

PG 371

#13, 15, 20, 22, 23, 27, 28, 31, 32, 35
49-57

#13 $x+3=y$
 $3x+4y=7$

① set = to y

$$y = x+3$$

② substitute in other equation

$$3x+4y=7$$

$$3x+4(x+3)=7$$

③ solve for x

$$3x+4x+12=7$$

$$7x+12=7$$

$$-12 = -12$$

$$\frac{7x}{7} = \frac{-5}{7}$$

$$x = -\frac{5}{7}$$

④ substitute x in to one of original equations

$$x+3=y$$

$$-\frac{5}{7}+3=y$$

$$\frac{-5}{7} + \frac{21}{7} = y$$

$$\frac{16}{7} = y$$

⑤ solution

$$\left(-\frac{5}{7}, \frac{16}{7}\right)$$

#15 $y = -2x+6$

$$3y - x + 3 = 0$$

① set 1 equation = to y

$$y = -2x+6$$

② substitute in other equation

$$3y - x + 3 = 0$$

$$3(-2x+6) - x + 3 = 0$$

③ solve for x

$$-6x + 18 - x + 3 = 0$$

$$-7x + 21 = 0$$

$$-21 = -21$$

$$-7x = -21$$

$$\frac{-7x}{-7} = \frac{-21}{-7}$$

$$x = 3$$

④ substitute x into one of equations

$$y = -2x+6$$

$$y = -2(3)+6$$

$$y = -6+6$$

$$y = 0$$

⑤ solution

$$(3, 0)$$

$$20) 4y + 3 = 3y + x$$

$$2x + 4y = 18$$

① set = to y

$$2x + 4y = 18$$

$$\begin{array}{r} -2x \\ \hline \end{array}$$

$$\frac{4y}{4} = \frac{-2x + 18}{4}$$

$$y = \frac{-1}{2}x + \frac{18}{4}$$

② substitute in other equation

$$4y + 3 = 3y + x$$

$$4\left(\frac{-1}{2}x + \frac{18}{4}\right) + 3 = 3\left(\frac{-1}{2}x + \frac{18}{4}\right) + x$$

③ solve

$$\text{for } x \quad -2x + 18 + 3 = -\frac{3}{2}x + \frac{54}{4} + x$$

$$-2x + 21 = -\frac{1}{2}x + \frac{54}{4}$$

$$\begin{array}{r} +\frac{1}{2}x \\ \hline \end{array} \quad -21 \quad \begin{array}{r} +\frac{1}{2}x \\ \hline \end{array} \quad -21$$

$$-\frac{3}{2}x = -\frac{30}{4} - \frac{2}{3}$$

$$x = \frac{+10}{2} = +5$$

$$\boxed{x=5}$$

④ substitute x into one of the equations

$$2(5) + 4y = 18$$

$$10 - 10 + 4y = 18 - 10$$

$$(5, 2) \quad \frac{4y}{4} = \frac{8}{4} = \boxed{2=y}$$

$$22) 4y - x = 5 + 2y$$

$$-3x + 7y = 24$$

① set = to y

$$4y - x = 5 + 2y$$

$$-2y + x = x - 2y$$

$$\frac{2y}{2} = \frac{x+5}{2}$$

$$y = \frac{1}{2}x + \frac{5}{2}$$

② substitute

$$3x + 7y = 24$$

$$3x + 7\left(\frac{1}{2}x + \frac{5}{2}\right) = 24$$

$$3x + \frac{7}{2}x + \frac{35}{2} = 24$$

$$\frac{13x}{2} + \frac{35}{2} = 24$$

$$-\frac{35}{2} = -\frac{35}{2}$$

$$\frac{2}{13} \cdot \frac{13}{2}x = \frac{13}{2} \cdot \frac{2}{13}$$

$$\boxed{x=1}$$

substitute

$$3x + 7y = 24$$

$$3(1) + 7y = 24$$

$$-3 + 7y = 24$$

$$-3 \quad -3$$

$$\frac{7y}{7} = \frac{21}{7}$$

$$\boxed{y=3}$$

solution (1, 3)

13, 15, 20, 22, 23, 27, 28, 31, 32, 35

23. $x =$ adult tickets
 $y =$ children tickets

$$\begin{aligned} x + y &= 11 \\ 22x + 15y &= 228 \end{aligned}$$

① solve for y

$$\begin{aligned} x + y &= 11 \\ -x &= -x \\ \hline y &= -x + 11 \end{aligned}$$

② substitute

$$\begin{aligned} 22x + 15y &= 228 \\ 22x + 15(-x + 11) &= 228 \\ 22x - 15x + 165 &= 228 \end{aligned}$$

$$\begin{aligned} 7x + 165 &= 228 \\ -165 &= -165 \\ \hline 7x &= 63 \end{aligned}$$

③ Solve for x

$$\boxed{x = 9}$$

7. substitute into any equation

$$\begin{aligned} x + y &= 11 \\ 9 + y &= 11 \\ -9 &= -9 \\ \hline y &= 2 \end{aligned}$$

5) order pair $(9, 2)$

9 adult tickets
 2 children tickets

27. $6y = -5x + 24$
 $2.5x + 3y = 12$

① solve for y

$$\begin{aligned} 6y &= -5x + 24 \\ \hline y &= \frac{-5x + 24}{6} \end{aligned}$$

② substitute in other equation

$$2.5x + 3\left(\frac{-5x + 24}{6}\right) = 12$$

$$2.5x + \frac{-5x}{2} + 12 = 12$$

$$12 = 12$$

\therefore infinite solutions

28.) $x = -7y + 34$
 $x + 7y = 32$

① solve for y

$$\begin{aligned} x + 7y &= 32 \\ -x &= -x \end{aligned}$$

$$7y = -x + 32$$

$$y = \frac{-x + 32}{7}$$

② substitute

$$x = -7\left(\frac{-x + 32}{7}\right) + 34$$

$$x = x - 32 + 34$$

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$$x = x - 32 + 34$$

$$-x - x = -p + x - 3x - 1$$

$$0 = 2 = 67 = x - 6x$$

∴ no solution

31. $1.5x + 2y = 11$

56. $3x + 6y = 22$

① solve for y

$$3x + 6y = 22$$

$$-3x \quad \quad \quad -3x$$

$$\frac{6y}{6} = \frac{-3x + 22}{6}$$

$$y = -\frac{1}{2}x + \frac{11}{3}$$

② substitute

$$1.5x + 2y = 11$$

$$1.5x + 2\left(-\frac{1}{2}x + \frac{11}{3}\right) = 11$$

$$1.5x - x + \frac{22}{3} = 11$$

$$.5x + \frac{22}{3} = 11$$

$$.5x = 11 - \frac{22}{3}$$

$$.5x = \frac{11}{3}$$

$$x = 7.\bar{3}$$

One solution

32. $2l + 2w = 34$

$$l = 2w + 5$$

$$2(2w + 5) + 2w = 34$$

$$4w + 10 + 2w = 34$$

$$6w + 10 = 34$$

$$6w = 24$$

$$w = 4$$

$$l = 2(4) + 5$$

$$l = 8 + 5$$

$$l = 13$$

∴ 4 cm = x 13 cm

35. The student

solved an equation for x but then substituted it into the same equation not the other equation

$$p = x + e$$

$$e = e$$

$$e = x$$

$$1 + e = y$$

$$p = y$$

no solution $(1, 0)$

$$49. y = 3x + 3$$

$$y = x - 3$$

① set = to y

② substitute

$$x - 3 = 3x + 3$$

Solve for x

$$-x - 3 = -x + 3$$

$$\frac{-6}{2} = \frac{2x}{2}$$

$$-3 = x$$

substitute

$$y = x - 3$$

$$y = -3 - 3$$

$$y = -6$$

one solution

$$(-3, -6)$$

50. $y = x + 1$

$$2x + y = 10$$

① set = to y

② substitute

$$2x + x + 1 = 10$$

$$3x + 1 = 10$$

$$\frac{-1}{3} = \frac{-9}{3}$$

$$3x = 9$$

$$x = 3$$

$$y = 3 + 1$$

$$y = 4$$

$(3, 4)$ one solution

51. $y = -x + 2$

$$x + y = 3$$

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

$$2 = 3$$

no solution

52. $y = 3x$

\perp is neg reciprocal

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

53. $y = \frac{1}{4}x$

$$\therefore -4$$

54. $\frac{1}{3}x - y = 2$

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

$$-y = -\frac{1}{3}x + 2$$

$$y = \frac{1}{3}x + 2$$

$$\therefore -3$$

$$\begin{aligned}
 55. \quad & 5x + 1 = 3x - 5 \\
 & \underline{-3x \quad -1 \quad -3x \quad -1} \\
 & 2x = -6 \\
 & \underline{\quad \quad \quad 2 \quad \quad \quad 2} \\
 & x = -3
 \end{aligned}$$

$$\begin{aligned}
 56. \quad & 4c - 7 = -c + 3 \\
 & \underline{+c \quad +7 \quad +c \quad +7} \\
 & 5c = 10 \\
 & \underline{\quad \quad \quad 5 \quad \quad \quad 5} \\
 & \boxed{c = 2}
 \end{aligned}$$

$$\begin{aligned}
 57. \quad & 5k + 7 = 3k + 10 \\
 & \underline{-3k \quad -7 \quad -3k \quad -7} \\
 & 2k = 3 \\
 & \underline{\quad \quad \quad 2 \quad \quad \quad 2} \\
 & k = 3/2
 \end{aligned}$$

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