

Rational Expressions

1) The expression $\frac{2}{2 - \sqrt{8}}$ simplifies to

A) $-1 - \sqrt{2}$

B) $1 - \sqrt{2}$

C) $-1 + \sqrt{2}$

D) $-2 + \sqrt{2}$

E) $-2 - \sqrt{2}$

2) $\frac{2y}{5-y} + \frac{10}{y-4} \div \frac{y^2-25}{y^2+y-20} =$

A) -2

B) 2

C) $\frac{2y}{(y-5)(y+5)(y-4)}$

D) $\frac{2y+10}{y-5}$

E) $\frac{y+5}{(y-5)(y-4)}$

3) The expression $\frac{\frac{1-t}{1+t} - \frac{1+t}{1-t}}{\frac{1}{1+t} - \frac{1}{1-t}}$ simplifies to

A) 2

B) -2

C) -1

D) 1

E) 0

$$4) \frac{3(x^2+3)^{-1/3} - 2x^2(x^2+3)^{-4/3}}{(x^2+3)^{-4/3}} =$$

A) $x^2 + 9$

B) $3(1+x)^{4/3}$

C) $\frac{3}{(1+x)^{4/3}}$

D) $(2x+3)(1+x)^{4/3}$

E) $\frac{2x+3}{(1+x)^{4/3}}$

$$5) \frac{1}{x} + \frac{2}{x-1} - \frac{3x+1}{x^2-1} =$$

A) $\frac{1}{x(x+1)}$

B) $\frac{-2}{x^2-1}$

C) $\frac{1}{x^2-1}$

D) $\frac{1}{x-1}$

E) $\frac{1}{x+1}$

$$6) y - \frac{\frac{y}{x} - \frac{x}{y}}{\frac{1}{y} - \frac{1}{x}} =$$

A) $2y + x$

B) $x - y$

C) x

D) $\frac{1}{y}$

E) y

7) $x - \frac{x^2 - 4}{x^2 + 2x + 4} \div \frac{x^2 - 2x}{x^3 - 8} =$

A) $\frac{4}{x}$

B) $\frac{x}{4}$

C) $\frac{4}{x - 2}$

D) $\frac{x - 2}{8}$

E) $\frac{4}{x + 2}$

8) When the denominator is rationalized, $\frac{\sqrt{3} - \sqrt{2}}{2\sqrt{3} + 3\sqrt{2}} =$

A) $\frac{5\sqrt{6}}{6} - 2$

B) $\frac{5\sqrt{6}}{6} + 2$

C) $-\frac{5\sqrt{6}}{6} - 12$

D) $-\frac{5\sqrt{6}}{6} + 12$

E) $-\frac{5\sqrt{6}}{6} + 2$

9) The **domain** of the expression $\frac{x + 1}{x^2 - x - 2}$, is

A) $\{x \mid x \neq -1, x \neq 2\}$

B) $\{x \mid x \neq -1, x \neq 1\}$

C) $\{x \mid x \neq 2\}$

D) $\{x \mid x \neq -2\}$

E) $\{x \mid x \neq -1\}$

10) $\left(\frac{a^2 + 2ab + b^2}{a^2 - b^2} \right) \div \left(\frac{a^2 - ab - 2b^2}{2a^2 - ab - b^2} \right) =$

A) $\frac{2a + b}{a - 2b}$

B) $\frac{a - 2b}{2a + b}$

C) $\frac{a + b}{a - b}$

D) $\frac{a - b}{a + b}$

E) $- 1$

11) The expression $\frac{x}{x^2 - 5x + 6} + \frac{1}{2 - x}$, simplifies to

A) $\frac{3}{(x - 2)(x - 3)}$

B) $\frac{- 3}{(x - 2)(x - 3)}$

C) $\frac{2x - 3}{(x - 2)(x - 3)}$

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

E) $\frac{3 - 2x}{(x - 2)(x - 3)}$

12) The **domain** of the expression $\frac{(x - 2)(x - 4)}{x^2 - 5x + 4}$ is

A) $(-\infty, 1) \cup (1, 4) \cup (4, \infty)$

B) $(-\infty, 2) \cup (2, 4) \cup (4, \infty)$

C) $(-\infty, 1) \cup (1, \infty)$

D) $(-\infty, 2) \cup (2, \infty)$

E) $(-\infty, 0) \cup (0, \infty)$

$$13) \frac{2}{x} - \frac{x^2 - 1}{(x + 1)(x - 3)} \div \frac{x^2 - x}{x - 3} =$$

A) $\frac{1}{x}$

B) $\frac{2}{x(x + 1)^2}$

C) 1

D) $\frac{x + 1}{x - 3}$

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

$$14) \frac{x + y}{x - y} \cdot \frac{x^{-1}y - xy^{-1}}{x^{-1} + y^{-1}} =$$

A) $-x - y$

B) $-x + y$

C) $x + y$

D) $x - y$

E) -1

$$15) 1 - \frac{1}{1 - \frac{1}{1 - x}} =$$

A) $\frac{1}{x}$

B) $-\frac{1}{x}$

C) $\frac{1}{x - 1}$

D) $\frac{1}{1 - x}$

E) $\frac{2}{x}$

$$16) \frac{x^2 - 2x - 15}{x^2 - 6x + 5} \div \frac{x^2 - x - 12}{x^2 - 1} - \frac{1}{x - 4} =$$

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

B) $\frac{x}{x + 1}$

C) $\frac{x}{x - 1}$

D) $\frac{x + 1}{x - 5}$

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

17) The domain of the expression $\frac{x^2 + 5x + 4}{(x + 4)^3 - 9x - 36}$, is

A) $(-\infty, -7) \cup (-7, -4) \cup (-4, -1) \cup (-1, \infty)$

B) $(-\infty, -7) \cup (-7, \infty)$

C) $(-\infty, -4) \cup (-4, -1) \cup (-1, \infty)$

D) $(-\infty, -7) \cup (-7, -1) \cup (-1, \infty)$

E) $(-\infty, -7) \cup (-7, -4) \cup (-4, \infty)$

$$18) \frac{1}{2 + \frac{3}{1 + \frac{4}{x}}} =$$

(a) $(x+4)/(5x+8)$

(b) $(x+4)/(3x+8)$

(c) $(x+4)/(2x+3)$

(d) $x/(2x+11)$

(e) $x/(2x+3)$

19) The expression $\frac{3x^2-3x-1}{(2x+1)(x-2)} + \frac{1}{2-x}$ is equal to

- (a) $\frac{3x+1}{2x+1}$
- (b) $\frac{3x-1}{2x+1}$
- (c) $\frac{3x+1}{x-2}$
- (d) $\frac{3x-1}{x-2}$
- (e) $\frac{2x+1}{x-2}$

20) $\frac{x^{-1}-y^{-1}}{x^{-2}y^{-2}} \div \frac{x^{-2}-y^{-2}}{x^{-3}y^{-3}} =$

- (a) $\frac{1}{x+y}$
- (b) $\frac{x}{x+y}$
- (c) $\frac{y}{x+y}$
- (d) $\frac{xy}{x+y}$
- (e) $xy(x+y)$

21) The expression $\frac{\frac{1+x}{1} - \frac{1-x}{1}}{\frac{1-x}{1+x} - \frac{1+x}{1-x}}$ simplifies to

- (a) -2
- (b) 2
- (c) $2/x$
- (d) $\frac{1}{1-x}$
- (e) $\frac{1}{1+x}$

22) The expression $\frac{x}{x+2} - \frac{x}{x-4} \div \frac{x^2-4}{x^2-6x+8}$ simplifies to

- (a) 0
- (b) $4x$
- (c) $-\frac{5x}{x+2}$
- (d) $-\frac{6x}{(x+2)^2}$
- (e) $\frac{x}{(x+2)^2}$

23) The expression $\left(x-1-\frac{6}{x}\right) \div \left(1+\frac{2}{x}-\frac{15}{x^2}\right)$ simplifies to

- (a) $\frac{x(x+2)}{x+5}$
- (b) $\frac{x+2}{x+5}$
- (c) $\frac{x+5}{x+2}$
- (d) $\frac{x(x+5)}{x+2}$
- (e) $5/2$

24) $\frac{1}{2+\frac{3}{1+\frac{4}{x}}} =$

- (f) $(x+4)/(5x+8)$
- (g) $(x+4)/(3x+8)$
- (h) $(x+4)/(2x+3)$
- (i) $x/(2x+11)$
- (j) $x/(2x+3)$

25) The expression $\frac{3x^2-3x-1}{(2x+1)(x-2)} + \frac{1}{2-x}$ is equal to

(f) $\frac{3x+1}{2x+1}$

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

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

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

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

26) $\frac{x^{-1}-y^{-1}}{x^{-2}y^{-2}} \div \frac{x^{-2}-y^{-2}}{x^{-3}y^{-3}} =$

(f) $\frac{1}{x+y}$

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

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

(i) $\frac{xy}{x+y}$

(j) $xy(x+y)$

27) The expression $\frac{\frac{1+x}{1} - \frac{1-x}{1}}{\frac{1-x}{1+x} - \frac{1+x}{1-x}}$ simplifies to

(f) -2

(g) 2

(h) $2/x$

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

(j) $\frac{1}{1+x}$

28) The expression $\frac{x}{x+2} - \frac{x}{x-4} \div \frac{x^2-4}{x^2-6x+8}$ simplifies to

- (f) 0
- (g) $4x$
- (h) $-\frac{5x}{x+2}$
- (i) $-\frac{6x}{(x+2)^2}$
- (j) $\frac{x}{(x+2)^2}$

29) The expression $\left(x-1-\frac{6}{x}\right) \div \left(1+\frac{2}{x}-\frac{15}{x^2}\right)$ simplifies to

- (f) $\frac{x(x+2)}{x+5}$
- (g) $\frac{x+2}{x+5}$
- (h) $\frac{x+5}{x+2}$
- (i) $\frac{x(x+5)}{x+2}$
- (j) $5/2$

30) The expression $\frac{3x}{x^2+x-12} - \frac{x}{x^2-16}$ simplifies to

- (A) $\frac{x(2x-9)}{(x-3)(x+4)(x-4)}$
- B) $\frac{x(x-9)}{(x-3)(x+4)(x-4)}$
- C) $\frac{x(x+9)}{(x-3)(x+4)(x-4)}$
- D) $\frac{2x+9}{(x+4)(x-4)}$
- E) $\frac{2x-9}{(x+4)(x-4)}$

31) The expression $\frac{\frac{x+4}{x} - \frac{3}{x-2}}{\frac{x}{x-2} + \frac{1}{x}}$ simplifies to

A) $\frac{x^2 - x - 8}{x^2 + x - 2}$

B) $\frac{x^2 + x - 8}{x^2 + x - 2}$

C) $\frac{x^2 - x - 8}{x^2 + x + 2}$

D) $\frac{x^2 + x + 8}{x^2 - x + 2}$

E) $\frac{x^2 - x + 8}{x^2 - x + 2}$

32) The expression $\frac{x^2 - 36y^2}{x^2 - 12xy + 36y^2} \div \frac{x^2 + 2xy + y^2}{x^2 - 5xy - 6y^2}$ simplifies to

A) $\frac{x + 6y}{x + y}$

B) $\frac{x + 6y}{x - y}$

C) $\frac{x + y}{(x - 6y)^2}$

D) $(x - 6y)^2$

E) $\frac{x - y}{x - 6y}$

33) The Least Common Denominator (LCD) of the expression

$$\frac{p}{2p^2 - 9p - 5} - \frac{2p}{6p^2 - p - 2} \text{ is}$$

A) $(2p + 1)(p - 5)(3p - 2)$

B) $(2p + 1)^2(p - 5)(3p - 2)$

C) $(2p + 1)(p + 5)(3p - 2)$

D) $(2p - 1)(p - 5)(3p - 2)$

E) $(2p - 1)(p - 5)(3p + 2)$

34) The expression $\frac{m - \frac{8-4m}{m^2-4}}{\frac{1}{m+2}}$ simplifies to :

A) $m^2 + 2m + 4$

B) $m^2 - 2m + 4$

C) $m^2 + 4m + 4$

D) $m^2 - 4m + 4$

E) $m^2 + 2m - 4$

35) If $\frac{x - \frac{8}{x-2}}{x - \frac{x+10}{x-2}} = \frac{x-a}{x-b}$, then $a + b =$

A) 9

B) 18

C) 2

D) 10

E) 12

36) The expression $\frac{x^{-1}y - xy^{-1}}{x^{-1} - y^{-1}}$ simplifies to:

A) $x + y$

B) $\frac{y + x}{xy}$

C) $y - x$

D) $\frac{xy}{x + y}$

E) 1

37) $\frac{x-7}{x-2} + \frac{5}{x^2+2x+4} \div \frac{x^2-4x+4}{x^3-8} =$

A) 1

B) -1

C) $\frac{x+1}{x-2}$

D) $\frac{x}{x-2}$

E) $\frac{1}{x-2}$

38) The **domain** of the expression $\frac{(x-2)(x+2)}{(x-2)(x-3)}$ is:

A) $\{x \mid x \neq 2 \text{ and } x \neq 3\}$

B) $\{x \mid x \neq 3\}$

C) $\{x \mid x \neq 2 \text{ and } x \neq -2\}$

D) $\{x \mid x \neq 2\}$

E) $(-\infty, \infty)$

