

Chapter 6 Solution

Exercise 14

1. (a) $a + b = 10$ A1 N1
 $9a + 3b = 42$ A1 N1
(or $36a + 6b = 120$) [2]
- (b) $a = 2, b = 8$ A2 N2 [2]
- (c) $h = -\frac{8}{2(2)}$ (M1) for substitution
 $h = -2$
Thus, the equation of the axis of symmetry is
 $x = -2$. A1 N2 [2]
2. (a) $a + b = 1$ (A1) for correct substitution
 $8a + b = 15$ (A1) for correct substitution
Solving, we have $a = 2$ and $b = -1$. A2 N4 [4]
- (b) $2c^3 - 1 = -129$ (M1) for substitution
 $2c^3 = -128$
 $c^3 = -64$
 $c = -4$ A1 N2 [2]
3. (a) $\frac{a}{3-b} = 1$ (A1) for correct substitution
 $a = 3 - b$
 $\frac{a}{3-4} = -2b$ (A1) for correct substitution
 $a = 2b$
Solving, we have $a = 2$ and $b = 1$. A2 N4 [4]
- (b) 1, 4 A1 N1 [1]
- (c) $y = 0$ A1 N1 [1]

4. (a) $\frac{1}{\left(\frac{1}{4}\right)^2} = p + q$ (A1) for correct substitution
 $p + q = 16$
 $\frac{1}{\left(\frac{1}{2}\right)^2} = p - q$ (A1) for correct substitution
 $p - q = 4$
Solving, we have $p = 10$ and $q = 6$. A2 N4
 $r = \frac{1}{r^2}$ (A1) for correct substitution
 $r^3 = 1$
 $r = 1$ A1 N2
- (b) 1, 4, 16 A1 N1 [6]
[1]
(c) $x = 0$ A1 N1 [1]
[1]

Exercise 15

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|----|-----|---|--|----------|-----|
| 1. | (a) | $x + y = 30$ | A1 | N1 | |
| | | | | | [1] |
| | (b) | $3x + y = 82$ | A1 | N1 | |
| | | | | | [1] |
| | (c) | $x = 26, y = 4$ | A2 | N2 | |
| | | | | | [2] |
| | (d) | The total points
$= 3(15) + 15$
$= 60$ | (M1) for substitution
A1 | N2 | |
| | | | | | [2] |
| 2. | (a) | $a + 190b = 8.25$ | A1 | N1 | |
| | | | | | [1] |
| | (b) | $a + 220b = 9.21$ | A1 | N1 | |
| | | | | | [1] |
| | (c) | $a = 2.17, b = 0.032$ | A2 | N2 | |
| | | | | | [2] |
| | (d) | $2.17 + 0.032T = 9.85$
$0.032T = 7.68$
$T = 240$
Therefore, the temperature is 240°C . | (M1) for substitution
A1 | N2 | |
| | | | | | [2] |
| 3. | (a) | $18000 = 2p + q$
$22000 = 7p + q$
Solving, we have $p = 800$ and $q = 16400$. | (A1) for correct substitution
(A1) for correct substitution
A2 | N1
N4 | |
| | | | | | [4] |
| | (b) | p represents the increase of the number of flats per year. | A1 | N1 | |
| | | | | | [1] |
| | (c) | q represents the initial number of flats. | A1 | N1 | |
| | | | | | [1] |

4. (a) Let x and y be the price of one CD and that of one DVD respectively.
- $10x + 7y = 76.5$ (A1) for correct substitution
- $8x + 11y = 90.9$ (A1) for correct substitution
- Solving, we have $x = 3.8$ and $y = 5.5$.
- Therefore, the price of one CD and that of one DVD are USD 3.8 and USD 5.5 respectively. A2 N4 [4]
- (b) The amount of change
- $= 100 - (7(3.8) + 10(5.5))$ (M1) for valid approach
- $= \text{USD } 18.4$ A1 N2 [2]

Exercise 16

1. (a) (i) $998 = a(1)^2 + b(1) + c$ A1
 $a + b + c = 998$ AG N0
- (ii) $982 = a(3)^2 + b(3) + c$ A1
 $9a + 3b + c = 982$ AG N0
- (iii) $36a + 6b + c = 928$ A1 N1
- [3]
- (b)
$$\begin{cases} a + b + c = 998 \\ 9a + 3b + c = 982 \\ 36a + 6b + c = 928 \end{cases}$$
 (M1) for valid approach
 $a = -2, b = 0$ and $c = 1000$ A3 N4
- [4]
2. (a) (i) $x + y + z = 8400$ A1 N1
- (ii) $x + z = y - 6288$ A1
 $x - y + z = -6288$ AG N0
- [2]
- (b) $42x + 84y + 21z = 655872$ A1 N1
- [1]
- (c)
$$\begin{cases} x + y + z = 8400 \\ x - y + z = -6288 \\ 42x + 84y + 21z = 655872 \end{cases}$$
 (M1) for valid approach
 $x = 800, y = 7344$ and $z = 256$ A3 N4
- [4]

3. (a) (i)
$$\begin{cases} 10a + 12b + 13c = 150 \\ 14a + 8b + 19c = 178 \\ 22a + 23b + 7c = 230 \end{cases}$$
 A2 N2
- (ii) $a = 5, b = 4$ and $c = 4$ A3 N3 [5]
- (b) The total price
 $= 5(30) + 4(0) + 4(35)$ (A1) for substitution
 $= \$290$ A1 N2 [2]
4. (a) (i)
$$\begin{cases} 30x + 16y = 152 \\ 23x + 15y + 8z = 114 \\ 11x + 17y + 18z = 60 \end{cases}$$
 A2 N2
- (ii) $x = 4, y = 2$ and $z = -1$ A3 N3 [5]
- (b) A team drops 1 point for losing a game. A1 N1 [1]