PC 6.2 Practice Solutions

6.2 Complex Fractions and Rationalizing

PRACTICE

Directions: Simplify each fraction.

1) $\dfrac{\frac{3}{16}+\frac{m^2}{16}}{9}\ (16)(16) = \dfrac{3+m^2}{144}$

2) $\dfrac{\frac{1}{x}}{\frac{5x}{x+4}+\frac{x+4}{25}}\ (x)(25)(x+4)$

$\dfrac{1(25)(x+4)}{5x(x)(25)+(x+4)(x+4)(x)} = \dfrac{25x+100}{125x^2+(x^2+8x+16)x}$

$= \dfrac{25x+100}{125x^2+x^3+8x^2+16x}$

$= \dfrac{25x+100}{x^3+133x^2+16x}$

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

$= \dfrac{2x+2-x}{3+3x+3} = \dfrac{x+2}{3x+6}$

$= \dfrac{x+2}{3(x+2)} = \dfrac{1}{3}$

4) $\dfrac{\frac{25}{4}+\frac{w}{\frac{8}{5}}}{\frac{16}{5}+\frac{5}{w^2}}\ (8)(5)(w^2) = \dfrac{25(2)(5)(w^2)+w(5)(w^2)}{16(8)(w^2)+5(5)(8)}$

$= \dfrac{250w^2+5w^3}{128w^2+200}$

5) $\dfrac{\frac{2}{\frac{x+5}{x}}-\frac{x^2}{\frac{x+5}{x^2}}}{\frac{x+5}{x}+\frac{x+5}{x^2}}\ \dfrac{(x+5)(x^2)}{(x+5)(x^2)} = \dfrac{2(x^2)-x^2(x^2)}{(x+5)(x)(x+5)+(x+5)(x+5)}$

$= \dfrac{2x^2-x^4}{(x^2+10x+25)x+x^2+10x+25} = \dfrac{2x^2-x^4}{x^3+10x^2+25x+x^2+10x+25}$

$= \dfrac{2x^2-x^4}{x^3+11x^2+35x+25}$

6) $\dfrac{\frac{g}{g+2}+1}{\frac{g}{g-2}-1}\ (g+2)(g-2) = \dfrac{g(g-2)+1(g+2)(g-2)}{g(g+2)-(1(g+2)(g-2))}$

$= \dfrac{g^2-2g+g^2-4}{g^2+2g-(g^2-4)} = \dfrac{2g^2-2g-4}{g^2+2g-g^2+4}$

$= \dfrac{2g^2-2g-4}{2g+4} = \dfrac{2(g^2-g-2)}{2(g+2)}$

$= \dfrac{g^2-g-2}{g+2}$

7) $\dfrac{\frac{9}{x-2}-\frac{3}{4}}{\frac{3}{x+5}-\frac{x-2}{x+5}}\ \dfrac{(x-2)(4)(x+5)}{(x-2)(4)(x+5)} = \dfrac{9(4)(x+5)-(3(x-2)(x+5))}{3(4)(x-2)-((x-2)(x-2)(4))}$

$= \dfrac{36x+180-[3(x^2+3x-10)]}{12x-24-[4(x^2-4x+4)]}$

$= \dfrac{36x+180-[3x^2+9x-30]}{12x-24-[4x^2-16x+16]} = \dfrac{-3x^2+27x+210}{-4x^2+28x-40}$

$= \dfrac{-(3x^2-27x-210)}{-(4x^2-28x+40)} = \dfrac{3x^2-27x-210}{4x^2-28x+40}$

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Directions: Rationalize each fraction.

8) $\frac{4}{\sqrt{x+1}-10}\cdot\frac{(\sqrt{x+1}+10)}{(\sqrt{x+1}+10)} = \frac{4(\sqrt{x+1}+10)}{(\sqrt{x+1})^2+10\sqrt{x+1}-10\sqrt{x+1}-100}$

$= \frac{4(\sqrt{x+1}+10)}{x+1-100} = \boxed{\frac{4(\sqrt{x+1}+10)}{x-99}}$

9) $\frac{5x+2}{4-\sqrt{2x}}\cdot\frac{(4+\sqrt{2x})}{(4+\sqrt{2x})} = \frac{(5x+2)(4+\sqrt{2x})}{16+4\sqrt{2x}-4\sqrt{2x}-(\sqrt{2x})^2}$

$= \boxed{\frac{(5x+2)(4+\sqrt{2x})}{16-2x}}$

10) $\frac{x+2}{\sqrt{x}+\sqrt{x-4}}\cdot\frac{(\sqrt{x}-\sqrt{x-4})}{(\sqrt{x}-\sqrt{x-4})} = \frac{(x+2)(\sqrt{x}-\sqrt{x-4})}{x-(x-4)}$

$= \frac{(x+2)(\sqrt{x}-\sqrt{x-4})}{4} = \boxed{\frac{(x+2)(\sqrt{x}-\sqrt{x-4})}{4}}$

11) $\frac{m-5}{\sqrt{m+4}-\sqrt{2m}}\cdot\frac{(\sqrt{m+4}+\sqrt{2m})}{(\sqrt{m+4}+\sqrt{2m})} = \frac{(m-5)(\sqrt{m+4}+\sqrt{2m})}{(\sqrt{m+4})^2-(\sqrt{2m})^2}$

$\frac{(m-5)(\sqrt{m+4}+\sqrt{2m})}{m+4-2m} = \boxed{\frac{(m-5)(\sqrt{m+4}+\sqrt{2m})}{4-m}}$

12) $\frac{6-y}{\sqrt{4-y}+\sqrt{y+4}}\cdot\frac{(\sqrt{4-y}-\sqrt{y+4})}{(\sqrt{4-y}-\sqrt{y+4})} = \frac{(6-y)(\sqrt{4-y}-\sqrt{y+4})}{(\sqrt{4-y})^2-(\sqrt{y+4})^2} = \frac{(6-y)(\sqrt{4-y}-\sqrt{y+4})}{4-y-(y+4)}$

$\frac{(6-y)(\sqrt{4-y}-\sqrt{y+4})}{-2y} = \boxed{-\frac{(6-y)(\sqrt{4-y}-\sqrt{y+4})}{2y}}$