

EX 1.7

(a) 4, 7, 10, 13, 16
1st Diff 3, 3, 3, 3 \Rightarrow Linear

(b) -2, 2, 6, 10, 14
1st D 4, 4, 4, 4 \Rightarrow Linear

(c) -4, -3, 0, 5, 12
1st D 1, 3, 5, 7
2nd D 2, 2, 2 \Rightarrow Quadratic

(d) 2, 1, -2, -7, -14, -23
1st D -1, -3, -5, -7, -9
2nd D -2, -2, -2, -2 \Rightarrow Quadratic

(e) 2, 7, 22, 47
1st D 5, 15, 25
2nd D 10, 10 \Rightarrow Quadratic

(f) 3, 1, -5, -15, -29
1st D -2, -6, -10, -14
2nd D -4, -4, -4 \Rightarrow Quadratic

(g) 1, -4, -19, -44, -79
1st D -5, -15, -25, -35
2nd D -10, -10, -10 \Rightarrow Quadratic

(h) 3, -2, -7, -12, -17
1st D -5, -5, -5, -5 \Rightarrow Linear

(i) 0, 3, 12, 27, 48
1st D 3, 9, 15, 21
2nd D 6, 6, 6 \Rightarrow Quadratic

(j) $1, 17, 37, 65, 101$
 $1^{st} D$ $16, 20, 28, 36$
 $2^{nd} D$ $4, 8, 8$ \Rightarrow Quadratic

Q2
 (a) Pattern $-1, 3, 15, 35, 63$
 $1^{st} D$ $4, 12, 20, 28$
 $2^{nd} D$ $8, 8, 8$ \Rightarrow Quad.

$2a = 8$
 $a = 4$ $4x^2 - 1$ Test $\begin{matrix} 0 & 1 & 2 & 3 & 4 \\ -1 & 3 & 15 & 35 & 63 \end{matrix} \Rightarrow$ correct.

(b) Pattern: $4, 3, 0, -5, -12, -21, -32$
 $1^{st} D$ $-1, -3, -5, -7, -9, -11$
 $2^{nd} D$ $-2, -2, -2, -2, -2$ \Rightarrow Quad

$-x^2 + 4$: Test $\begin{matrix} 0 & 1 & 2 & 3 & 4 \\ 4 & 3 & 0 & -5 & -12 \end{matrix} \rightarrow$ Correct

Q3 (i) 2 7 12 17 22
 1st D 5 5 5 5 \Rightarrow Linear.

$$f(x) = 5x + 2.$$

(iv) -2, -7, -12, -17, -22, -27
 1st D -5, -5, -5, -5, -5 \Rightarrow Linear.

$$f(x) = -5x - 2$$

(vi) -1, -0.8, -0.6, -0.4, -0.2
 1st D 0.2, 0.2, 0.2, 0.2 \Rightarrow Linear

$$f(x) = 0.2x - 1 \quad \text{or} \quad \frac{x}{5} - 1$$

Q4 $x \geq 3$

Pattern: 11 13 15 17 19
 2 2 2 2 \Rightarrow Linear

$$\begin{aligned} 2x + b &= 11 && \text{when } x \geq 3 \quad x=3 \\ 6 + b &= 11 \\ b &= 5 \end{aligned}$$

$$\Rightarrow 2x + 5.$$

Q5 $x \geq -2$

Pattern: 1, 3, 5, 7, 9
2 2 2 2 \Rightarrow Linear

$2x + b$ at $x = -2$

~~$2x +$~~

$$2(-2) + b = 1$$

$$-4 + b = 1$$

$$b = +5$$

$f(x) = 2x + 5$

Q6

$f(1)$ $f(2)$ $f(3)$
(a) Pattern: 3, 6, 9
1st D: 3 3 \Rightarrow Linear

$f(x) = 3x$ ~~Test~~

$$f(15) = 3(15) = 45$$

$f(1)$ $f(2)$ $f(3)$
(b) Pattern: 4, 8, 12
1st D: 4 4 \Rightarrow Linear

$$f(x) = 4x$$

$$f(15) = 4(15) = 60$$

$f(1)$ $f(2)$ $f(3)$
(c) Pattern: 3, 5, 7
2 2 \Rightarrow Linear

$$f(x) = 2x + 1$$

$$f(15) = 2(15) + 1 = 31$$

Q7 $x = \text{N}^\circ \text{ of Months}$

Plan A :- $35x + 70$

Plan B :- $24x + 125$

	1 month	2 month	3 month	4 month
Plan A :	105	140	175	210
Plan B :	149	173	197	221

$$35x + 70 = 24x + 125$$

$$35x - 24x = 125 - 70$$

$$11x = 55$$

$$x = 5$$

Q8

4, 7, 14, 25, 40

1st D

3, 7, 11, 15

2nd D

4, 4, 4 \Rightarrow Quadratic

$$2a = 4 \Rightarrow a = 2$$

$$2x^2$$

Subtract from Original.

$$2x^2$$

New Pattern

1st D

4, 7, 14, 25, 40

0, 2, 8, 18, 32

4, 5, 6, 7, 8

1, 1, 1, 1 \Rightarrow Linear.

$$f(x) = x + 4$$

$$\text{Combine } \Rightarrow f(x) = 2x^2 + x + 4$$

$$2t^2 + t + 4 = 500?$$

Try $t=10$ $2(10)^2 + (10) + 4 = 214$

Try $t=15$ $2(15)^2 + (15) + 4 = 469 \Rightarrow 16^{\text{th}} \text{ hr}$

Try $t=16$ $2(16)^2 + (16) + 4 = 532 \checkmark$