



A rational expression is in **simplest form** if its numerator and denominator have **no common factor other than 1**.



Express in simplest form, stating the nonpermissible values of the variable.

a) $\frac{12x^2}{2x}$ b) $\frac{(a+1)(a-6)}{(a+7)(a+1)}$ c) $\frac{y+4}{y^2-y-20}$ d) $\frac{x^2+11x+28}{x^2-49}$

Complete Assignment Questions #1 - #8

Assignment

1. Determine the nonpermissible values of the variable.

a) $\frac{6}{8x-7}$ b) $\frac{y}{10y+20}$ c) $\frac{5a}{5-a}$ d) $\frac{a^2+7a+12}{(a+4)(a+5)}$ e) $\frac{12y^2-2}{y}$

$x \neq \frac{7}{8}$ $y \neq \frac{20}{10} = 2$ $a \neq 5$ $a \neq -4, -5$ $y \neq 0$

f) $\frac{1+16x^2}{1-16x^2}$ g) $\frac{40p^3-4}{8q^3}$ h) $\frac{3}{x^2+13x+12}$ i) $\frac{d}{d^2-8d+16}$

$\frac{1-16x^2}{1-16x^2}$
 $\frac{1}{16} - \frac{16x^2}{16}$
 $\pm \sqrt{\frac{1}{16}} \neq x^2$
 $x \neq \pm \frac{1}{4}$

$q \neq 0$

$(x+12)(x+1)$
 $x \neq -12, -1$

$(d-4)(d-4)$
 $d \neq 4$

2. Express in simplest form, stating the nonpermissible values of the variable.

a) $\frac{4ab}{16a}$ b) $\frac{25x^3y^4}{5y^9}$ c) $\frac{(a+3)(a-8)}{(a+1)(a-8)}$ d) $\frac{(x+7)(x-2)}{x(x-2)(x+14)}$

$\frac{b}{4}$
 $a \neq 0$

$\frac{5x^3}{y^5}$
 $y \neq 0$

$\frac{a+3}{a+1}$, $a \neq -1, 8$

$\frac{(x+7)}{x(x+14)}$
 $x \neq 0, 2, -14$

3. Express in simplest form, stating the nonpermissible values of the variable.

a) $\frac{y+9}{y^2-81}$

$\frac{\cancel{y+9}}{(y-9)(\cancel{y+9})}$
 $\frac{1}{y-9}, y \neq \pm 9$

b) $\frac{25y^2-36}{5y+6}$

$\frac{(5y-6)(\cancel{5y+6})}{\cancel{5y+6}}$
 $5y-6, y \neq -6/5$

c) $\frac{64-9p^2}{(8-3p)(3+8p)}$

$\frac{(8-3p)(\cancel{8+3p})}{(\cancel{8-3p})(3+8p)}$
 $\frac{8+3p}{3+8p}, p \neq \pm 8/3$

d) $\frac{x^2-100}{(x+10)^2}$

$\frac{(x-10)(\cancel{x+10})}{(x+10)(\cancel{x+10})}$
 $\frac{x-10}{x+10}, x \neq -10$

4. The area of a soccer field is represented by $a^2 - 12a + 32$ square metres.

a) Find a simplified expression for the length of the field if the width can be represented by $a - 8$ metres.

$l = \frac{A}{w}$
 $\frac{a^2-12a+32}{a-8} = \frac{(a-8)(a-4)}{a-8}$
 $= a-4, a \neq 8$

b) Calculate the area of the field if $a = 90$.

$a^2-12a+32$
 $= 90^2-12(90)+32 =$

5. Reduce to lowest terms, stating the restrictions on the variable.

a) $\frac{(t+3)^2}{(t+1)(t+3)}$

$\frac{(\cancel{t+3})(\cancel{t+3})}{(t+1)(\cancel{t+3})}$
 $\frac{t+3}{t+1}, t \neq -1, -3$

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

$\frac{(x-1)(\cancel{x+1})}{(x+1)(\cancel{x+1})}$
 $\frac{x-1}{x+1}, x \neq -1$

c) $\frac{e^2+2e-35}{e^2+14e+49}$

$\frac{(e+7)(e-5)}{(e+7)(e+7)}$
 $\frac{e-5}{e+7}, e \neq -7$

d) $\frac{m^2-2m-15}{m^2+12m+27}$

$\frac{(m-5)(\cancel{m+3})}{(m+9)(\cancel{m+3})}$
 $\frac{m-5}{m+9}, m \neq -9, -3$

e) $\frac{y^2+4y}{y^2-16}$

$\frac{y(y+4)}{(y-4)(y+4)}$
 $\frac{y}{y-4}, y \neq \pm 4$

f) $\frac{x^2+9x-22}{x^2+12x+11}$

$\frac{(x+11)(x-2)}{(x+11)(x+1)}$
 $\frac{x-2}{x+1}, x \neq -11, -1$

g) $\frac{a^2+11a+10}{a^2+8a-20}$

$\frac{(a+10)(a+1)}{(a+10)(a-2)}$
 $\frac{a+1}{a-2}, a \neq -10, 2$

h) $\frac{p^2+5p+6}{p^2-4}$

$\frac{(p+3)(p+2)}{(p-2)(p+2)}$
 $\frac{p+3}{p-2}, p \neq \pm 2$

Multiple Choice

6. $\frac{(x-y)^2}{x^2-y^2}$ is equivalent to

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

- A. 0 B. 1
 C. $\left(\frac{1}{x} - \frac{1}{y}\right)^2$ D. $\frac{x-y}{x+y}$

7. In the rational expression $\frac{a-3}{a(a+7)}$, the nonpermissible value(s) of a are

- A. 3, -7 B. 0, 3, -7
 C. 0, -7 D. -7

$$a \neq 0, -7$$

Numerical Response

8. The rational expressions $\frac{x^2 + 13x + 40}{x^2 - 13x + 40}$ and $\frac{64 + x^2}{64 - x^2}$ have one nonpermissible value in common. The nonpermissible value is _____.

(Record your answer in the numerical response box from left to right.)

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$$(x-8)(x-5)$$

$$x \neq 8, 5$$

$$(8-x)(8+x)$$

$$x \neq \pm 8$$

Answer Key

1. a) $x = \frac{7}{8}$ b) $y = -2$ c) $a = 5$ d) $a = -5, -4$ e) $y = 0$
 f) $x = \pm \frac{1}{4}$ g) $q = 0$ h) $x = -12, -1$ i) $d = 4$
2. a) $\frac{b}{4}, a = 0$ b) $\frac{5x^3}{y^5}, y = 0$ c) $\frac{a+3}{a+1}, a = -1, 8$ d) $\frac{x+7}{x(x+14)}, x = -14, 0, 2$
3. a) $\frac{1}{y-9}, y = \pm 9$ b) $5y-6, y = -\frac{6}{5}$ c) $\frac{8+3p}{3+8p}, p = -\frac{3}{8}, \frac{8}{3}$ d) $\frac{x-10}{x+10}, x = -10$
4. a) $a-4$ metres b) 7052 square metres
5. a) $\frac{t+3}{t+1}, t = -1, -3$ b) $\frac{x-1}{x+1}, x = -1$ c) $\frac{e-5}{e+7}, e = -7$ d) $\frac{m-5}{m+9}, m = -9, -3$
 e) $\frac{y}{y-4}, y = \pm 4$ f) $\frac{x-2}{x+1}, x = -11, -1$ g) $\frac{a+1}{a-2}, a = -10, 2$ h) $\frac{p+3}{p-2}, p = \pm 2$

6. D

7. C

8.

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