Chapter 6

Chapter 6 REVIEW

Assignment

Complete pgs. 352 - 354

Questions

4, 9, 10(a-d),
11ab,15(a-d) and 20(a-c)

Solutions

4. What is the numerical value for each rational expression? Identify any non-permissible values.

a) $\frac{2s-8s}{s}$

$= \frac{-6\cancel{s}}{\cancel{s}}$

$= -6, s \neq 0$

b) $\frac{5x-3}{3-5x}$

$= \frac{5x-3}{-5x+3}$

$= \frac{\cancel{5x-3}}{-1(\cancel{5x-3})}$

$= \frac{1}{-1}$

$= -1, x \neq \frac{3}{5}$

$3-5x \neq 0$

$\frac{3}{5} \neq \frac{\cancel{5}x}{\cancel{5}}$

$\frac{3}{5} \neq x$

c) $\frac{2-b}{4b-8}$

$= \frac{-b+2}{4b-8}$

$= \frac{-1(\cancel{b-2})}{4(\cancel{b-2})}$

$= -\frac{1}{4}, b \neq 2$

$4b-8 \neq 0$

$\frac{\cancel{4}b}{\cancel{4}} \neq \frac{8}{4}$

$b \neq 2$

Solutions

9. Simplify each product. Determine all non-permissible values.

a) $\frac{2\cancel{p}}{r} \times \frac{10q}{8\cancel{p}}$

$= \frac{(2)(10q)}{(r)(8)}$

$= \frac{20q}{8r}$

$= \frac{5q}{2r}, r \neq 0, p \neq 0$

b) $4m^{\cancel{3}\,2}\cancel{t} \times \frac{1}{16\cancel{m}t^{\cancel{4}\,3}}$

$= \frac{4m^2}{16t^3}$

$= \frac{m^2}{4t^3}, m \neq 0, t \neq 0$

c) $\frac{3a+3b}{8} \times \frac{4}{a+b}$

$= \frac{3\cancel{(a+b)}}{8} \times \frac{4}{\cancel{a+b}}$

$= \frac{(3)(4)}{8}$

$= \frac{12}{8}$

$= \frac{3}{2}, a \neq -b$

d) $\frac{x^2-4}{x^2+25} \times \frac{2x^2+10x}{x^2+2x}$

$= \frac{(x-2)\cancel{(x+2)}}{x^2+25} \times \frac{2\cancel{x}(x+5)}{\cancel{x}\cancel{(x+2)}}$

$= \frac{2(x-2)(x+5)}{x^2+25}, x \neq 0, -2$

Solutions

e) $\frac{d^2+3d+2}{2d+2} \times \frac{2d+6}{d^2+5d+6}$

$= \frac{\cancel{(d+1)}\cancel{(d+2)}}{\cancel{2}\cancel{(d+1)}} \times \frac{\cancel{2}\cancel{(d+3)}}{\cancel{(d+2)}\cancel{(d+3)}}$

$= 1,\ d \neq -1, -2, -3$

f) $\frac{y^2-8y-9}{y^2-10y+9} \times \frac{y^2-9y+8}{y^2-1} \times \frac{y^2-25}{5-y}$

$= \frac{\cancel{(y+1)}\cancel{(y-9)}}{\cancel{(y-1)}\cancel{(y-9)}} \times \frac{\cancel{(y-1)}(y-8)}{(y-1)\cancel{(y+1)}} \times \frac{(y-5)(y+5)}{-y+5}$

$= \frac{(y-8)}{(y-1)} \times \frac{\cancel{(y-5)}(y+5)}{-1\cancel{(y-5)}}$

$= \frac{(y-8)(y+5)}{-1(y-1)}$

$= \frac{-1(y-8)(y+5)}{(y-1)},\ y \neq 1, 9, -1, 5$

10. Divide. Express answers in simplest form. Identify any non-permissible values.

a) $2t \div \frac{1}{4}$

$= 2t \times \frac{4}{1}$

$= \frac{8t}{1}$

$= 8t$

Solutions

b) $\frac{a^3}{b^4} \div \frac{a^3}{b^3}$

$= \frac{\cancel{a^3}}{b^{\cancel{4}}} \times \frac{\cancel{b^3}}{\cancel{a^3}}$

$= \frac{1}{b}, \; a \neq 0, b \neq 0$

c) $\frac{7}{x^2-y^2} \div \frac{-35}{x-y}$

$= \frac{7}{(\cancel{x-y})(x+y)} \times \frac{\cancel{x-y}}{-35}$

$= \frac{7}{-35(x+y)}$

$= \frac{-1}{5(x+y)}, \; x \neq \pm y$

d) $\frac{3a+9}{a-3} \div \frac{a^2+6a+9}{a-3}$

$= \frac{3(a+3)}{a-3} \div \frac{(a+3)(a+3)}{a-3}$

$= \frac{3(\cancel{a+3})}{\cancel{a-3}} \times \frac{\cancel{a-3}}{(a+3)(\cancel{a+3})}$

$= \frac{3}{a+3}, \; a \neq \pm 3$

Solutions

11. Multiply or divide as indicated. Express answers in simplest form. Determine all non-permissible values.

a) $\frac{9}{2m} \div \frac{3}{m} \times \frac{m}{3}$

$= \frac{9}{2\cancel{m}} \times \frac{\cancel{m}}{3} \times \frac{m}{3}$

$= \frac{9(m)}{(2)(3)(3)}$

$= \frac{9m}{18}$

$= \frac{m}{2}, m \neq 0$

b) $\frac{x^2-3x+2}{x^2-4} \times \frac{x+3}{x^2+3x} \div \frac{1}{x+2}$

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

$= \frac{x-1}{x}, x \neq \pm 2, 0, -3$

15. Add or subtract. Express answers in simplest form. Identify any non-permissible values.

a) $\frac{4x-3}{6} - \frac{x-2}{4}$

$= \frac{2(4x-3)}{12} - \frac{3(x-2)}{12}$

$= \frac{2(4x-3)-3(x-2)}{12}$

$= \frac{8x-6-3x+6}{12}$

$= \frac{5x}{12}$

Solutions

b) $\frac{2y-1}{3y} + \frac{y-2}{2y} - \frac{y-8}{6y}$

$= \frac{2(2y-1)}{6y} + \frac{3(y-2)}{6y} - \frac{y-8}{6y}$

$= \frac{4y-2}{6y} + \frac{3y-6}{6y} - \frac{(y-8)}{6y}$

$= \frac{4y-2+3y-6-y+8}{6y}$

$= \frac{6y}{6y}$

$= 1, \; y \neq 0$

c) $\frac{9}{x-3} + \frac{7}{x^2-9}$

$= \frac{9}{x-3} + \frac{7}{(x-3)(x+3)}$

$= \frac{9(x+3)}{(x-3)(x+3)} + \frac{7}{(x-3)(x+3)}$

$= \frac{9x+27+7}{(x-3)(x+3)}$

$= \frac{9x+34}{(x-3)(x+3)}, \; x \neq \pm 3$

d) $\frac{a}{a+3} - \frac{a^2-3a}{a^2+a-6}$

$= \frac{a}{a+3} - \frac{a(a-3)}{(a+3)(a-2)}$

$= \frac{a(a-2)}{(a+3)(a-2)} - \frac{a(a-3)}{(a+3)(a-2)}$

$= \frac{a^2-2a-a^2+3a}{(a+3)(a-2)}$

$= \frac{a}{(a+3)(a-2)}, \; a \neq -3, 2$

Solutions

20. Solve each rational equation. Identify all non-permissible values.

a) $\frac{s-3}{s+3} = 2$

$\cancel{s+3}\left[\frac{s-3}{\cancel{s+3}}\right] = s+3[2]$

$s-3 = 2(s+3)$

$s-3 = 2s+6$

$-3-6 = 2s-s$

$-9 = s, \; s \neq -3$

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

$\cancel{(3x+2)}(x-1)\left[\frac{x+2}{\cancel{3x+2}}\right] = (3x+2)\cancel{(x-1)}\left[\frac{x+3}{\cancel{x-1}}\right]$

$(x-1)(x+2) = (3x+2)(x+3)$

$x^2+2x-1x-2 = 3x^2+9x+2x+6$

$x^2+x-2 = 3x^2+11x+6$

$0 = 3x^2-x^2+11x-x+6+2$

$0 = 2x^2+10x+8$

$0 = 2(x^2+5x+4)$

$0 = 2(x+1)(x+4)$

$0 = x+1$ or $0 = x+4$

$-1 = x$ $\quad -4 = x, \; x \neq -\frac{2}{3}, 1$

Solutions

c) $\frac{z-2}{z} + \frac{1}{5} = \frac{-4}{5z}$

$5z\left[\frac{z-2}{z} + \frac{1}{5}\right] = 5z\left[\frac{-4}{5z}\right]$

$5\cancel{z}\left[\frac{z-2}{\cancel{z}}\right] + \cancel{5}z\left[\frac{1}{\cancel{5}}\right] = \cancel{5z}\left[\frac{-4}{\cancel{5z}}\right]$

$5(z-2) + z(1) = -4$

$5z - 10 + z = -4$

$6z = -4 + 10$

$\frac{\cancel{6}z}{\cancel{6}} = \frac{6}{6}$

$z = 1, z \neq 0$