9 Solve the simultaneous equations.

$2x+y=7$ (1)
$3x-y=8$ (2)

(1)+(2): $2x+3x=7+8$

$5x=15$

$\div 5 \quad \div 5$

$x=3$

Sub. into (1):

$2(3)+y=7$

$6+y=7$

$-6 \quad -6$

$y=1$

$x =$ 3

$y =$ 1 [2]

5 Solve the simultaneous equations.

$2p-3q=7$ (1)
$p+3q=2$ (2)

(1)+(2): $3p=9$

$\div 3 \quad \div 3$

$p=3$

→(2): $3+3q=2$

$-3 \quad -3$

$3q=-1$

$\div 3 \quad \div 3$

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

$p =$ 3

$q =$ $-\frac{1}{3}$ [2]

9 Solve the simultaneous equations.

$3x-2y=21$ (1)
$5x+2y=51$ (2)

(1)+(2): $8x=72$

$\div 8 \quad \div 8$

$x=9$

→(2): $5(9)+2y=51$

$45+2y=51$

$-45 \quad -45$

$2y=6$

$\div 2 \quad \div 2$

$y=3$

$x =$ 9

$y =$ 3 [2]

5 Solve the simultaneous equations.

(a) $x + 2y = 13$ ①
$x + 5y = 22$ ②

② − ①: $3y = 9$
$\div 3 \quad \div 3$
$y = 3$

→ ①: $x + 2(3) = 13$
$x + 6 = 13$
$-6 \quad -6$
$x = 7$

$x =$ 7

$y =$ 3 [2]

9 Solve the simultaneous equations.
You must show all your working.

$3x-2y=19$ (1)
$x+y=3$ ×2: $2x+2y=6$ (2)

(1) + (2): $5x = 25$
÷5 ÷5
$x = 5$

→ $x+y=3$: $5+y=3$
−5 −5
$y=-2$

$x =$ 5
$y =$ −2 [3]

9 Solve the simultaneous equations.

$5x+2y=-12$ (1)
$3x-y=-5$ ×2: $6x-2y=-10$ (2)

(1) + (2): $11x = -22$
÷11 ÷11
$x = -2$

→ (1): $5(-2)+2y=-12$
$-10+2y=-12$
+10 +10
$2y=-2$
÷2 ÷2
$y=-1$

$x =$ −2
$y =$ −1 [3]

11 Solve the simultaneous equations.

$5x - 2y = 12$ ×2: $10x - 4y = 24$ ①
$3x + 4y = 2$ ②

① + ②: $13x = 26$
÷13 ÷13
$x = 2$

→ ②: $3(2) + 4y = 2$
$6 + 4y = 2$
−6 −6
$4y = -4$
÷4 ÷4
$y = -1$

$x =$ 2
$y =$ −1 [3]

8 Solve the simultaneous equations.

$3x + 2y = -1$ ①
$7x - y = 26$ ×2: $14x - 2y = 52$ ②

① + ②: $17x = 51$
÷17 ÷17
$x = 3$

→ ①: $3(3) + 2y = -1$
$9 + 2y = -1$
−9 −9
$2y = -10$
÷2 ÷2
$y = -5$

$x =$ 3
$y =$ −5 [3]

7 Solve the simultaneous equations.
You must show all your working.

$2x+y=3$ ×5: $10x + 5y = 15$ ①
$x-5y=40$ ②

① + ②: $11x = 55$
÷11 ÷11
$x = 5$

→ $2x+y=3$:
$2(5)+y=3$
$10+y=3$
-10 -10
$y=-7$

$x =$ 5
$y =$ -7 [3]

8 Solve the simultaneous equations.

$3x-2y=12$ ①
$5x+y=7$ ×2: $10x + 2y = 14$ ②

① + ②: $13x = 26$
÷13 ÷13
$x = 2$

→ $5x+y=7$:
$5(2)+y=7$
$10+y=7$
-10 -10
$y=-3$

$x =$ 2
$y =$ -3 [3]

10 Solve the simultaneous equations.
You must show all your working.

$3x - 8y = 22$ ①
$x + 4y = 4$ ×2: $2x + 8y = 8$ ②

① + ②: $5x = 30$
÷5 ÷5
$x = 6$

→ $x + 4y = 4$:
$6 + 4y = 4$
−6 −6
$4y = -2$
÷4 ÷4
$y = -\frac{1}{2}$

$x =$ 6
$y =$ $-\frac{1}{2}$ [3]

4 **(a)** Solve the simultaneous equations.
You must show all your working.

$2p - q = 7$ ×2: $4p - 2q = 14$ ①
$3p + 2q = 7$ ②

① + ②: $7p = 21$
÷7 ÷7
$p = 3$

→ ②: $3(3) + 2q = 7$
$9 + 2q = 7$
−9 −9
$2q = -2$
÷2 ÷2
$q = -1$

$p =$ 3
$q =$ −1 [3]

8 Solve the simultaneous equations.
You must show all your working.

$4x-2y=-13$ $\times 2$: $8x-4y=-26$ ①
$-3x+4y=11$ ②

① + ②: $5x = -15$
$\div 5 \quad \div 5$
$x = -3$

→ ②: $-3(-3)+4y=11$
$9+4y=11$
$-9 \quad -9$
$4y=2$
$\div 4 \quad \div 4$
$y=\frac{1}{2}$

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

10 Solve the simultaneous equations.
You must show all your working.

$4x+3y=-10$ $\times 4$: $16x+12y=-40$ ①
$3x-4y=5$ $\times 3$: $9x-12y=15$ ②

① + ②: $25x = -25$
$\div 25 \quad \div 25$
$x = -1$

→ $4x+3y=-10$:
$4(-1)+3y=-10$
$-4+3y=-10$
$+4 \quad +4$
$3y=-6$
$\div 3 \quad \div 3$
$y=-2$

$x =$ -1
$y =$ -2 [4]

11 Solve the simultaneous equations.

$x - 3y = 7$ ①
$2x - 3y = 11$ ②

② − ①: $x = 4$

→ ①: $4 - 3y = 7$
$-4 \quad -4$
$-3y = 3$
$\div -3 \quad \div -3$
$y = -1$

$x =$ 4
$y =$ −1 [2]

10 Solve the simultaneous equations.

$4x - 5y = 13$ ×2: $8x - 10y = 26$ ①
$3x - 2y = 8$ ×5: $15x - 10y = 40$ ②

② − ①: $7x = 14$
$\div 7 \quad \div 7$
$x = 2$

→ $3x - 2y = 8$:
$3(2) - 2y = 8$
$6 - 2y = 8$
$-6 \quad -6$
$-2y = 2$
$\div -2 \quad \div -2$
$y = -1$

$x =$ 2
$y =$ −1 [4]

11 Solve the simultaneous equations.

$\frac{1}{2}x - \frac{1}{3}y = 7$ ×3: $\frac{3}{2}x - y = 21$ ①

$3x + y = 6$ ②

① + ②: $3x + \frac{3}{2}x = 27$

$\frac{6}{2}x + \frac{3}{2}x = 27$

$\frac{9}{2}x = 27$

×2 ×2

$9x = 54$

÷9 ÷9

$x = 6$

→ ②: $3(6) + y = 6$

$18 + y = 6$

−18 −18

$y = -12$

$x =$ 6

$y =$ −12 [3]

8 Solve the simultaneous equations.

$\frac{1}{2}x + \frac{2}{3}y = 8$ ×3: $\frac{3}{2}x + 2y = 24$ ①

$3x - y = 18$ ×2: $6x - 2y = 36$ ②

① + ②: $\frac{3}{2}x + 6x = 60$

$\frac{3}{2}x + \frac{12}{2}x = 60$

$\frac{15}{2}x = 60$

×2 ×2

$15x = 120$

÷15 ÷15

$x = 8$

→ $3x - y = 18$:

$3(8) - y = 18$

$24 - y = 18$

−24 −24

$-y = -6$

$y = 6$

$x =$ 8

$y =$ 6 [3]

12 Solve the simultaneous equations.
You must show all your working.

$\frac{3x}{2} + 5y = 5$ ×3: $\frac{9x}{2} + 15y = 15$ ①

$4x - 3y = 46$ ×5: $20x - 15y = 230$ ②

① + ②: $\frac{9}{2}x + 20x = 245$

$\frac{9}{2}x + \frac{40}{2}x = 245$

$\frac{49}{2}x = 245$

×2 ×2

$49x = 490$

÷49 ÷49

$x = 10$

→ $4x - 3y = 46$:

$4(10) - 3y = 46$

$40 - 3y = 46$

−40 −40

$-3y = 6$

÷−3 ÷−3

$y = -2$

$x =$ 10

$y =$ −2 [4]

10 Solve the simultaneous equations.

$$2x+3y=5 \quad (1)$$
$$y=3x+9 \quad (2)$$

Sub. (2) into (1):

$$2x+3(3x+9)=5$$
$$2x+9x+27=5$$
$$11x+27=5$$
$$-27 \quad -27$$
$$11x=-22$$
$$\div 11 \quad \div 11$$
$$x=-2$$

→ (2): $y=3(-2)+9$
$=-6+9$
$=3$

$x=$ −2

$y=$ 3 [3]

21 The nth term of a sequence is an^2+bn-4.

The first term is -3 and the second term is 2.

Find the value of a and the value of b.

1st term: when $n=1$:

$$a(1)^2+b(1)-4=-3$$
$$a+b-4=-3$$
$$+4 \quad +4$$
$$a+b=1 \quad (1)$$

2nd term: when $n=2$:

$$a(2)^2+b(2)-4=2$$
$$4a+2b-4=2$$
$$+4 \quad +4$$
$$4a+2b=6$$
$$\div 2 \quad \div 2 \quad \div 2$$
$$2a+b=3 \quad (2)$$

(2) − (1):

$a=2$

→ (1):

$2+b=1$
$-2 \quad -2$
$b=-1$

$a=$ 2

$b=$ −1 [5]

22 These are the first four terms of a sequence.

2.75 6 11.25 20

The nth term of this sequence is $\frac{1}{4}n^3 + an^2 + bn$.

Calculate the value of a and the value of b.

1st term: $n=1$:

$\frac{1}{4}(1)^3 + a(1)^2 + b(1) = 2.75$

$0.25 + a + b = 2.75$

-0.25 -0.25

$a + b = 2.5$ (1)

2nd term: $n=2$:

$\frac{1}{4}(2)^3 + a(2)^2 + b(2) = 6$

$\frac{1}{4} \times 8 + 4a + 2b = 6$

$2 + 4a + 2b = 6$

-2 -2

$4a + 2b = 4$

$\div 2$ $\div 2$ $\div 2$

$2a + b = 2$ (2)

(2) − (1):

$a = -0.5$

→ (1):

$-0.5 + b = 2.5$

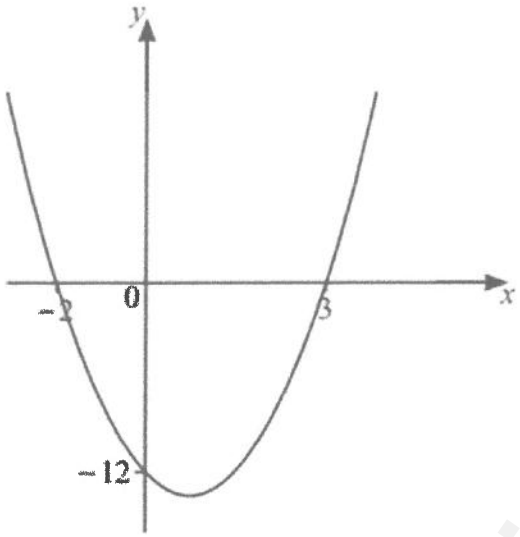
$+0.5$ $+0.5$

$b = 3$

$a =$ -0.5

$b =$ 3 [5]

13



NOT TO SCALE

The equation of the curve is $y = ax^2 + bx - 12$.

Find the value of a and the value of b.

At (3,0), $x=3$ and $y=0$:

$0 = a(3)^2 + b(3) - 12$

$0 = 9a + 3b - 12$

$9a + 3b = 12 \quad \div 3$

$3a + b = 4$ ①

At (-2,0), $x=-2$ and $y=0$:

$0 = a(-2)^2 + b(-2) - 12$

$0 = 4a - 2b - 12$

$4a - 2b = 12 \quad \div 2$

$2a - b = 6$ ②

→ ① + ②:

$5a = 10$

$\div 5 \quad \div 5$

$a = 2$

→ ①: $3(2) + b = 4$

$6 + b = 4$

$-6 \quad -6$

$b = -2$

$a =$ 2

$b =$ -2 [3]