

Test 4: Nr Patterns

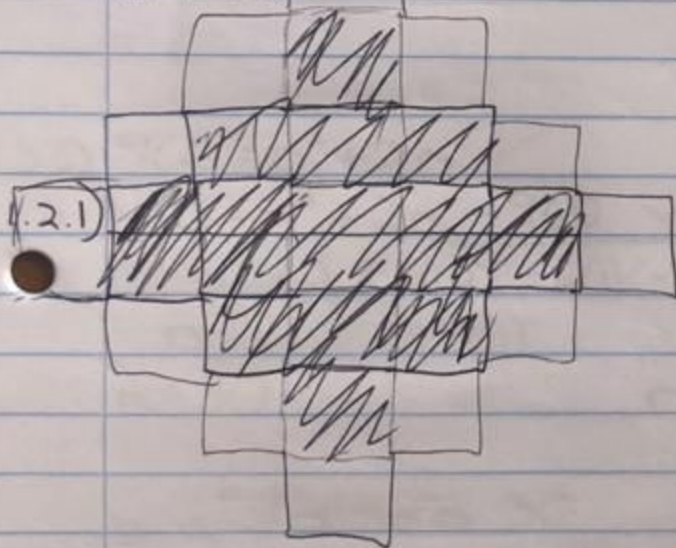
1.1.1) 23, 27, 31 ✓
linear ✓

1.1.2) 20, 14, 8 ✓
linear ✓

1.1.3) $9\frac{1}{2}$; 11; $12\frac{1}{2}$ ✓
linear ✓

1.1.4) 38, 51, 66 ✓
quadratic ✓

1.1.5) $13 + 15x$; $15 + 17x$; $17 + 19x$ ✓
linear ✓



1.2.2) Squares added: 0, 4, 8, 12, 16, 20, 24 ✓

Total nr of squares: 1, 5, 13, 25, 41, 61 ✓

1.2.3) Added $\square$'s:

$$T_n = 4n - \cancel{4} 4$$

$$\text{Total } \square\text{'s} : T_n = 2n^2 - 2n + 1$$

$$2a = 4$$

$$a = 2$$

$$3a + b = 4$$

$$b = 4 - 6$$

$$b = -2$$

$$a + b + c = 1$$

$$c = 1$$

1.3) 24 diamonds

1.3.2) $T_n = n^2 + 2n$

$$3, 8, 15, 24$$

$$5 \quad 7 \quad 9$$

$$2 \quad 2$$

$$2a = 2$$

$$a = 1$$

$$3a + b = 5$$

$$b = 2$$

$$a + b + c = 3$$

$$c = 0$$

1.3.3) $960 = n^2 + 2n$

$$0 = n^2 + 2n - 960$$

$$n = \frac{-2 \pm \sqrt{(2)^2 - 4(1)(-960)}}{2(1)}$$

$$n = 30$$

or

$$n = -32$$

N.A

$\therefore$ Pattern 30

$$1.4) \quad x; 1; -6, y; -14$$

$$\quad \quad \quad \begin{array}{cccc} \swarrow & \swarrow & \swarrow & \swarrow \\ (1-x) & (-7) & (y+6) & (-14-y) \end{array} \quad \checkmark$$

$$1.4.1) \quad \begin{array}{ccc} \swarrow & \swarrow & \swarrow \\ [-7-1+x] & [y+6+7] & [-14-y-y-6] \end{array} \quad \checkmark$$

$$\therefore y+13 = -2y-20 \quad \checkmark$$

$$3y = -33$$

$$y = -11 \quad \checkmark$$

$$\therefore \text{2nd difference is; } 2 \quad \checkmark$$

$$1.4.1) \quad x-8=2 \quad \checkmark$$

$$x=10 \quad \checkmark$$

$$1.5.1) \quad 4, 9, x, 37$$

$$\quad \quad \quad \begin{array}{ccc} \swarrow & \swarrow & \swarrow \\ (5) & (x-9) & (37-x) \end{array}$$

$$\quad \quad \quad \begin{array}{cc} \swarrow & \swarrow \\ [x-9-5] & [37-x-x+9] \end{array}$$

$$1.5.1) \quad x-14 = -2x+46 \quad \checkmark$$

$$3x = 60 \quad \checkmark$$

$$x = 20 \quad \checkmark$$

$$1.5.2) \quad 4, 9, 20, 37$$

$$\quad \quad \quad \begin{array}{ccc} \swarrow & \swarrow & \swarrow \\ 5 & 11 & 17 \\ \swarrow & \swarrow & \\ 6 & 6 & \end{array}$$

$$2a=6$$

$$a=3 \quad \checkmark$$

$$3a+b=5$$

$$b=-4 \quad \checkmark$$

$$a+b+c=4$$

$$c=5 \quad \checkmark$$

$$T_n = 3n^2 - 4n + 5 \quad \checkmark$$

1.6)

$$\begin{array}{ccccccc} & 3 & , & p & , & 10 & , & q & , & 21 \\ & \swarrow & & \swarrow & & \swarrow & & \swarrow & & \swarrow \\ (p-3) & & (10-p) & & (q-10) & & (21-q) \\ & \swarrow & & \swarrow & & \swarrow & & \swarrow \\ [10-p-p+3] & & [q-10-10+p] & & [21-q-q+10] \end{array}$$

$$\therefore 13 - 2p = 1 \quad \checkmark$$

$$-2p = -12$$

$$p = 6 \quad \checkmark$$

$$\text{and } q - 20 + 6 = 1 \quad \checkmark$$

$$q = 15 \quad \checkmark$$