12} \\ x \neq -5 \end{array}$

3) $\dfrac{7a-70}{a-10} * \dfrac{5a^2+32a-21}{35a^2-21a}$

$\dfrac{7(a-10)\cdot(5a-3)(a+7)}{(a-10)\cdot 7a(5a-3)}$

$= \boxed{\dfrac{a+7}{a}} \quad \boxed{a \neq 0}$

4) $(49x+35) \div \dfrac{35x^2-31x-40}{5x-8}$ multiply by reciprocal

$\dfrac{7(7x+5)}{1} \cdot \dfrac{5x-8}{35x^2-31x-40}$

$= \dfrac{7(7x+5)(5x-8)}{(7x+5)(5x-8)} = \boxed{7}$

5) $\dfrac{3n^2}{28n-36} \div \dfrac{3}{28n^3-36n^2}$ multiply by reciprocal

$\dfrac{3n\cdot n}{4(7n-9)} \cdot \dfrac{4n^2(7n-9)}{3}$

$= \boxed{n^4}$

6) $\dfrac{\frac{14x-7}{x-8}}{\frac{7x+56}{x^2-64}} = \dfrac{14x-7}{x-8} \div \dfrac{7x+56}{x^2-64}$ multiply by reciprocal

$= \dfrac{14x-7}{x-8} \cdot \dfrac{x^2-64}{7x+56} = \dfrac{7(2x-1)(x+8)(x-8)}{(x-8)\cdot 7(x+8)}$

$= \boxed{2x-1}$

7) The product of the width and height of a rectangular prism can be represented by the expression 3x + 4. If the volume of the rectangular prism is $3x^2 + x - 4$, what is the expression for the length of the rectangular prism?

$V = L \cdot W \cdot H$

$\dfrac{3x^2+x-4}{3x+4} = \dfrac{L\cdot(3x+4)}{3x+4} \rightarrow L = \dfrac{(3x+4)(x-1)}{3x+4} = \boxed{x-1}$