

A2.A.17: Complex Fractions 1: Simplify complex fractional expressions

1 The expression $\frac{\frac{a-1}{a}}{\frac{a^2-1}{a^2}}$ is equivalent to

- 1) $\frac{a}{a+1}$
- 2) $\frac{a+1}{a}$
- 3) $\frac{a}{a-1}$
- 4) $\frac{a-1}{a}$

2 The expression $\frac{\frac{3x}{x+3}}{\frac{x}{x^2-9}}$ is equivalent to

- 1) $3x-9$
- 2) $2x+6$
- 3) $3x$
- 4) $\frac{3}{x+3}$

3 In a science experiment, when resistor A and resistor B are connected in a parallel circuit, the total resistance is $\frac{1}{\frac{1}{A} + \frac{1}{B}}$. This complex fraction is

equivalent to

- 1) 1
- 2) $\frac{AB}{A+B}$
- 3) $A+B$
- 4) AB

4 The expression $\frac{\frac{1}{x} + \frac{3}{y}}{\frac{2}{xy}}$ is equivalent to

- 1) $\frac{3}{2}$
- 2) $\frac{3x+y}{2xy}$
- 3) $\frac{3xy}{2}$
- 4) $\frac{3x+y}{2}$

5 The expression $\frac{\frac{1}{3} + \frac{1}{3x}}{\frac{1}{x} + \frac{1}{3}}$ is equivalent to

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

6 Written in simplest form, the expression $\frac{\frac{x}{4} - \frac{1}{x}}{\frac{1}{2x} + \frac{1}{4}}$ is

equivalent to

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

7 The expression $\frac{\frac{a}{b} - \frac{b}{a}}{\frac{1}{a} + \frac{1}{b}}$ is equivalent to

- 1) $a + b$
- 2) $a - b$
- 3) ab
- 4) $\frac{a - b}{ab}$

8 In simplest form, $\frac{\frac{1}{x^2} - \frac{1}{y^2}}{\frac{1}{y} + \frac{1}{x}}$ is equal to

- 1) $\frac{x - y}{xy}$
- 2) $\frac{y - x}{xy}$
- 3) $x - y$
- 4) $y - x$

9 The expression $\frac{\frac{1}{x} + \frac{1}{y}}{\frac{1}{x^2} - \frac{1}{y^2}}$ is equivalent to

- 1) $\frac{xy}{y - x}$
- 2) $\frac{xy}{x - y}$
- 3) $\frac{y - x}{xy}$
- 4) $y - x$

10 The expression $\frac{\frac{1}{3} - \frac{1}{x}}{\frac{3}{x} - 1}$ is equivalent to

- 1) $\frac{1}{3}$
- 2) $-\frac{1}{3}$
- 3) 3
- 4) -3

11 The expression $\frac{\frac{a}{b} - 1}{\frac{a}{b} + 1}$ is equivalent to

- 1) $\frac{a + b}{a - b}$
- 2) $\frac{a - b}{a + b}$
- 3) $\frac{1}{a - b}$
- 4) $\frac{1}{a + b}$

12 The fraction $\frac{\frac{x}{y} + x}{\frac{1}{y} + 1}$ is equivalent to

- 1) $\frac{2xy}{1 + y}$
- 2) $\frac{x^2y}{1 + y}$
- 3) x
- 4) $2x$

13 When simplified, the complex fraction

$$\frac{1 + \frac{1}{x}}{\frac{1}{x} - x}, x \neq 0, \text{ is equivalent to}$$

- 1) 1
- 2) -1
- 3) $\frac{1}{1 - x}$
- 4) $\frac{1}{x - 1}$

14 Which expression is equivalent to the complex

fraction $\frac{\frac{1}{a} - a}{\frac{1}{a} + 1}$?

- 1) +1
- 2) -1
- 3) $1 - a$
- 4) $-(1 - a)$

15 In simplest form, the expression $\frac{\frac{1}{x} - 1}{x - \frac{1}{x}}$ is

equivalent to

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

16 The complex fraction $\frac{x - \frac{1}{3}}{3 - \frac{1}{x}}$ is equivalent to

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

17 The expression $\frac{\frac{4}{x} - 2}{6 - \frac{12}{x}}$ is equal to

- 1) -1
- 2) $\frac{3}{x}$
- 3) $-3x$
- 4) $-\frac{1}{3}$

18 The fraction $\frac{b + \frac{b}{a}}{a - \frac{1}{a}}$ is equivalent to

- 1) b
- 2) $\frac{b}{a-1}$
- 3) $\frac{2ab}{a^2-1}$
- 4) $\frac{a-1}{b}$

19 The expression $\frac{a + \frac{b}{c}}{d - \frac{b}{c}}$ is equivalent to

- 1) $\frac{c+1}{d-1}$
- 2) $\frac{a+b}{d-b}$
- 3) $\frac{ac+b}{cd-b}$
- 4) $\frac{ac+1}{cd-1}$

20 The complex fraction $\frac{\frac{x-y}{1}}{\frac{1}{y} - \frac{1}{x}}$ is equivalent to

- 1) -1
- 2) 0
- 3) $\frac{1}{xy}$
- 4) xy

21 The fraction $\frac{1 + \frac{1}{x}}{1 - \frac{1}{x^2}}$ is equivalent to

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

22 The expression $\frac{\frac{x^2}{y} - y}{\frac{x}{y} + 1}$ is equivalent to

- 1) $x^2 - y^2$
- 2) $\frac{x^2 - y^2}{x+1}$
- 3) $x+y$
- 4) $x-y$

23 Which expression is equivalent to the complex

fraction $\frac{\frac{x}{x+2}}{1 - \frac{x}{x+2}}$?

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

24 The expression $\frac{1 - \frac{x}{x-y}}{\frac{1}{x-y}}$

- 1) $1-x$
- 2) $1-y$
- 3) y
- 4) $-y$

25 The expression $\frac{\frac{2x}{x+1}}{1 - \frac{x}{x+1}}$ is equivalent to

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

26 The simplest form of $\frac{1 - \frac{4}{x}}{1 - \frac{2}{x} - \frac{8}{x^2}}$ is

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

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Answer Section

1 ANS: 1 REF: 069618siii

2 ANS: 1 REF: 010320siii

3 ANS: 2 REF: 060112b

4 ANS: 4

$$\frac{\frac{3x+y}{xy}}{\frac{2}{xy}} = \frac{3x+y}{xy} \cdot \frac{xy}{2} = \frac{3x+y}{2}$$

REF: 011603a2

5 ANS: 1 REF: 010706b

6 ANS: 2 REF: fall0920a2

7 ANS: 2 REF: 010206b

8 ANS: 2 REF: 060317b

9 ANS: 1 REF: 060415b

10 ANS: 2 REF: 060713b

11 ANS: 2 REF: 069818siii

12 ANS: 3 REF: 010312b

13 ANS: 3 REF: 080513b

14 ANS: 3 REF: 080706b

15 ANS: 4 REF: 089531siii

16 ANS: 3 REF: 068934siii

17 ANS: 4 REF: 089027siii

18 ANS: 2 REF: 060128siii

19 ANS: 3

$$\frac{a + \frac{b}{c}}{d - \frac{b}{c}} = \frac{\frac{ac+b}{c}}{\frac{cd-b}{c}} = \frac{ac+b}{c} \cdot \frac{c}{cd-b} = \frac{ac+b}{cd-b}$$

REF: 011405a2

20 ANS: 4 REF: 088735siii

21 ANS: 4 REF: 018924siii

22 ANS: 4 REF: 080119siii

23 ANS: 2 REF: 080220b

24 ANS: 4 REF: 060919b

25 ANS: 4 REF: 010126siii

26 ANS: 2

$$\frac{1 - \frac{4}{x}}{1 - \frac{2}{x} - \frac{8}{x^2}} \times \frac{x^2}{x^2} = \frac{x^2 - 4x}{x^2 - 2x - 8} = \frac{x(x-4)}{(x-4)(x+2)} = \frac{x}{x+2}$$

REF: 061305a2