

A.APR.D.7: Complex Fractions 1b

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

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

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

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

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

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

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

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

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

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

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

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

13 When simplified, the complex fraction $\frac{1 + \frac{1}{x}}{\frac{1}{x} - x}$, $x \neq 0$, is equivalent to

14 Which expression is equivalent to the complex fraction $\frac{\frac{1}{a} - a}{\frac{1}{a} + 1}$?

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

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

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

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

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

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

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

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

23 Which expression is equivalent to the complex fraction $\frac{\frac{x}{x+2}}{1 - \frac{x}{x+2}}$?

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

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

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

27 When $x^{-1} - 1$ is divided by $x - 1$, the quotient is

28 When $x^{-1} + 1$ is divided by $x + 1$, the quotient equals

A.APR.D.7: Complex Fractions 1b

Answer Section

1 ANS:

$$\frac{a}{a+1}$$

REF: 069618siii

2 ANS:

$$3x - 9$$

REF: 010320siii

3 ANS:

$$\frac{AB}{A+B}$$

$$1 \div \left(\frac{1}{A} + \frac{1}{B} \right) = 1 \div \frac{B+A}{AB} = 1 \cdot \frac{AB}{A+B}$$

REF: 060112b

4 ANS:

$$\frac{3x+y}{2}$$

$$\frac{3x+y}{2}$$

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

REF: 011603a2

5 ANS:

$$\frac{x+1}{x+3}$$

$$\left(\frac{1}{3} + \frac{1}{3x} \right) \div \left(\frac{1}{x} + \frac{1}{3} \right) = \frac{3x+3}{9x} \div \frac{x+3}{3x} = \frac{3(x+1)}{9x} \cdot \frac{3x}{x+3} = \frac{x+1}{x+3}$$

REF: 010706b

6 ANS:

$$x - 2$$

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

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

REF: fall0920a2

7 ANS:

 $a - b$

$$\left(\frac{a}{b} - \frac{b}{a}\right) \div \left(\frac{1}{a} + \frac{1}{b}\right) = \frac{a^2 - b^2}{ab} \div \frac{a+b}{ab} = \frac{a^2 - b^2}{ab} \cdot \frac{ab}{a+b} = \frac{a^2 - b^2}{a+b} = \frac{(a+b)(a-b)}{a+b} = a - b$$

REF: 010206b

8 ANS:

 $\frac{y-x}{xy}$

$$\left(\frac{1}{x^2} - \frac{1}{y^2}\right) \div \left(\frac{1}{y} + \frac{1}{x}\right) = \frac{y^2 - x^2}{x^2 y^2} \div \frac{x+y}{xy} = \frac{y^2 - x^2}{x^2 y^2} \cdot \frac{xy}{x+y} = \frac{(y+x)(y-x)}{xy} \cdot \frac{1}{x+y} = \frac{y-x}{xy}$$

REF: 060317b

9 ANS:

 $\frac{xy}{y-x}$

$$\left(\frac{1}{x} + \frac{1}{y}\right) \div \left(\frac{1}{x^2} - \frac{1}{y^2}\right) = \frac{y+x}{xy} \div \frac{y^2 - x^2}{x^2 y^2} = \frac{y+x}{xy} \cdot \frac{x^2 y^2}{y^2 - x^2} = \frac{y+x}{1} \cdot \frac{xy}{(y-x)(y+x)} = \frac{xy}{y-x}$$

REF: 060415b

10 ANS:

 $-\frac{1}{3}$

$$\left(\frac{1}{3} - \frac{1}{x}\right) \div \left(\frac{3}{x} - 1\right) = \frac{x-3}{3x} \div \frac{3-x}{x} = \frac{x-3}{3x} \cdot \frac{x}{3-x} = \frac{x-3}{3} \cdot \frac{1}{3-x} = -\frac{1}{3}$$

REF: 060713b

11 ANS:

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

REF: 069818siii

12 ANS:

 x

$$\left(\frac{x}{y} + x\right) \div \left(\frac{y+1}{y}\right) = \frac{x+xy}{y} \cdot \frac{y}{y+1} = \frac{x+xy}{y+1} = \frac{x(1+y)}{y+1} = x$$

REF: 010312b

13 ANS:

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

$$\left(1 + \frac{1}{x}\right) \div \left(\frac{1}{x} - x\right) = \frac{x+1}{x} \div \frac{1-x^2}{x} = \frac{x+1}{x} \cdot \frac{x}{1-x^2} = \frac{x+1}{(1-x)(1+x)} = \frac{1}{1-x}$$

REF: 080513b

14 ANS:

$$\frac{1-a}{\left(\frac{1}{a}-a\right)+\left(\frac{1}{a}+1\right)} = \frac{1-a^2}{\frac{1-a^2}{a} + \frac{1+a}{a}} = \frac{1-a^2}{\frac{1-a^2}{a}} \cdot \frac{a}{1+a} = \frac{(1-a)(1+a)}{1+a} = 1-a$$

REF: 080706b

15 ANS:

$$-\frac{1}{x+1}$$

REF: 089531siii

16 ANS:

$$\frac{x}{3}$$

REF: 068934siii

17 ANS:

$$-\frac{1}{3}$$

REF: 089027siii

18 ANS:

$$\frac{b}{a-1}$$

REF: 060128siii

19 ANS:

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

REF: 011405a2

20 ANS:

$$xy$$

REF: 088735siii

21 ANS:

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

REF: 018924siii

22 ANS:

$$x-y$$

REF: 080119siii

23 ANS:

$$\frac{x}{2}$$

$$\frac{x}{x+2} \div \left(1 - \frac{x}{x+2}\right) = \frac{x}{x+2} \div \frac{(x+2) - x}{x+2} = \frac{x}{x+2} \div \frac{2}{x+2} = \frac{x}{x+2} \cdot \frac{x+2}{2} = \frac{x}{2}$$

REF: 080220b

24 ANS:

$$-y$$

$$\frac{1 - \frac{x}{x-y}}{\frac{1}{x-y}} = \left(1 - \frac{x}{x-y}\right) \cdot (x-y) = (x-y) - x = -y$$

REF: 060919b

25 ANS:

$$2x$$

REF: 010126siii

26 ANS:

$$\frac{x}{x+2}$$

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

REF: 061305a2

27 ANS:

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

$$\frac{x^{-1} - 1}{x-1} = \frac{\frac{1}{x} - 1}{x-1} = \frac{\frac{1-x}{x}}{x-1} = \frac{-(x-1)}{x(x-1)} = -\frac{1}{x}$$

REF: 081018a2

28 ANS:

$$\frac{1}{x}$$

$$\frac{x^{-1} + 1}{x+1} = \frac{\frac{1}{x} + 1}{x+1} = \frac{\frac{1+x}{x}}{x+1} = \frac{1}{x}$$

REF: 011211a2