Math 20-1

KEY

## LO2 – Worksheet - 6.1 Rational Expressions

**Pg 317 #4ace:** Determine the non-permissible value(s) for each rational expression.

$\frac{3a}{4-a}$

$4-a \neq 0$
$-1a \neq -4$
$a \neq 4$

$\frac{3(y+7)}{(y-4)(y+2)}$

$y-4 \neq 0$
$y \neq 4$

$y+2 \neq 0$
$y \neq -2$

$\frac{2k+8}{k^2}$

$k^2 \neq 0$
$k \neq 0$

**Pg 318 #6acd:** Simplify each rational expression. State any non-permissible values for the variables.

$\frac{2c(c-5)}{3c(c-5)}$

$c \neq 0$ $c \neq 5$

$\frac{2}{3}$, where $c \neq 0, 5$

$\frac{(x-7)(x+7)}{(2x-1)(x-7)}$

$2x-1 \neq 0$
$2x \neq 1$
$x \neq \frac{1}{2}$

$x-7 \neq 0$
$x \neq 7$

$\frac{x+7}{2x-1}$, where $x \neq \frac{1}{2}, 7$

$\frac{5(a-3)(a+2)}{10(3-a)(a+2)}$

$3-a \neq 0$
$-1a \neq -3$
$a \neq 3$

$a+2 \neq 0$
$a \neq -2$

$\frac{5(a-3)(a+2)}{(10)(-1)(a-3)(a+2)}$

$-\frac{1}{2}$, where $a \neq -2, 3$

**Pg 318 #8bcef:** Write each rational expression in simplest form. State any non-permissible values for the variables.

$\frac{3x-6}{10-5x}$

$\frac{3x-6}{(-1)(5x-10)}$

$\frac{3(x-2)}{(-1)(5)(x-2)}$

$-\frac{3}{5}$, where $x \neq 2$

$\frac{b^2+2b-24}{2b^2-72}$

$\frac{(b+6)(b-4)}{2(b^2-36)}$

$\frac{(b+6)(b-4)}{2(b+6)(b-6)}$

$b+6 \neq 0$
$b \neq -6$

$b-6 \neq 0$
$b \neq 6$

$\frac{b-4}{2(b-6)}$

where $b \neq -6, 6$

$\frac{x-4}{4-x}$

$\frac{(x-4)}{(-1)(x-4)}$

$x-4 \neq 0$
$x \neq 4$

$-1$, where $x \neq 4$

$\frac{5(x^2-y^2)}{x^2-2xy+y^2}$

$\frac{5(x+y)(x-y)}{(x-y)(x-y)}$

$x-y \neq 0$
$x \neq y$

$x-y \neq 0$
$x \neq y$

$\frac{5(x+y)}{(x-y)}$, where $x \neq y$

KEY

**Pg 318 #9:** Since $\frac{x^2+2x-15}{x-3}$ can be written as $\frac{(x-3)(x+5)}{x-3}$, you can say that $\frac{x^2+3x-15}{x-3}$ and $x+5$ are equivalent expressions. Is this statement always, sometimes, or never true? Explain.

$$\frac{x^2+2x-15}{x-3} = \frac{(\cancel{x-3})(x+5)}{(\cancel{x-3})} = \boxed{x+5,\ x \neq 3}$$

This is only true when $x \neq 3$.

**Pg 318 #14:** Create a rational expression with variable $p$ that has non-permissible values of 1 and -2.

$$\frac{\text{SOMETHING}}{(p-1)(p+2)}$$

$p-1 \neq 0$
$p \neq 1$

$p+2 \neq 0$
$p \neq -2$

**Pg 320 #26a:** Write in simplest form. Identify any non-permissible values.

$$\frac{(x+2)^2-(x+2)-20}{x^2-9}$$

$$= \frac{(x+2)(x+2) - (x+2) - 20}{x^2-9}$$

$$= \frac{x^2+4x+4 - x - 2 - 20}{x^2-9}$$

$$= \frac{x^2+3x-18}{x^2-9}$$

$$= \frac{(x+6)(x-3)}{(x+3)(x-3)}$$

$x+3 \neq 0$
$x \neq -3$

$x-3 \neq 0$
$x \neq 3$

$$= \frac{x+6}{x+3}, \text{ where } x \neq -3, 3$$

METHOD #2: Let $y = (x+2)$

$$\frac{y^2-y-20}{x^2-9} = \frac{(y+4)(y-5)}{x^2-9}$$

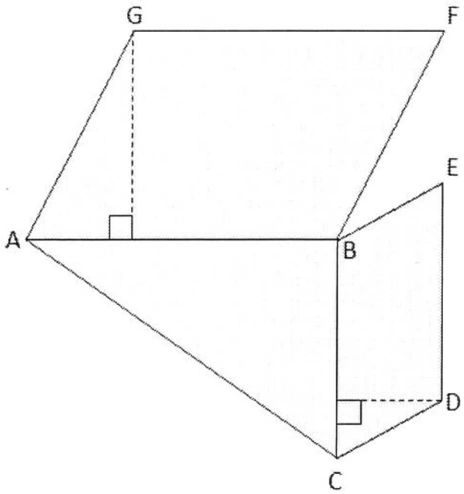
$$= \frac{(x+2+4)(x+2-5)}{(x+3)(x-3)}$$

$$= \frac{(x+6)(x-3)}{(x+3)(x-3)}$$

$$= \frac{x+6}{x+3}, \text{ where } x \neq -3, 3$$

Math 20-1 KEY

**Pg 320 #27:** Parallelogram ABFG has an area of $(16x^2 - 1)$ square units and a height of $(4x - 1)$ units. Parallelogram BCDE has an area of $(6x^2 - x - 12)$ square units and a height of $(2x - 3)$ units. What is an expression for the area of $\Delta ABC$? Leave your answer in the form $ax^2 + bx + c$. What are the non-permissible values?



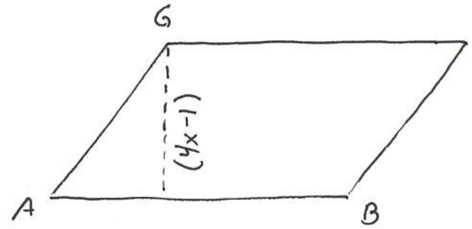

Area of triangle $= \frac{1}{2}(4x+1)(3x+4)$

$= \frac{1}{2}(12x^2+16x+3x+4)$

$= \frac{1}{2}(12x^2+19x+4)$

$= 6x^2 + \frac{19}{2}x + 2$

where $x \neq 1/4, 3/2$




Area $= 16x^2 - 1$

Area = (base)(height)

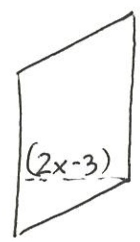
Base $= \frac{\text{Area}}{\text{Height}} = \frac{16x^2-1}{4x-1} = \frac{(4x+1)(4x-1)}{(4x-1)}$

$4x-1 \neq 0$

$4x \neq 1$

$x \neq 1/4$

Base $= 4x+1, \ x \neq 1/4$




Area $= 6x^2 - x - 12$

Base $= \frac{\text{Area}}{\text{Height}} = \frac{6x^2-x-12}{2x-3}$

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

$2x-3 \neq 0$

$2x \neq 3$

$x \neq 3/2$

BASE $= 3x+4, \ x \neq 3/2$