

Exercise 3.5 (p. 69)

$$3. a) b+c = 3; \quad \underbrace{5}_{b=2}; \quad \underbrace{7}_{c=2}; \dots$$

$$T_n = bn + c$$

$$b = 2$$

$$b + c = T_1$$

$$2 + c = 3$$

$$c = 1$$

$$\therefore T_n = 2n + 1$$

$$41 = 2n + 1$$

$$\frac{40}{2} = \frac{2n}{2}$$

$$20 = n \quad \therefore T_{20} = 41$$

$$3. b) -4; \quad \underbrace{1}_{b=5}; \quad \underbrace{6}_{c=5}; \dots$$

$$T_n = bn + c$$

$$b = 5$$

$$b + c = T_1$$

$$5 + c = -4$$

$$c = -9$$

$$\therefore T_n = 5n - 9$$

$$41 = 5n - 9$$

$$\frac{50}{5} = \frac{5n}{5}$$

$$10 = n \quad \therefore T_{10} = 41$$

$$3.c) b+c=1; -2; -5; \dots$$

$$b = \underbrace{-3} \quad \underbrace{-3}$$

$$T_n = b_n + c$$

$$b = -3$$

$$b+c=1$$

$$-3+c=1$$

$$c=4$$

$$\therefore T_n = -3n + 4$$

$$-32 = -3n + 4$$

$$\underline{-36 = -3n}$$

$$\underline{-3 \quad -3}$$

$$12 = n$$

$$\therefore T_{12} = -32$$

$$3.d) -5; -4\frac{1}{4}; -3\frac{1}{2}; \dots$$

$$+ \frac{3}{4} \quad + \frac{3}{4}$$

$$T_n = b_n + c$$

$$b = \frac{3}{4}$$

$$b+c = T_1$$

$$\frac{3}{4} + c = -5$$

$$c = -5\frac{3}{4}$$

$$c = -\frac{23}{4}$$

$$T_n = \frac{3}{4}n - \frac{23}{4}$$

$$13^{\times 4} = \frac{3}{4}n^{\times 4} - \frac{23}{4}^{\times 4}$$

$$52 = 3n - 23$$

$$\underline{75 = 3n}$$

$$\underline{3 \quad 3}$$

$$25 = n$$

$$\therefore T_{25} = 13$$

$$3e) \quad -5a; -8a; -11a; \dots$$

$$\quad \quad \quad \underbrace{\quad \quad}_{-3a} \quad \underbrace{\quad \quad}_{-3a}$$

$$T_n = bn + c$$

$$b = -3a$$

$$b + c = T_1$$

$$-3a + c = -5a$$

$$c = -2a$$

$$\therefore T_n = -3an - 2a$$

$$-32a = -3an - 2a$$

$$\frac{-30a}{-3a} = \frac{-3an}{-3a}$$

$$10 = n \quad \therefore T_{10} = -32a$$

$$3.f) \quad x; \frac{x}{2}; 0; -\frac{x}{2}; \dots$$

$$= \frac{2x}{2}; \frac{x}{2}; \frac{0}{2}; -\frac{x}{2}; \dots$$

$$\quad \quad \quad \underbrace{\quad \quad}_{-\frac{x}{2}} \quad \underbrace{\quad \quad}_{-\frac{x}{2}} \quad \underbrace{\quad \quad}_{-\frac{x}{2}}$$

$$T_n = bn + c$$

$$b = -\frac{x}{2}$$

$$b + c = T_1$$

$$-\frac{x}{2} + c = x$$

$$-\frac{x}{2} + c = \frac{2x}{2}$$

$$c = \frac{3x}{2}$$

$$T_n = -\frac{x}{2}n + \frac{3x}{2}$$

$$-3x \stackrel{\times 2}{=} -\frac{x}{2}n \stackrel{\times 2}{=} + \frac{3x \times 2}{2}$$

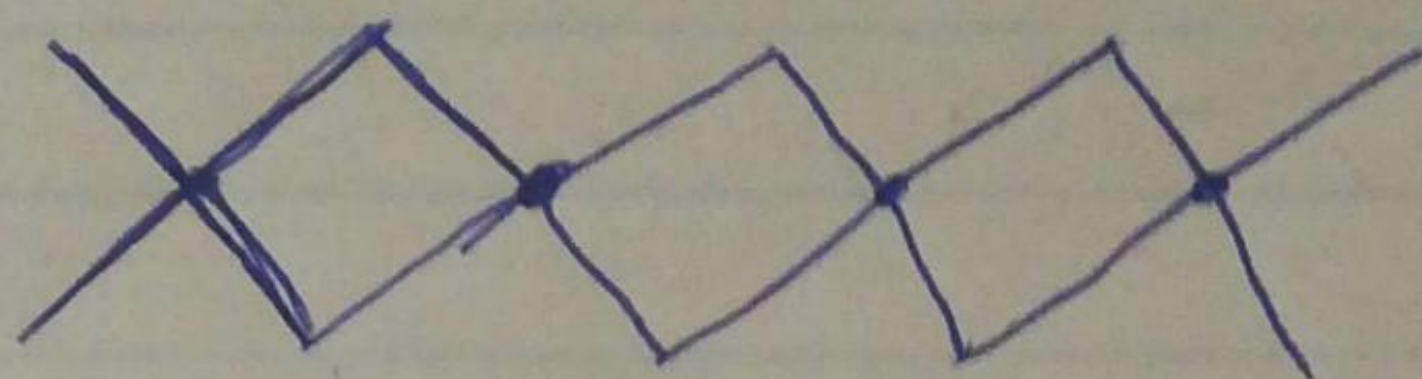
$$-6x = -xn + 3x$$

$$-9x = -xn$$

$$\frac{-9x}{-x} = \frac{-xn}{-x}$$

$$9 = n \quad \therefore T_9 = -3x$$

4.a)



4 sections

4.b) 2 sections = 8 toothpicks
 3 sections = 12 toothpicks
 4 sections = 16 toothpicks

4.c) 4, 8, 12, 16, ...

✓ ✓ ✓
 4 4 4

$$T_n = bn + c$$

$$b = 4$$

$$b + c = T_1$$

$$4 + c = 4$$

$$c = 0$$

$$\therefore T_n = 4n$$

4.d) $T_n = 4n$

$$T_{18} = 4(18)$$

$$T_{18} = 72 \text{ toothpicks}$$
