Exercise 4.2

Question 1:

Give first the step you will use to separate the variable and then solve the equations:

(a) $x-1=0$ (b) $x+1=0$
(c) $x-1=5$ (d) $x+6=2$
(e) $y-4=-7$ (f) $y-4=4$
(g) $y+4=4$ (h) $y+4=-4$

Answer 1:

(a) $x-1=0$
$\Rightarrow \quad x-1+1=0+1$ [Adding 1 both sides]
$\Rightarrow \quad x=1$

(b) $x+1=0$
$\Rightarrow \quad x+1-1=0-1$ [Subtracting 1 both sides]
$\Rightarrow \quad x=-1$

(c) $x-1=5$
$\Rightarrow \quad x-1+1=5+1$ [Adding 1 both sides]
$\Rightarrow \quad x=6$

(d) $x+6=2$
$\Rightarrow \quad x+6-6=2-6$ [Subtracting 6 both sides]
$\Rightarrow \quad x=-4$

(e) $y-4=-7$
$\Rightarrow \quad y-4+4=-7+4$ [Adding 4 both sides]
$\Rightarrow \quad y=-3$

(f) $y-4=4$
$\Rightarrow \quad y-4+4=4+4$ [Adding 4 both sides]
$\Rightarrow \quad y=8$

(g) $y+4=4$
$\Rightarrow \quad y+4-4=4-4$ [Subtracting 4 both sides]
$\Rightarrow \quad y=0$

(h) $y+4=-4$
$\Rightarrow \quad y+4-4=-4-4$ [Subtracting 4 both sides]
$\Rightarrow \quad y=-8$

Question 2:

Give first the step you will use to separate the variable and then solve the equations

(a) $3l=42$ (b) $\frac{b}{2}=6$ (c) $\frac{p}{7}=4$ (d) $4x=25$
(e) $8y=36$ (f) $\frac{z}{3}=\frac{5}{4}$ (g) $\frac{a}{5}=\frac{7}{15}$ (h) $20t=-10$

Answer 2:

(a) $3l=42$
$\Rightarrow \quad \frac{3l}{3}=\frac{42}{3}$ [Dividing both sides by 3]
$\Rightarrow \quad l=14$

(b) $\frac{b}{2}=6$

$\Rightarrow \quad \frac{b}{2}\times 2=6\times 2$ [Multiplying both sides by 2]

$\Rightarrow \quad b=12$

(c) $\frac{p}{7}=4$

$\Rightarrow \quad \frac{p}{7}\times 7=4\times 7$ [Multiplying both sides by 7]

$\Rightarrow \quad p=28$

(d) $4x=25$

$\Rightarrow \quad \frac{4x}{4}=\frac{25}{4}$ [Dividing both sides by 4]

$\Rightarrow \quad x=\frac{25}{4}$

(e) $8y=36$

$\Rightarrow \quad \frac{8y}{8}=\frac{36}{8}$ [Dividing both sides by 8]

$\Rightarrow \quad y=\frac{9}{2}$

(f) $\frac{z}{3}=\frac{5}{4}$

$\Rightarrow \quad \frac{z}{3}\times 3=\frac{5}{4}\times 3$ [Multiplying both sides by 3]

$\Rightarrow \quad z=\frac{15}{4}$

(g) $\frac{a}{5}=\frac{7}{15}$

$\Rightarrow \quad \frac{a}{5}\times 5=\frac{7}{15}\times 5$ [Multiplying both sides by 5]

$\Rightarrow \quad a=\frac{7}{3}$

(h) $20t=-10$

$\Rightarrow \quad \frac{20t}{20}=\frac{-10}{20}$ [Dividing both sides by 20]

$\Rightarrow \quad t=\frac{-1}{2}$

Question 3:

Give first the step you will use to separate the variable and then solve the equations

(a) $3n-2=46$ (b) $5m+7=17$ (c) $\frac{20p}{3}=40$ (d) $\frac{3p}{10}=6$

Answer 3:

(a) $3n-2=46$

Step I: $3n-2+2=46+2$

$\Rightarrow \quad 3n = 48$ [Adding 2 both sides]

Step II: $\frac{3n}{3} = \frac{48}{3} \Rightarrow n = 16$ [Dividing both sides by 3]

(b) $5m + 7 = 17$

Step I: $5m + 7 - 7 = 17 - 7 \Rightarrow 5m = 10$ [Subtracting 7 both sides]

Step II: $\frac{5m}{5} = \frac{10}{5} \Rightarrow m = 2$ [Dividing both sides by 5]

(c) $\frac{20p}{3} = 40$

Step I: $\frac{20p}{3} \times 3 = 40 \times 3 \Rightarrow 20p = 120$ [Multiplying both sides by 3]

Step II: $\frac{20p}{20} = \frac{120}{20} \Rightarrow p = 6$ [Dividing both sides by 20]

(d) $\frac{3p}{10} = 6$

Step I: $\frac{3p}{10} \times 10 = 6 \times 10 \Rightarrow 3p = 60$ [Multiplying both sides by 10]

Step II: $\frac{3p}{3} = \frac{60}{3} \Rightarrow p = 20$ [Dividing both sides by 3]

Question 4:

Solve the following equation:

(a) $10p = 100$ (b) $10p + 10 = 100$ (c) $\frac{p}{4} = 5$

(d) $\frac{-p}{3} = 5$ (e) $\frac{3p}{4} = 6$ (f) $3s = -9$

(g) $3s + 12 = 0$ (h) $3s = 0$ (i) $2q = 6$

(j) $2q - 6 = 0$ (k) $2q + 6 = 0$ (l) $2q + 6 = 12$

Answer 4:

(a) $10p = 100$

$\Rightarrow \quad \frac{10p}{10} = \frac{100}{10}$ [Dividing both sides by 10]

$\Rightarrow \quad p = 10$

(b) $10p + 10 = 100$

$\Rightarrow \quad 10p + 10 - 10 = 100 - 10$ [Subtracting both sides 10]

$\Rightarrow \quad 10p = 90$

$\Rightarrow \quad \frac{10p}{10} = \frac{90}{10}$ [Dividing both sides by 10]

$\Rightarrow \quad p = 9$

(c) $\frac{p}{4} = 5$

$\Rightarrow \quad \frac{p}{4} \times 4 = 5 \times 4$ [Multiplying both sides by 4]

$\Rightarrow \quad p = 20$

(d) $\frac{-p}{3}=5$

$\Rightarrow \quad \frac{-p}{3}\times(-3)=5\times(-3)$ [Multiplying both sides by – 3]

$\Rightarrow \quad p=-15$

(e) $\frac{3p}{4}=6$

$\Rightarrow \quad \frac{3p}{4}\times 4=6\times 4$ [Multiplying both sides by 4]

$\Rightarrow \quad 3p=24 \Rightarrow \frac{3p}{3}=\frac{24}{3}$ [Dividing both sides by 3]

$\Rightarrow \quad p=8$

(f) $3s=-9$

$\Rightarrow \quad \frac{3s}{3}=\frac{-9}{3}$ [Dividing both sides by 3]

$\Rightarrow \quad s=-3$

(g) $3s+12=0$

$\Rightarrow \quad 3s+12-12=0-12$ [Subtracting both sides 12]

$\Rightarrow \quad 3s=-12 \Rightarrow \frac{3s}{3}=\frac{-12}{3}$ [Dividing both sides by 3]

$\Rightarrow \quad s=-4$

(h) $3s=0$

$\Rightarrow \quad \frac{3s}{3}=\frac{0}{3}$ [Dividing both sides by 3]

$\Rightarrow \quad s=0$

(i) $2q=6$

$\Rightarrow \quad \frac{2q}{2}=\frac{6}{2}$ [Dividing both sides by 2]

$\Rightarrow \quad q=3$

(j) $2q-6=0$

$\Rightarrow \quad 2q-6+6=0+6$ [Adding both sides 6]

$\Rightarrow \quad 2q=6 \Rightarrow \frac{2q}{2}=\frac{6}{2}$ [Dividing both sides by 2]

$\Rightarrow \quad q=3$

(k) $2q+6=0$

$\Rightarrow \quad 2q+6-6=0-6$ [Subtracting both sides 6]

$\Rightarrow \quad 2q=-6 \Rightarrow \frac{2q}{2}=\frac{-6}{2}$ [Dividing both sides by 2]

$\Rightarrow \quad q=-3$

(l) $2q+6=12$

$\Rightarrow \quad 2q+6-6=12-6$ [Subtracting both sides 6]

$\Rightarrow \quad 2q=6 \Rightarrow \frac{2q}{2}=\frac{6}{2}$ [Dividing both sides by 2]

$\Rightarrow \quad q=3$