Exercise 4.3

Question 1:

Solve the following equations:

(a) $2y+\frac{5}{2}=\frac{37}{2}$ (b) $5t+28=10$ (c) $\frac{a}{5}+3=2$

(d) $\frac{q}{4}+7=5$ (e) $\frac{5}{2}x=10$ (f) $\frac{5}{2}x=\frac{25}{4}$

(g) $7m+\frac{19}{2}=13$ (h) $6z+10=-2$ (i) $\frac{3l}{2}=\frac{2}{3}$

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

Answer 1:

(a) $2y+\frac{5}{2}=\frac{37}{2}$

$\Rightarrow \quad 2y=\frac{37}{2}-\frac{5}{2}$

$\Rightarrow \quad 2y=\frac{37-5}{2}$

$\Rightarrow \quad 2y=\frac{32}{2}$

$\Rightarrow \quad 2y=16$

$\Rightarrow \quad y=\frac{16}{2}$

$\Rightarrow \quad y=8$

(b) $5t+28=10$

$\Rightarrow \quad 5t=10-28$

$\Rightarrow \quad 5t=-18$

$\Rightarrow \quad t=\frac{-18}{5}$

(c) $\frac{a}{5}+3=2$

$\Rightarrow \quad \frac{a}{5}=2-3$

$\Rightarrow \quad \frac{a}{5} = -1$

$\Rightarrow \quad a = -1 \times 5$

$\Rightarrow \quad a = -5$

(d) $\frac{q}{4} + 7 = 5$

$\Rightarrow \quad \frac{q}{4} = 5 - 7$

$\Rightarrow \quad \frac{q}{4} = -2$

$\Rightarrow \quad q = -2 \times 4$

$\Rightarrow \quad q = -8$

(e) $\frac{5}{2}x = 10$

$\Rightarrow \quad 5x = 10 \times 2$

$\Rightarrow \quad 5x = 20$

$\Rightarrow \quad x = \frac{20}{5}$

$\Rightarrow \quad x = 4$

(f) $\frac{5}{2}x = \frac{25}{4}$

$\Rightarrow \quad 5x = \frac{25}{4} \times 2$

$\Rightarrow \quad 5x = \frac{25}{2}$

$\Rightarrow \quad x = \frac{25}{2 \times 5}$

$\Rightarrow \quad x = \frac{5}{2}$

(g) $7m + \frac{19}{2} = 13$

$\Rightarrow \quad 7m = 13 - \frac{19}{2}$

$\Rightarrow \quad 7m = \frac{26-19}{2}$

$\Rightarrow \quad 7m = \frac{7}{2}$

$\Rightarrow \quad m = \frac{7}{2\times 7}$

$\Rightarrow \quad m = \frac{1}{2}$

(h) $6z + 10 = -2$

$\Rightarrow \quad 6z = -2 - 10$

$\Rightarrow \quad 6z = -12$

$\Rightarrow \quad z = \frac{-12}{6}$

$\Rightarrow \quad z = -2$

(i) $\frac{3l}{2} = \frac{2}{3}$

$\Rightarrow \quad 3l = \frac{2}{3}\times 2$

$\Rightarrow \quad 3l = \frac{4}{3}$

$\Rightarrow \quad l = \frac{4}{3\times 3}$

$\Rightarrow \quad l = \frac{4}{9}$

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

$\Rightarrow \quad \frac{2b}{3} = 3 + 5$

$\Rightarrow \quad \frac{2b}{3} = 8$

$\Rightarrow \quad 2b = 8\times 3$

$\Rightarrow \quad 2b = 24$

$\Rightarrow \quad b = \frac{24}{2}$

$\Rightarrow \quad b = 12$

Question 2:

Solve the following equations:

(a) $2(x+4)=12$

(b) $3(n-5)=21$

(c) $3(n-5)=-21$

(d) $3-2(2-y)=7$

(e) $-4(2-x)=9$

(f) $4(2-x)=9$

(g) $4+5(p-1)=34$

(h) $34-5(p-1)=4$

Answer 2:

(a) $2(x+4)=12$

$\Rightarrow \quad x+4=\frac{12}{2}$

$\Rightarrow \quad x+4=6$

$\Rightarrow \quad x=6-4$

$\Rightarrow \quad x=2$

(b) $3(n-5)=21$

$\Rightarrow \quad n-5=\frac{21}{3}$

$\Rightarrow \quad n-5=7$

$\Rightarrow \quad n=7+5$

$\Rightarrow \quad n=12$

(c) $3(n-5)=-21$

$\Rightarrow \quad n-5=\frac{-21}{3}$

$\Rightarrow \quad n-5=-7$

$\Rightarrow \quad n=-7+5$

$\Rightarrow \quad n=-2$

(d) $3-2(2-y)=7$

$\Rightarrow \quad -2(2-y)=7-3$

$\Rightarrow \quad -2(2-y)=4$

$\Rightarrow \quad 2-y=\frac{4}{-2}$

$\Rightarrow \quad 2-y=-2$

$\Rightarrow \quad -y=-2-2$

$\Rightarrow \quad -y=-4$

$\Rightarrow \quad y=4$

(e) $-4(2-x)=9$

$\Rightarrow \quad -4\times 2-x\times(-4)=9$

$\Rightarrow \quad -8+4x=9$

$\Rightarrow \quad 4x=9+8$

$\Rightarrow \quad 4x=17$

$\Rightarrow \quad x=\frac{17}{4}$

(f) $4(2-x)=9$

$\Rightarrow \quad 4\times 2-x\times(4)=9$

$\Rightarrow \quad 8-4x=9$

$\Rightarrow \quad -4x=9-8$

$\Rightarrow \quad -4x=1$

$\Rightarrow \quad x=\frac{-1}{4}$

(g) $4+5(p-1)=34$

$\Rightarrow \quad 5(p-1)=34-4$

$\Rightarrow \quad 5(p-1)=30$

$\Rightarrow \quad p-1=\frac{30}{5}$

$\Rightarrow \quad p-1=6$

$\Rightarrow \quad p=6+1$

$\Rightarrow \quad p=7$

(h) $34-5(p-1)=4$

$\Rightarrow \quad -5(p-1)=4-34$

$\Rightarrow \quad -5(p-1)=-30$

$\Rightarrow \quad p-1=\dfrac{-30}{-5}$

$\Rightarrow \quad p-1=6$

$\Rightarrow \quad p=6+1$

$\Rightarrow \quad p=7$

Question 3:

Solve the following equations:

(a) $4=5(p-2)$

(b) $-4=5(p-2)$

(c) $-16=-5(2-p)$

(d) $10=4+3(t+2)$

(e) $28=4+3(t+5)$

(f) $0=16+4(m-6)$

Answer 3:

(a) $4=5(p-2)$

$\Rightarrow \quad 4=5\times p-5\times 2$

$\Rightarrow \quad 4=5p-10$

$\Rightarrow \quad 5p-10=4$

$\Rightarrow \quad 5p=4+10$

$\Rightarrow \quad 5p=14$

$\Rightarrow \quad p=\dfrac{14}{5}$

(b) $-4=5(p-2)$

$\Rightarrow \quad -4=5\times p-5\times 2$

$\Rightarrow \quad -4=5p-10$

$\Rightarrow \quad 5p-10=-4$

$\Rightarrow \quad 5p=-4+10$

$\Rightarrow \quad 5p=6$

$\Rightarrow \quad p=\dfrac{6}{5}$

(c) $-16=-5(2-p)$

$\Rightarrow \quad -16=-5\times 2-(-5)\times p$

$\Rightarrow \quad -16=-10+5p$

$\Rightarrow \quad -10+5p=-16$

$\Rightarrow \quad 5p=-16+10$

$\Rightarrow \quad 5p=-6$

$\Rightarrow \quad p=\frac{-6}{5}$

(d) $10=4+3(t+2)$

$\Rightarrow \quad 10-4=3(t+2)$

$\Rightarrow \quad 6=3(t+2)$

$\Rightarrow \quad \frac{6}{3}=t+2$

$\Rightarrow \quad 2=t+2$

$\Rightarrow \quad 2-2=t$

$\Rightarrow \quad 0=t$

$\Rightarrow \quad t=0$

(e) $28=4+3(t+5)$

$\Rightarrow \quad 28-4=3(t+5)$

$\Rightarrow \quad 24=3(t+5)$

$\Rightarrow \quad \frac{24}{3}=t+5$

$\Rightarrow \quad 8=t+5$

$\Rightarrow \quad 8-5=t$

$\Rightarrow \quad 3=t$

$\Rightarrow \quad t=3$

(f) $0=16+4(m-6)$

$\Rightarrow \quad 0-16=4(m-6)$

$\Rightarrow \quad -16=4(m-6)$

$\Rightarrow \quad \frac{-16}{4} = m - 6$

$\Rightarrow \quad -4 = m - 6$

$\Rightarrow \quad -4 + 6 = m$

$\Rightarrow \quad 2 = m$

$\Rightarrow \quad m = 2$

Question 4:

(a) Construct 3 equations starting with $x = 2$.

(b) Construct 3 equations starting with $x = -2$.

Answer 4:

(a) 3 equations starting with $x = 2$.

(i) $x = 2$

Multiplying both sides by 10,

$10x = 20$

Adding 2 both sides

$10x + 2 = 20 + 2 \;=\; 10x + 2 = 22$

(ii) $x = 2$

Multiplying both sides by 5

$5x = 10$

Subtracting 3 from both sides

$5x - 3 = 10 - 3 \;=\; 5x - 3 = 7$

(iii) $x = 2$

Dividing both sides by 5

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

(b) 3 equations starting with $x = -2$.

(i) $x = -2$

Multiplying both sides by 3

$3x = -6$

(ii) $x = -2$

Multiplying both sides by 3

$3x = -6$

Adding 7 to both sides

$3x + 7 = -6 + 7 \;=\; 3x + 7 = 1$

(iii) $x = -2$

Multiplying both sides by 3

$3x = -6$

Adding 10 to both sides

$3x + 10 = -6 + 10 \;=\; 3x + 10 = 4$