Exam 3
Math 093
Fall 2010

Name Key

Show All Work

1) Simplify $\dfrac{4-\frac{1}{y^2}}{2-\frac{1}{y}}$ $= \dfrac{\frac{4y^2}{y^2}-\frac{1}{y^2}}{\frac{2y}{y}-\frac{1}{y}} = \dfrac{\frac{4y^2-1}{y^2}}{\frac{2y-1}{y}} = \dfrac{4y^2-1}{y^2} \cdot \dfrac{y}{2y-1}$

$= \dfrac{(2y-1)(2y+1)}{y^2} \cdot \dfrac{y}{2y-1} = \dfrac{2y+1}{y}$

2) Solve $\dfrac{5}{x-3} - \dfrac{30}{x^2-9} = 1$

$(x-3)(x+3)\left[\dfrac{5}{x-3} - \dfrac{30}{x^2-9}\right] = (x-3)(x+3)\cdot 1$

$(x-3)(x+3)\cdot\dfrac{5}{x-3} - (x-3)(x+3)\cdot\dfrac{30}{x^2-9} = (x-3)(x+3)$

$5(x+3) - 30 = x^2-9$

$5x+15-30 = x^2-9$

$5x-15 = x^2-9$

$0 = x^2-5x+6$

$0 = (x-2)(x-3)$

$x=2$ or $x=3$ impossible

check

$\dfrac{5}{-1} - \dfrac{30}{-5}$

$= -5+6$

$= 1$ ✓

3) If $f(x) = x^2 - 2x$ then

a) $f(2) = 2^2 - 2\cdot 2 = 4-4 = 0$

b) $f(-2) = (-2)^2 - 2(-2) = 4+4 = 8$

c) $f(3a) = (3a)^2 - 2(3a)$

$= 9a^2 - 6a$

4) Find the domain of $f(x) = \frac{2x+1}{3x-2}$

$3x-2 \neq 0$

$3x \neq 2$

$x \neq \frac{2}{3}$

$\{x \mid x \neq \frac{2}{3}\}$