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Self Exercise 9 LIU LEE LEE 051PP17F2006

~~1 a) x + 9~~ Solve the following equations.

1a) $x + 9 = 20$

$x + 9 - 9 = 20 - 9$ ✓

$x = 11$ ✓

b) $x - 8 = 10$

$x - 8 + 8 = 10 + 8$ ✓

$x = 18$ ✓

c) $x + 1.6 = 2.4$

$x + 1.6 - 1.6 = 2.4 - 1.6$ ✓

$x = 0.8$ ✓

d) $y - 2 = -8$

$y - 2 + 2 = -8 + 2$ ✓

$y = -6$ ✓

e) $x - \frac{3}{4} = 1\frac{1}{2}$

$x - \frac{3}{4} + \frac{3}{4} = 1\frac{1}{2} + \frac{3}{4}$

$x = \frac{3 \times 1}{2 \times 2} + \frac{3}{4}$

$x = \frac{6}{4} + \frac{3}{4}$ ✓

$x = \frac{9}{4}$ ✓

$x = 1\frac{5}{4}$ $x = 2\frac{1}{4}$.

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

2 | 2, 4
2 | 1, 2
1, 1

$4\overline{)9}$ quotient 2, remainder 1

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f) $m + 6 = -4$

$m + 6 - 6 = -4 - 6$ ✓

$m = -10$ ✓

g) $m - 7.1 = -8.4$

$m - 7.1 + 7.1 = -8.4 + 7.1$ ✓

$m = -1.3$ ✓

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

$x + \frac{3}{2} = 2$ ✓

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

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

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

$= \frac{1}{2}$

i) $y + 80 = 120$

$y + 80 - 80 = 120 - 80$ ✓

$y = 40$ ✓

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Solve the following equations

2 a) $2x = 11$

$\frac{2x}{2} = \frac{11}{2}$ ✓

$x = \frac{11}{2}$ ✓

b) $4x = 20$

$\frac{4x}{4} = \frac{20}{4}$ ✓

$x = \frac{20}{4_1}\ 5$ ✓

$x = 5$ ✓

c) $3x = -24$

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

$x = \frac{-24}{3_1}\ -8$ ✓

$x = -8$ ✓

d) $6x = 24$

$\frac{6x}{6} = \frac{24}{6}$

$x = \frac{24}{6_1}\ 4$ ✓

$x = 4$ ✓

e) $\frac{x}{3} = 1.2$

$\frac{x}{3} \times \frac{1.2}{1}$

$1x = 3(1.2)$ ✓

$x = 3.6$ ✓

f) $\frac{x}{5} = 5$

$\frac{x}{5} \times \frac{25}{1}$

$x = 5(5)$ ✓

$x = 25$ ✓

g) $\frac{x}{2} = -7$

$\frac{x}{2} \times \frac{-7}{1}$

$x = -7(2)$ ✓

$x = -14$ ✓

h) $\frac{2}{5}m = 10$

$\frac{2m}{5} \times \frac{10}{1}$

$\frac{2m}{2} = \frac{50}{2}$

$m = \frac{50}{2_1}\ 25$ ✓

$m = 25$ ✓

i) $\frac{3m}{4} = -6$

$\frac{3m}{4} \times \frac{-6}{1}$

$\frac{3m}{3} = \frac{-24}{3_1}\ -8$

$m = -8$ ✓

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Solve the following equations

3 a) $2x - 1 = 9$

$2x - 1 + 1 = 9 + 1$ ✓

$\frac{2x}{2} = \frac{10}{2}$ ✓

$x = 5$ ✓

b) $5(2 - x) - 3(4 - 2x) = 20$

$10 - 5x - 12 + 6x = 20$ ✓

$10 - 5x + 6x - 12 = 20$ ✓

$10 - 12 - 5x + 6x = 20$

$-2 + x = 20$ ✓

$-2 + 2 + x = 20 + 2$ ✓

$x = 22$ ✓

c) $2m + 4 - 3m = 8(m - 1)$

$2m + 4 - 3m = 8m - 8$

$2m - 3m + 4 = 8m - 8$ ✓

$-m + 4 = 8m - 8$ ✓

$-m - 8m = -8 - 4$ ✓

$\frac{-9m}{-9} = \frac{-12}{-9}$

$m = \frac{-12}{-9}$ ← Simplify!

$m = \frac{4}{3}$

d) $\frac{x+1}{4} = 5$

$\frac{x+1}{4} \times \frac{15}{1}$

$x + 1(1) = 5(4)$

$x + 1 = 20$ ✓

$x + 1 - 1 = 20 - 1$ ✓

$x = 19$ ✓

e) $\frac{x}{5} + \frac{x}{3} = 10$ (5 × 3)

$\frac{3x}{15} + \frac{5x}{15} = 10$ ✓

$\frac{3x + 5x}{15} = 10$ ✓

$\frac{8x}{15} \times \frac{10}{1}$ ✓

$1(8x) = 10(15)$

$\frac{8x}{8} = \frac{150}{8}$ ✓

$x = \frac{75}{4}$ ✓

$x = 18.75$

$x = 18\frac{3}{4}$

5 | 5, 3
3 | 1, 3
1, 1

18.75
4) 75
4
35
32
3

18
4 | 75
4
35
32
3

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f) $5(y+2) - 4(y-1) = 6$

$5y + 10 - 4y + 4 = 6$

$5y - 4y + 10 + 4 = 6$

$y + 14 = 6$

$y + 14 - 14 = 6 - 14$

$y = -8$

g) $4(y+3) - 2y = 7$

$4y + 12 - 2y = 7$

$4y - 2y + 12 = 7$

$2y + 12 = 7$

$2y + 12 - 12 = 7 - 12$

$\frac{2y}{2} = \frac{-5}{2}$

$y = \frac{-5}{2}$

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4) Solve each of the following simultaneous equations by using (a) elimination method and (b) substitution method.

a) $3u + v = 15$; $3u + 2v = 10$

$3u + v = 15$ —— ①

$-)\ 3u + 2v = 10$ —— ②

$-v = 5$ ✓

$\frac{+v}{+1} = \frac{5}{1}$

Then, $v = -5$

$v = -5$

Substitute $-v = 5$ into ②

$3u + 2(5) = 10$

$3u + 10 = 10$

$3u + 10 - 10 = 10 - 10$

$\frac{3u}{3} = \frac{0}{3}$

$u = 0$

$\therefore u = 0$, $v = 5$

✗ ✗.

$15 - (+10)$

$15 - 10$

5

15

-10

5

$1v - (+2v)$

$1v - 2v$

$3u + 2(-5) = 10$

$3u - 10 = 10$

$3u = 10 + 10$

$3u = 20$

$u = \frac{20}{3}$.

$\therefore u = \frac{20}{3}$, $v = -5$.

Please try again.

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b) Substitution method

$3u + v = 15$ — ①

$3u + 2v = 10$ — ②

From ②, $3u + 2v = 10$ ✓

$3u + 2v - 2v = 10 - 2v$ ✓

$\frac{3u}{3} = \frac{10 - 2v}{3}$ ✓

$u = \frac{10 - 2v}{3}$ — ③ ✓

Substitute ③ into ①

$3\left(\frac{10 - 2v}{3}\right) + v = 15$ ✓

$(10 - 2v) + v = 15$ ✓

$10 - v = 15$ ✓

$10 - 10 - v = 15 - 10$ ✓

$-v = 5$

$v = -5$

$v = 5$ ✗

-5

Substitute $v = 5$ into ②

$3u + 2(5) = 10$

$3u + 10 = 10$

$3u + 10 - 10 = 10 - 10$

$\frac{3u}{3} = \frac{0}{3}$

$u = 0$ ✗

$3u + 2(-5) = 10$

$3u - 10 = 10$

$3u = 20$

$u = \frac{20}{3}$.

$\therefore u = 0, \quad v = 5$ ✗

✗ ✗

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b) $2a + 2x = 18$; $a + 2x = 17$

$2a + 2x = 18$ ——— ①

$a + 2x = 17$ ——— ②

a) Elimination method :

$$\begin{array}{rl} & 2a + 2x = 18 \\ -) & a + 2x = 17 \\ \hline & a = 1 \end{array}$$

$a = 1$ *

Substitute $a = 1$ into ①

$2(1) + 2x = 18$

$2 + 2x = 18$

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

$\frac{2x}{2} = \frac{16}{2}$

$x = \frac{16^{8}}{\cancel{2}_{1}}$

$x = 8$ *

$\therefore a = 1, \; x = 8$

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b) Substitution method :

$2a + 2x = 18$ —— ①

$a + 2x = 17$ —— ②

From ①, $2a + 2x = 18$

$2a - 2a + 2x = 18 - 2a$

$\frac{2x}{2} = \frac{18 - 2a}{2}$

$x = \frac{18 - 2a}{2}$ —— ③

Substitute ③ into ②

$a + 2\left(\frac{18 - 2a}{2}\right) = 17$

$a + 18 - 2a = 17$

$-a + 18 = 17$

$-a + 18 - 18 = 17 - 18$

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

$a = 1$

Use pen !

Substitute $a = 1$ into ①

$2(1) + 2x = 18$

$2 + 2x = 18$

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

$\frac{2x}{2} = \frac{16}{2}$

$x = \frac{16}{2}^{8}$

$x = 8$

$\therefore a = 1, x = 8$

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c) $-5x + 5y = 0$; $-5x + 3y = 8$

a) Elimination method:

$-5x + 5y = 0$ — ①

$-) \quad -5x + 3y = 8$ — ②

$+5y - (+3y)$

$5y - 3y$

$2y$

$\frac{2y}{2} = \frac{-8}{2}$ ✓

✓

$y = \frac{-8}{2} - 4$

✓

$y = -4$

✓

Substitute $y = -4$ into ②

$-5x + 3(-4) = 8$

$-5x - 12 = 8$

$-5x - 12 + 12 = 8 + 12$

$\frac{-5x}{-5} = \frac{20}{-5}$

$x = \frac{20}{-5}$

$x = -4$

✓

$\therefore x = -4, \quad y = -4$

✓

✓

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b) Substitution method

$-5x + 5y = 0$ — ①

$-5x + 3y = 8$ — ②

From ② $-5x + 3y = 8$

$-5x + 3y - 3y = 8 - 3y$

$\frac{-5x}{-5} = \frac{8-3y}{-5}$

$x = \frac{8-3y}{-5}$ — ③

Substitute ③ into ①

$-5\left(\frac{8-3y}{-5}\right) + 5y = 0$

$(8-3y) + 5y = 0$

$8 - 3y + 5y = 0$

$8 - 2y = 0$

$8 - 8 - 2y = 0 - 8$

$\frac{-2y}{-2} = \frac{-8}{-2} - 4$

$y = -4$

Substitute $y = -4$ into ②

$-5x + 3(-4) = 8$

$-5x - 12 = 8$

$-5x - 12 + 12 = 8 + 12$

$\frac{-5x}{-5} = \frac{20}{-5} - 4$

$x = -4$

$\therefore x = -4, y = -4$ ✓

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d) $7x + 9y = 27$; $9x + 9y = 27$

a) Elimination method :

$7x + 9y = 27$ ——— ①

$-)\ 9x + 9y = 27$ ——— ②

$\frac{-2x}{-2} = \frac{0}{-2}$

$x = \frac{0}{2}$

$x = 0$ ✓

Substitute $x = 0$ into ①

$7(0) + 9y = 27$

$\frac{9y}{9} = \frac{27}{9}$

$y = \frac{27}{9}\ ^{3}$

$y = 3$ ✓

$\therefore x = 0$, $y = 3$ ✓ ✓

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b) Substitution method

$7x + 9y = 27$ — ①

$9x + 9y = 27$ — ②

From ② $9x + 9y = 27$

$9x + 9y - 9y = 27 - 9y$

$\frac{9x}{9} = \frac{27 - 9y}{9}$

$x = \frac{27 - 9y}{9}$ — ③

Substitute ③ into ①

$9\left(\frac{27 - 9y}{9}\right) + 9y = 27$

$(27 - 9y) + 9y = 27$

$27 - 9y + 9y = 27$

$27 = 27$

$27 - 27 = 27 - 27$

$x = 0$

Substitute $x = 0$ into ①

$7(0) + 9y = 27$

$9y = 27$

$9y - 9y = 27 - 9y$

$y =$

Substitute $x = 0$ into ①

$7(0) + 9y = 27$

$\frac{9y}{9} = \frac{27}{9}$

$y = \frac{27}{9}3$

$y = 3$

$\therefore x = 0, \quad y = 3$