

**A.A.26: Solving Rationals 1: Solve algebraic proportions in one variable which result in linear or quadratic equations**

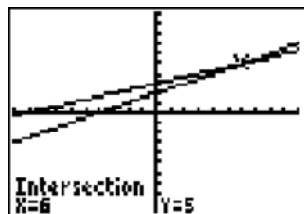
- 1 What is the solution of  $\frac{k+4}{2} = \frac{k+9}{3}$ ?
  - 1) 1
  - 2) 5
  - 3) 6
  - 4) 14
- 2 Which value of  $x$  is the solution of  $\frac{2x-3}{x-4} = \frac{2}{3}$ ?
  - 1)  $-\frac{1}{4}$
  - 2)  $\frac{1}{4}$
  - 3)  $-4$
  - 4) 4
- 3 Which value of  $x$  is the solution of  $\frac{1}{5} + \frac{2}{x} = \frac{1}{3}$ ?
  - 1)  $-2\frac{3}{4}$
  - 2)  $-15$
  - 3)  $2\frac{3}{4}$
  - 4) 15
- 4 What is the value of  $x$  in the equation  $\frac{2}{x} - 3 = \frac{26}{x}$ ?
  - 1)  $-8$
  - 2)  $-\frac{1}{8}$
  - 3)  $\frac{1}{8}$
  - 4) 8
- 5 What is the solution of the equation  $\frac{12}{7x} + \frac{3}{2x} = \frac{15}{14}$ ?
  - 1) 1
  - 2) 5
  - 3) 3
  - 4) 14
- 6 What is the solution of the equation  $\frac{x+2}{2} = \frac{4}{x}$ ?
  - 1) 1 and  $-8$
  - 2) 2 and  $-4$
  - 3)  $-1$  and 8
  - 4)  $-2$  and 4
- 7 Which value of  $x$  is a solution of  $\frac{5}{x} = \frac{x+13}{6}$ ?
  - 1)  $-2$
  - 2)  $-3$
  - 3)  $-10$
  - 4)  $-15$
- 8 What is the solution of the equation  $\frac{x}{3} = \frac{8}{x+2}$ ?
  - 1)  $\{-6, -4\}$
  - 2)  $\{-6, 4\}$
  - 3)  $\{6, -4\}$
  - 4)  $\{6, 4\}$
- 9 What is the solution set of  $\frac{x+2}{x-2} = \frac{-3}{x}$ ?
  - 1)  $\{-2, 3\}$
  - 2)  $\{-3, -2\}$
  - 3)  $\{-1, 6\}$
  - 4)  $\{-6, 1\}$
- 10 What is the solution of  $\frac{2}{x+1} = \frac{x+1}{2}$ ?
  - 1)  $-1$  and  $-3$
  - 2)  $-1$  and 3
  - 3) 1 and  $-3$
  - 4) 1 and 3
- 11 Solve algebraically for  $x$ :  $\frac{x+2}{6} = \frac{3}{x-1}$
- 12 Solve for  $x$ :  $\frac{x+1}{x} = \frac{-7}{x-12}$
- 13 Solve algebraically for all values of  $x$ :
$$\frac{3}{x+5} = \frac{2x}{x^2-8}$$
- 14 Solve algebraically:  $\frac{2}{3x} + \frac{4}{x} = \frac{7}{x+1}$ 

[Only an algebraic solution can receive full credit.]
- 15 Solve algebraically for  $x$ :  $\frac{3}{4} = \frac{-(x+11)}{4x} + \frac{1}{2x}$

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## Answer Section

1 ANS: 3



$$\frac{k+4}{2} = \frac{k+9}{3}$$

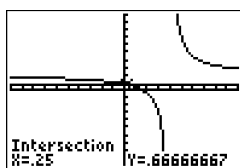
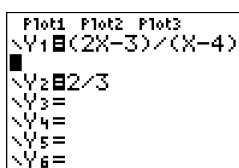
$$3(k+4) = 2(k+9)$$

$$3k+12 = 2k+18$$

$$k = 6$$

REF: 010906ia

2 ANS: 2



$$\frac{2x-3}{x-4} = \frac{2}{3}$$

$$3(2x-3) = 2(x-4)$$

$$6x-9 = 2x-8$$

$$4x = 1$$

$$x = \frac{1}{4}$$

REF: 081012ia

3 ANS: 4

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

$$\frac{2}{x} = \frac{2}{15}$$

$$x = 15$$

REF: 061507ia

4 ANS: 1

$$\frac{2}{x} - 3 = \frac{26}{x}$$

$$-3 = \frac{24}{x}$$

$$x = -8$$

REF: 010918ia

5 ANS: 3

$$\frac{24}{14x} + \frac{21}{14x} = \frac{15x}{14x}$$

$$45 = 15x$$

$$x = 3$$

REF: 081416ia

6 ANS: 2

$$\frac{x+2}{2} = \frac{4}{x}$$

$$x^2 + 2x = 8$$

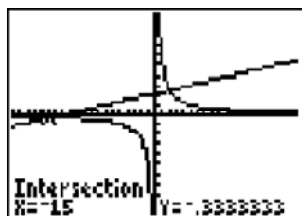
$$x^2 + 2x - 8 = 0$$

$$(x+4)(x-2) = 0$$

$$x = -4, 2$$

REF: 061317ia

7 ANS: 4



$$\frac{5}{x} = \frac{x+13}{6}$$

$$x^2 + 13x = 30$$

$$x^2 + 13x - 30 = 0$$

$$(x+15)(x-2) = 0$$

$$x = -15 \text{ or } 2$$

REF: 060826ia

8 ANS: 2

$$\frac{x}{3} = \frac{8}{x+2}$$

$$x^2 + 2x = 24$$

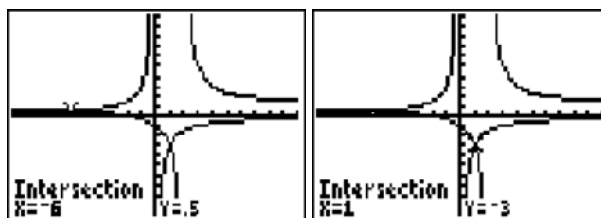
$$x^2 + 2x - 24 = 0$$

$$(x+6)(x-4) = 0$$

$$x = -6, 4$$

REF: 081429ia

9 ANS: 4



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

$$x(x+2) = -3(x-2)$$

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

$$x^2 + 5x - 6 = 0$$

$$(x+6)(x-1) = 0$$

$$x = -6 \text{ or } 1$$

REF: 011028ia

10 ANS: 3

$$\frac{2}{x+1} = \frac{x+1}{2}$$

$$x^2 + 2x + 1 = 4$$

$$x^2 + 2x - 3 = 0$$

$$(x+3)(x-1) = 0$$

$$x = -3, 1$$

REF: 081226ia

11 ANS:

$$4, -5. \quad \frac{x+2}{6} = \frac{3}{x-1}$$

$$(x+2)(x-1) = 18$$

$$x^2 - x + 2x - 2 = 18$$

$$x^2 + x - 20 = 0$$

$$(x+5)(x-4) = 0$$

$$x = -5 \text{ or } 4$$

REF: 011136ia

12 ANS:

$$6, -2. \quad \frac{x+1}{x} = \frac{-7}{x-12}$$

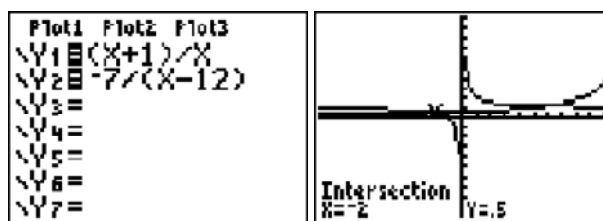
$$(x+1)(x-12) = -7x$$

$$x^2 - 11x - 12 = -7x$$

$$x^2 - 4x - 12 = 0$$

$$(x-6)(x+2) = 0$$

$$x = 6 \text{ or } -2$$



REF: fall0739ia

13 ANS:

$$\frac{3}{x+5} = \frac{2x}{x^2-8}$$

$$3x^2 - 24 = 2x^2 + 10x$$

$$x^2 - 10x + 24 = 0$$

$$(x-12)(x+2) = 0$$

$$x = 12, -2$$

REF: 011438ia

14 ANS:

$$\frac{2}{3x} + \frac{12}{3x} = \frac{7}{x+1}$$

$$\frac{14}{3x} = \frac{7}{x+1}$$

$$21x = 14x + 14$$

$$7x = 14$$

$$x = 2$$

REF: 061337ia

15 ANS:

$$-\frac{9}{4} \cdot \frac{3}{4} = \frac{-(x+11)}{4x} + \frac{1}{2x}$$

$$\frac{3}{4} = \frac{-x-11}{4x} + \frac{2}{4x}$$

$$\frac{3}{4} = \frac{-x-9}{4x}$$

$$12x = -4x - 36$$

$$16x = -36$$

$$x = -\frac{9}{4}$$

REF: 061137ia