

$$1, 5, 12, 22 \rightarrow 1^2 + 0, 1^2 + 1, 2^2 + 3, 3^2 + 6 \rightarrow n^2 + \frac{n(n-1)}{2} \rightarrow 10^2 + \frac{10 \times 9}{2} = 100 + 45 = 145$$

$$0, 1, 3, 6, 10 \rightarrow \frac{n \times n-1}{2} = 55 \rightarrow n(n-1) = 110 \rightarrow n = 11$$

$$5, 9, 13 \rightarrow 2n+1 \rightarrow 4 \times (11+1) = 48$$

$$5+0, 9+3, 13+6, \dots \rightarrow (2n+1) + 2(n-1) \rightarrow 40 + 20 = 60$$

$$\begin{array}{|c|c|} \hline -1 & 1 \\ \hline 1 & 2 \\ \hline \end{array} \rightarrow \frac{1}{1} - (-1) = \frac{1}{1} + 1 = \frac{2}{1}$$

$$b_n = (-2)^n - v_n \rightarrow (-2)^3 - v(3) = -8 - 21 = -29$$

$$a_n = -a_{n-1} + 22 \rightarrow -a_{n-1} + 22 = -29 \rightarrow a_{n-1} = 51$$

$$a_n = an + b \rightarrow 10a + b - 4a + b = 12 \rightarrow 6a = 12 \rightarrow a = 2$$

$$4a + b - a + b = 0a = 2$$

$$4a + b = 10 \rightarrow 4 \times 2 + b = 10 \rightarrow b = -2 \rightarrow 4n - 2$$

$$\begin{array}{l} 4a + b = 10 \\ 2a = 1 \\ a = 0.5 \end{array}$$

$$\begin{array}{l} 10 - 1 = 9 \\ 20 - 1 = 19 \end{array}$$

$$3, 11, \dots \rightarrow 14$$

$$14 - 0$$

$$\frac{2}{3} \rightarrow \frac{4}{9} \rightarrow \frac{10}{9} \rightarrow \frac{14}{11}$$

$$\text{all} \rightarrow \frac{4n-2}{2n+3} < \frac{5}{2} \rightarrow 4n-2 < 5n+7.5$$

$$4n < 9.5$$

$$n < 2.375 \rightarrow n=2$$

(A)

$$0, 4, 9, 9, 4$$

$$C=0$$

$$-1.0n^2 + Bn = 4$$

$$-1.0 + B = 4$$

$$B = 5.0$$

$$\text{all} \rightarrow -1.0n^2 + 5.0n$$

$$4A + 5B = 4(-1.0) + 5(5.0) = 21$$

(B)

$$-4, -4, -4, 0$$

$$C=-4$$

$$an^2 + bn + C$$

$$\text{all} = n^2 - n - 4$$

$$n^2 + bn - 4 \rightarrow -4$$

$$1 + b - 4 \rightarrow -4$$

$$b = -1$$

$$1 - 1 - 4 = -4$$

$$40 + 11 = 51$$

(C)

$$24, 21, 18, 15$$

$$21 - 24 = -3 = 2d \rightarrow d = -1.5$$

$$an + b = 24$$

$$0(1) + b = 24$$

$$10 + b = 24$$

$$b = 14$$

$$0n + 14$$

$$an + 14 = n^2 - n - 4$$

$$24 = n^2 - 4n$$

$$24 = n(n-4) \rightarrow n=9$$