

A.APR.D.7: Complex Fractions 2

1 Express in simplest form: $\frac{\frac{2}{x}}{\frac{1}{2x}}$

6 Write in simplest form: $\frac{\frac{1}{x}}{1 + \frac{1}{x}}$

2 Express as a fraction in *simplest form*: $\frac{\frac{1}{ab}}{\frac{1}{a} - \frac{1}{b}}$

7 Express in simplest form: $\frac{\frac{x-y}{y}}{\frac{1}{y} - \frac{1}{x}}$

3 Express in simplest form: $\frac{\frac{1}{a}}{\frac{1}{a} - \frac{1}{b}}$

8 Simplify completely: $\frac{\frac{1-m}{m}}{m - \frac{1}{m}}$

4 Express $\frac{\frac{a}{b}}{\frac{1}{a} - \frac{1}{b}}$ in simplest form.

9 Express in simplest form: $\frac{x - \frac{4}{x}}{\frac{2+x}{x}}$

5 Express in simplest form: $\frac{\frac{1}{2} + \frac{1}{x}}{\frac{1}{x}}$

10 Simplify: $\frac{\frac{x}{3} - \frac{3}{x}}{\frac{x-3}{x}}$

11 Express in *simplest form*: $\frac{n - \frac{1}{n}}{\frac{1 - n^2}{n}}$

17 Express in simplest form: $\frac{\frac{x}{4} - \frac{4}{x}}{1 - \frac{4}{x}}$

12 Express in simplest form: $\frac{\frac{1}{2} - \frac{4}{d}}{\frac{1}{d} + \frac{3}{2d}}$

18 Express in simplest form: $\frac{1 - \frac{1}{x}}{\frac{1}{x^2} - \frac{1}{x}}$

13 Simplify: $\frac{\frac{1}{4} + \frac{1}{4x}}{\frac{1}{x} + \frac{1}{4}}$

19 Express in simplest form: $\frac{\frac{1}{r} - \frac{1}{s}}{\frac{r^2}{s^2} - 1}$

14 Simplify: $\frac{\frac{1}{3} + \frac{1}{3x}}{\frac{1}{x} + \frac{1}{3}}$

20 Express $\frac{\frac{3}{x^2} + \frac{1}{x}}{1 - \frac{9}{x^2}}$ in simplest form.

15 Express in simplest form: $\frac{\frac{3}{4} + \frac{3}{x}}{\frac{1}{x} + \frac{1}{4}}$

21 Express in simplest form: $\frac{1 + \frac{2}{x}}{x - \frac{4}{x}}$

16 Express in simplest form: $\frac{1 + \frac{x}{y}}{\frac{1}{x} + \frac{1}{y}}$

22 Express in simplest form: $\frac{x - \frac{9}{x}}{2 + \frac{6}{x}}$

23 Express in simplest form: $\frac{x - \frac{1}{x}}{1 + \frac{1}{x}}$

28 Express in simplest form: $\frac{\frac{5}{a+b} - \frac{5}{a-b}}{\frac{10}{a^2 - b^2}}$

24 Express in simplest form: $\frac{x - \frac{1}{x}}{1 - \frac{1}{x}}$

29 Perform the indicated operations and express in simplest form: $\frac{\frac{1}{x+h} - \frac{1}{x}}{h}$

25 Express $\frac{\frac{x}{3} - 1}{\frac{x^2}{3} - 3}$ in simplest form.

30 Express in simplest form: $\frac{2 + \frac{4}{x-2}}{\frac{2}{x-2}}$

26 Simplify for all values of a for which the expression is defined: $\frac{1 - \frac{2}{a}}{\frac{4}{a^2} - 1}$

31 Express $\frac{2 + \frac{6}{x-3}}{\frac{x}{x-3}}$ in simplest form, where $x \neq 0$ and $x \neq 3$.

27 Express in simplest form: $\frac{\frac{1}{4x^2} - 1}{2 - \frac{1}{x}}$

32 Simplify: $\frac{\frac{x}{x-3} + \frac{4}{x}}{1 - \frac{1}{3-x}}$

33 Express in simplest form: $\frac{1 - \frac{1}{x}}{x - 2 + \frac{1}{x}}$

34 Express in simplest terms: $\frac{1 + \frac{3}{x}}{1 - \frac{5}{x} - \frac{24}{x^2}}$

35 Simplify: $\frac{\frac{3a+b}{2a-b} - \frac{3a-b}{2a+b}}{\frac{2a}{4a^2 - b^2}}$

36 Simplify: $\frac{1 - \frac{3}{\cos x}}{\frac{9}{\cos^2 x} - 1}$

37 Express in simplest form: $\frac{\frac{4-x^2}{x^2+7x+12}}{\frac{2x-4}{x+3}}$

38 Express in simplest form: $\frac{\frac{36-x^2}{(x+6)^2}}{\frac{x-3}{x^2+3x-18}}$

39 Express in simplest form: $\left(\frac{a}{b} - \frac{b}{a}\right) \div \left(\frac{b}{a} - \frac{a}{b}\right)$

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Answer Section

1 ANS:
4

REF: 069505siii

2 ANS:
 $\frac{1}{b-a}$

REF: 068608siii

3 ANS:
 $\frac{b}{b-a}$

REF: 010209siii

4 ANS:
 $\frac{a^2}{b-a}$

REF: 080312siii

5 ANS:
 $\frac{x+2}{2}$

REF: 068004siii

6 ANS:
 $\frac{1}{x+1}$

REF: 068508siii

7 ANS:
 x

REF: 060012siii

8 ANS:
$$\frac{-1}{m+1} \cdot \frac{1-m}{m} \div \left(m - \frac{1}{m}\right) = \frac{1-m}{m} \div \frac{m^2-1}{m} = \frac{1-m}{m} \cdot \frac{m}{m^2-1} = \frac{1-m}{(m+1)(m-1)} = \frac{-(m-1)}{(m+1)(m-1)} = \frac{-1}{m+1}$$

REF: 010629b

9 ANS:
$$x-2 \cdot \left(x - \frac{4}{x}\right) \div \frac{2+x}{x} = \frac{x^2-4}{x} \cdot \frac{x}{2+x} = \frac{(x+2)(x-2)}{x} \cdot \frac{x}{2+x} = x-2$$

REF: 010826b

10 ANS:

$$\frac{x+3}{3} \cdot \left(\frac{x}{3} - \frac{3}{x}\right) \div \frac{x-3}{x} = \left(\frac{x}{3} - \frac{3}{x}\right) \times \frac{x}{x-3} = \frac{x^2-9}{3x} \times \frac{x}{x-3} = \frac{(x+3)(x-3)}{3x} \times \frac{x}{x-3} = \frac{x+3}{3}$$

REF: 060823b

11 ANS:

-1

REF: 068103siii

12 ANS:

$$\frac{\frac{1}{2} - \frac{4}{d}}{\frac{1}{d} + \frac{3}{2d}} = \frac{\frac{d-8}{2d}}{\frac{2d+3d}{2d^2}} = \frac{d-8}{2d} \times \frac{2d^2}{5d} = \frac{d-8}{5}$$

REF: 061035a2

13 ANS:

$$\frac{x+1}{x+4} \cdot \frac{\frac{1}{4} + \frac{1}{4x}}{\frac{1}{x} + \frac{1}{4}} = \frac{\frac{4x+4}{16x}}{\frac{4+x}{4x}} = \frac{4(x+1)}{16x} \cdot \frac{4x}{x+4} = \frac{x+1}{x+4}$$

REF: 061021b

14 ANS:

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

REF: 069010siii

15 ANS:

3

REF: 019910siii

16 ANS:

 x

REF: 089310siii

17 ANS:

$$\frac{x+4}{4} \cdot \left(\frac{x}{4} - \frac{4}{x}\right) \div \left(1 - \frac{4}{x}\right) = \frac{x^2-16}{4x} \div \frac{x-4}{x} = \frac{(x+4)(x-4)}{4x} \cdot \frac{x}{x-4} = \frac{x+4}{4}$$

REF: 080323b

18 ANS:

-x

REF: 019740siii

19 ANS:

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

REF: 080425b

20 ANS:

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

REF: 080014siii

21 ANS:

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

REF: 019016siii

22 ANS:

$$\frac{x-3}{2}$$

REF: 060210siii

23 ANS:

$$x-1$$

REF: 080213siii

24 ANS:

$$x+1$$

REF: 018404siii

25 ANS:

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

REF: 010012siii

26 ANS:

$$\frac{-a}{2+a} \cdot \left(1 - \frac{2}{a} \right) \div \left(\frac{4}{a^2} - 1 \right) = \frac{a-2}{a} \div \frac{4-a^2}{a^2} = \frac{a-2}{a} \cdot \frac{a^2}{4-a^2} = \frac{-(2-a)}{1} \cdot \frac{a}{(2+a)(2-a)} = \frac{-a}{2+a}$$

REF: 060628b

27 ANS:

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

REF: 068838siii

28 ANS:

$$-b \cdot \left(\frac{5}{a+b} - \frac{5}{a-b} \right) \div \frac{10}{a^2-b^2} = \left(\frac{5(a-b) - 5(a+b)}{(a+b)(a-b)} \right) \cdot \frac{a^2-b^2}{10} = \left(\frac{5a-5b-5a-5b}{a^2-b^2} \right) \cdot \frac{a^2-b^2}{10} = \frac{-10b}{10} = -b$$

REF: 080930b

29 ANS:

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

REF: 088437siii

30 ANS:

 x

REF: 018717siii

31 ANS:

$$2 + \frac{6}{x-3} \cdot \frac{x-3}{1} = \frac{2(x-3)+6}{x} = \frac{2x-6+6}{x} = 2$$

REF: 061631a2

32 ANS:

$$\frac{x+6}{x}$$

REF: 089838siii

33 ANS:

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

REF: 080824b

34 ANS:

$$\frac{1+\frac{3}{x}}{1-\frac{5}{x}-\frac{24}{x^2}} \cdot \frac{x^2}{x^2} = \frac{x^2+3x}{x^2-5x-24} = \frac{x(x+3)}{(x-8)(x+3)} = \frac{x}{x-8}$$

REF: 061436a2

35 ANS:

 $5b$

REF: 099801a1

36 ANS:

$$\frac{-\cos x}{3 + \cos x}$$

REF: 019539siii

37 ANS:

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

REF: 061236a2

38 ANS:

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

REF: 011529a2

39 ANS:

$$\left(\frac{a}{b} - \frac{b}{a}\right) \div \left(\frac{b}{a} - \frac{a}{b}\right) = \left(\frac{a}{b} - \frac{b}{a}\right) \div -\left(\frac{a}{b} - \frac{b}{a}\right) = -1$$

REF: 081633a2