

A2.A.23: Solving Rationals 2: Solve rational equations and inequalities

- 1 Which equation could be used to solve

$$\frac{5}{x-3} - \frac{2}{x} = 1?$$

- 1) $x^2 - 6x - 3 = 0$
- 2) $x^2 - 6x + 3 = 0$
- 3) $x^2 - 6x - 6 = 0$
- 4) $x^2 - 6x + 6 = 0$

- 2 Solve for all values of x , to the *nearest tenth*:

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

- 3 Solve for x and express your answer in simplest

radical form: $\frac{4}{x} - \frac{3}{x+1} = 7$

- 4 Solve the equation below algebraically, and express the result in simplest radical form:

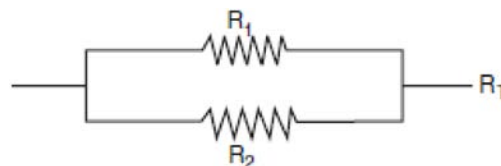
$$\frac{13}{x} = 10 - x$$

- 5 A rectangle is said to have a golden ratio when

$$\frac{w}{h} = \frac{h}{w-h}, \text{ where } w \text{ represents width and } h$$

represents height. When $w = 3$, between which two consecutive integers will h lie?

- 6 Electrical circuits can be connected in series, one after another, or in parallel circuits that branch off a main line. If circuits are hooked up in parallel, the reciprocal of the total resistance in the series is found by adding the reciprocals of each resistance, as shown in the accompanying diagram.



$$\frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{R_T}$$

If $R_1 = x$, $R_2 = x + 3$, and the total resistance, R_T , is 2.25 ohms, find the positive value of R_1 to the *nearest tenth of an ohm*.

- 7 One root of the equation $\frac{3x}{2} + \frac{1}{x} = -\frac{3x}{4}$ is

- 1) $\frac{2}{3}$
- 2) $\frac{4i}{9}$
- 3) $\frac{2i}{3}$
- 4) $\frac{4}{9}$

- 8 Solve for x and express the roots in terms of i :

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

9 Express, in terms of i , the roots of $\frac{x}{8} + \frac{8}{9x} = 0$

10 Solve for x and express the roots in simplest $a + bi$ form: $x + \frac{5}{x} = 2$

11 Solve the equation $\frac{x+8}{5} + \frac{x+5}{x} = 1$ and express the roots in simplest $a + bi$ form.

12 Solve the equation $2(x-3) = -\frac{5}{x}$ and express its roots in terms of i .

13 Solve for x and express the roots in simplest $a + bi$ form: $2 + \frac{5}{x^2} = \frac{6}{x}$

14 Express the roots of the equation $2x + \frac{5}{x} = 2$ in simplest $a + bi$ form.

15 Solve for y and express the roots of the equation in simplest $a + bi$ form: $5y + \frac{5}{y} = 8$

16 Solve for x and express your answer in simplest $a + bi$ form: $16x = 16 - \frac{13}{x}$

17 Solve for x and express the roots in simplest $a + bi$ form: $9x + \frac{2}{x} = -6$

18 Solve the equation $2x + \frac{3}{x} = -2$ and express the roots in $a + bi$ form.

19 Solve the equation $x = 2 - \frac{8}{x}$ and express the roots in simplest $a + bi$ form.

20 Express the roots of the equation $\frac{3}{x} + x = 2$ in simplest $a + bi$ form.

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Answer Section

1 ANS: 3

$$\frac{5x}{x(x-3)} - \frac{2(x-3)}{x(x-3)} = \frac{x(x-3)}{x(x-3)}$$

$$5x - 2x + 6 = x^2 - 3x$$

$$0 = x^2 - 6x - 6$$

REF: 011522a2

2 ANS:

0.4 and -2.7

REF: 011034b

3 ANS:

$$\frac{-3 \pm \sqrt{37}}{7}$$

REF: 060429b

4 ANS:

$$\frac{13}{x} = 10 - x \quad \cdot \quad x = \frac{10 \pm \sqrt{100 - 4(1)(13)}}{2(1)} = \frac{10 \pm \sqrt{48}}{2} = \frac{10 \pm 4\sqrt{3}}{2} = 5 \pm 2\sqrt{3}$$

$$13 = 10x - x^2$$

$$x^2 - 10x + 13 = 0$$

REF: 061336a2

5 ANS:

$$1 < h < 2$$

REF: 010224b

6 ANS:

3.5

REF: 080234b

7 ANS: 3

REF: 080818b

8 ANS:

$$\pm 3i$$

REF: 019736siii

9 ANS:

$$\pm \frac{8i}{3}$$

REF: 089339siii

10 ANS:
 $1 \pm 2i$

REF: 060237siii

11 ANS:
 $-4 \pm 3i$

REF: 068537siii

12 ANS:
 $\frac{3 \pm i}{2}$

REF: 068738siii

13 ANS:
 $\frac{3}{2} \pm \frac{1}{2}i$

REF: 069740siii

14 ANS:
 $\frac{1}{2} \pm \frac{3}{2}i$

REF: 019838siii

15 ANS:
 $\frac{4}{5} \pm \frac{3}{5}i$

REF: 069841siii

16 ANS:
 $\frac{1}{2} \pm \frac{3}{4}i$

REF: 080142siii

17 ANS:
 $-\frac{1}{3} \pm \frac{i}{3}$

REF: 080341siii

18 ANS:
 $-\frac{1}{2} \pm \frac{i\sqrt{5}}{2}$

REF: 068837siii

19 ANS:
 $1 \pm i\sqrt{7}$

REF: 068936siii

20 ANS:

$$1 \pm i\sqrt{2}$$

REF: 069441siii