

Unit 3 Review - Warmup

Simplify each expression.

$$1) \frac{3(m^2 + 6m + 9)}{6m + 18} \cdot \frac{5m^2 + 49m + 36}{5m + 4}$$

$$\frac{3(m+3)(m+3)}{6(m+3)} \cdot \frac{(5m+4)(m+9)}{(5m+4)}$$

$$\frac{3(m+3)(m+9)}{2 \cancel{6}} = \boxed{\frac{m^2 + 12m + 27}{2}}$$

$$3) \frac{\frac{2}{m} + \frac{5}{m^2}}{\frac{9}{5} + \frac{25}{m}} = \frac{\frac{2m}{m^2} + \frac{5}{m^2}}{\frac{9m}{5m} + \frac{125}{5m}} = \frac{\frac{(2m+5)}{m^2}}{\frac{(9m+125)}{5m}}$$

$$\frac{2m+5}{m^2} \cdot \frac{5m}{9m+125} = \frac{5(2m+5)}{m(9m+125)}$$

$$\boxed{\frac{10m+25}{9m^2+125m}}$$

$$5) \frac{6}{3a-5} - \frac{2a}{a-3}$$

$$\frac{6(a-3)}{(3a-5)(a-3)} + \frac{-2a(3a-5)}{(3a-5)(a-3)} = \frac{6a-18-6a^2+10a}{(3a-5)(a-3)} = \boxed{\frac{-6a^2+16a-18}{(3a-5)(a-3)}}$$

Solve each equation. Remember to check for extraneous solutions.

$$6) \frac{3\sqrt{v}}{\sqrt{v+6}} + \frac{1}{\frac{v^2+6v}{\sqrt{v+6}} \cdot v} = \frac{1}{v}$$

$$\frac{3\sqrt{v+1}}{\sqrt{v+6}} = \frac{1}{\sqrt{v}}$$

$$\sqrt{3v+1} = \sqrt{v+6}$$

$$3v+1 = v+6$$

$$2v = 5$$

$$\boxed{v = \frac{5}{2}}$$

$$7) \frac{b-1}{b-6} = \frac{3}{b-4} + 1 \cdot \frac{b+4}{b-4}$$

$$\frac{b-1}{b-6} = \frac{b-1}{b-4}$$

$$(b-1)(b-4) = (b-6)(b-1)$$

$$b^2 - 5b + 4 = b^2 - 7b + 6$$

$$-5b + 4 = -7b + 6$$

$$2b = 2$$

$$\boxed{b = 1}$$

$$2) \frac{4p^2 + 12p - 7}{4p^2 + 4p - 35} \div \frac{2p^2 + 9p - 5}{10p - 25}$$

$$\frac{(2p-1)(2p+7)}{(2p-5)(2p+7)} \cdot \frac{5(2p-5)}{(2p-1)(p+5)}$$

$$\boxed{\frac{5}{p+5}}$$

$$4) \frac{4r}{r-6} + \frac{2}{3r-3} = \frac{4r-3(r-1)}{3(r-1)(r-6)} + \frac{2(r-6)}{3(r-1)(r-6)}$$

$$\frac{12r^2 - 12r + 2r - 12}{3(r-1)(r-6)} = \boxed{\frac{12r^2 - 10r - 12}{3(r-1)(r-6)}}$$