

ANSWERS → EXTRA PRACTICE WORKSHEET.

1

A)  $\{-2, -5, -8, -11, -14, \dots\}$

D<sub>1</sub>  $\begin{array}{cccc} -3 & -3 & -3 & -3 \\ \vee & \vee & \vee & \vee \\ \text{Arithmetic} \end{array}$

B)  $\{-3, -10, -21, -36, -55, -78, -105, \dots\}$

D<sub>1</sub>  $\begin{array}{cccccc} -7 & -11 & -15 & -19 & -23 & -27 \\ \vee & \vee & \vee & \vee & \vee & \vee \\ D_2 & -4 & -4 & -4 & -4 & -4 \end{array}$

C)  $\{-1, -14, -51, -124, -245, -426, -679, \dots\}$  Quadratic.

D<sub>1</sub>  $\begin{array}{cccccc} -13 & -37 & -73 & -121 & -181 & -253 \\ \vee & \vee & \vee & \vee & \vee & \vee \end{array}$

D<sub>2</sub>  $\begin{array}{cccccc} -24 & -36 & -48 & -60 & -72 \\ \vee & \vee & \vee & \vee & \vee \end{array}$

D<sub>3</sub>  $\begin{array}{cccc} -12 & -12 & -12 & -12 \\ \text{Cubic.} \end{array}$

$$\begin{array}{cccccccc}
 D) & \{-\frac{1}{3}, & \frac{2}{3}, & \frac{4}{3}, & \frac{20}{3}, & \frac{35}{3}, & \frac{24}{3}, & \frac{77}{3}, & \frac{104}{3}, & \frac{135}{3}, \dots\} \\
 & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow \\
 D_1 & \frac{3}{3} & \frac{7}{3} & \frac{11}{3} & \frac{15}{3} & \frac{19}{3} & \frac{23}{3} & \frac{27}{3} & \frac{31}{3} & \\
 & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & \\
 D_2 & \frac{4}{3} & \frac{4}{3} & \frac{4}{3} & \frac{4}{3} & \frac{4}{3} & \frac{4}{3} & \frac{4}{3} & & \\
 & & & & & & & & & \text{Quadratic}
 \end{array}$$

$$\begin{array}{cccc}
 E) & \{11, 101, 1001, 10001, 100001, \dots\} \\
 & \swarrow & \swarrow & \swarrow & \swarrow \\
 D_1 & 90 & 900 & 9000 & 90000 \\
 & \swarrow & \swarrow & \swarrow & \\
 D_2 & 810 & 8100 & 81000 & \\
 & \swarrow & \swarrow & & \\
 D_3 & 7290 & 72900 & & \\
 & & & & \text{Neither}
 \end{array}$$

$$F \left\{ \frac{1}{5}, \frac{2}{5}, \frac{4}{5}, \frac{7}{5}, \frac{11}{5}, \frac{16}{5}, \dots \right\}$$

$$D_1 \frac{1}{5} \quad \frac{2}{5} \quad \frac{3}{5} \quad \frac{4}{5} \quad \frac{5}{5}$$

$$D_2 \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5}$$

Quadratic.

$$G. \{0.0, 3.2, 18.4, 75.6, 252.8, 700.0, 1663.2, 3508.4, 6745.6\}$$

$$D_1 \quad 3.2 \quad 15.2 \quad 57.2 \quad 177.2 \quad 447.2 \quad 963.2 \quad 1845.2 \quad 3237.2$$

$$D_2 \quad 12 \quad 42 \quad 120 \quad 270 \quad 516 \quad 882 \quad 1392$$

$$D_3 \quad 30 \quad 78 \quad 150 \quad 246 \quad 366 \quad 510$$

$$D_4 \quad 48 \quad 72 \quad 96 \quad 120 \quad 144$$

$$D_5 \quad 24 \quad 24 \quad 24 \quad 24$$

Quintic.

$$2.A) t_n = -2n - 5$$

$$\begin{aligned} t_1 &= -2(1) - 5 \\ &= -2 - 5 \\ &= -7 \end{aligned}$$

$$\begin{aligned} t_2 &= -2(2) - 5 \\ &= -4 - 5 \\ &= -9 \end{aligned}$$

$$\begin{aligned} t_3 &= -2(3) - 5 \\ &= -6 - 5 \\ &= -11 \end{aligned}$$

$$\begin{aligned} t_4 &= -2(4) - 5 \\ &= -8 - 5 \\ &= -13. \end{aligned}$$

$$\{-7, -9, -11, -13\}$$

$$\begin{aligned}
 \text{b) } t_n &= -3n + \frac{3}{4} & t_2 &= -3(2) + \frac{3}{4} & t_3 &= -3(3) + \frac{3}{4} \\
 t_1 &= -3(1) + \frac{3}{4} & &= -6 + \frac{3}{4} & &= -9 + \frac{3}{4} \\
 &= -3 + \frac{3}{4} & &= \frac{-24}{4} + \frac{3}{4} & &= \frac{-36}{4} + \frac{3}{4} \\
 &= \frac{-12}{4} + \frac{3}{4} & &= \frac{-21}{4} & &= \frac{-33}{4} \\
 &= \frac{-9}{4} & & & & \\
 t_4 &= -3(4) + \frac{3}{4} & & & & \\
 &= -12 + \frac{3}{4} & & & & \\
 &= \frac{-48}{4} + \frac{3}{4} & & & & \\
 &= \frac{-45}{4} & & & & \\
 & & & & & \left\{ \frac{-9}{4}, \frac{-21}{4}, \frac{-33}{4}, \frac{-45}{4}, \dots \right\}
 \end{aligned}$$

$$\begin{aligned} c) \quad t_n &= -n^2 - 5n + 3 \\ t_1 &= -(1)^2 - 5(1) + 3 \\ &= -1 - 5 + 3 \\ &= -6 + 3 \\ &= -3. \end{aligned}$$

$$\begin{aligned} t_3 &= -(3)^2 - 5(3) + 3 \\ &= -9 - 15 + 3 \\ &= -24 + 3 \\ &= -21. \end{aligned}$$

$$\begin{aligned} t_2 &= -(2)^2 - 5(2) + 3 \\ &= -4 - 10 + 3 \\ &= -14 + 3 \\ &= -11. \end{aligned}$$

$$\begin{aligned} t_4 &= -(4)^2 - 5(4) + 3 \\ &= -16 - 20 + 3 \\ &= -36 + 3 \\ &= -33 \end{aligned}$$

$$\{-3, -11, -21, -33\}$$

$$\begin{aligned} \text{D) } t_n &= \frac{1}{3} n^2 & t_2 &= \frac{1}{3} (2)^2 & t_3 &= \frac{1}{3} (3)^2 & t_4 &= \frac{1}{3} (4)^2 \\ t_1 &= \frac{1}{3} (1)^2 & &= \frac{1}{3} (4) & &= \frac{1}{3} (9) & &= \frac{1}{3} (16) \\ &= \frac{1}{3} (1) & &= \frac{4}{3} & &= \frac{9}{3} & &= \frac{16}{3} \\ &= \frac{1}{3} & & & &= 3 & & \end{aligned}$$

$$\left\{ \frac{1}{3}, \frac{4}{3}, 3, \frac{16}{3} \right\}$$

3.  $t_n = \frac{5n}{7} + \frac{4}{5} \rightarrow$  First we need to find the first few terms!

$$\begin{aligned}t_1 &= \frac{5(1)}{7} + \frac{4}{5} \\&= \frac{5}{7} + \frac{4}{5} \\&= \frac{25}{35} + \frac{28}{35} \\&= \frac{53}{35}\end{aligned}$$

$$\begin{aligned}t_2 &= \frac{5(2)}{7} + \frac{4}{5} & t_3 &= \frac{5(3)}{7} + \frac{4}{5} \\&= \frac{10}{7} + \frac{4}{5} & &= \frac{15}{7} + \frac{4}{5} \\&= \frac{50}{35} + \frac{28}{35} & &= \frac{75}{35} + \frac{28}{35} \\&= \frac{78}{35} & &= \frac{103}{35}\end{aligned}$$

$$\begin{aligned}t_4 &= \frac{5(4)}{7} + \frac{4}{5} \\&= \frac{20}{7} + \frac{4}{5} \\&= \frac{100}{35} + \frac{28}{35} \\&= \frac{128}{35}\end{aligned}$$

$$\left\{ \frac{53}{35}, \frac{78}{35}, \frac{103}{35}, \frac{128}{35} \right\}$$

D<sub>1</sub>     $\frac{25}{35}$      $\frac{25}{35}$      $\frac{25}{35}$

or

$\frac{5}{7}$      $\frac{5}{7}$      $\frac{5}{7}$

$$D_1 = \frac{5}{7}$$



$$\begin{array}{cccccccc}
 4. & \{ & 78, & 152, & 222, & 288, & 350, & 408, & 462, & 512 & \} \\
 & & \checkmark & \checkmark & \checkmark & \checkmark & \checkmark & \checkmark & \checkmark & \checkmark & \\
 D_1 & & 74 & 70 & 66 & 62 & 58 & 54 & 50 & & \\
 & & \checkmark & \checkmark & \checkmark & \checkmark & \checkmark & \checkmark & & & \\
 D_2 & & -4 & -4 & -4 & -4 & -4 & -4 & & & 
 \end{array}$$

Quadratic!

5. Sequence (C) has a common difference at  $D_3$  (The function has a degree of 3)