Arithmetic

$$d = a_2 - a_1$$

$$a_n = a_1 + d(n-1)$$

Ex: $17, 21, 25, 29, \ldots$

$$d = 21 - 17 = 4$$
$$a_n = 17 + 4(n-1)$$

$$a_{20} = 17 + 4(20-1)$$
$$a_{20} = 93$$

Geometric

$$r = \frac{a_2}{a_1}$$

Ex: $8, 12, 18, 27, \ldots$

$$r = \frac{12}{8} = \frac{3}{2}$$

$$a_n = a_1 (r)^{n-1}$$

$$a_n = 8 \left(\frac{3}{2}\right)^{n-1}$$

$$a_5 = 8\left(\frac{3}{2}\right)^{5-1}$$
$$a_5 = 40.5$$

~~Neither~~

1) $2, 4, 8, 16, \ldots$ $a_n = 2^n$

Neither

1) $1, \frac{3}{4}, \frac{5}{9}, \frac{7}{16}, \frac{9}{25}$

$\frac{1}{1}, \frac{3}{4}, \frac{5}{9}, \frac{7}{16}, \frac{9}{25}$

$n = 1 \quad 2 \quad 3 \quad 4 \quad 5$

$$a_n = \frac{1 + 2(n-1)}{n^2}$$

$$a_n = \frac{2n-1}{n^2}$$

$$a_1 \quad a_2 \quad \cdots \quad a_n$$

37) $1\ 8, 24, \ldots, 336$

$d = 24 - 18$ $a_n = a_1 + d(n-1)$
$d = 6$

$$336 = 18 + 6(n-1)$$
$$336 = 18 + 6n - 6$$
$$336 = 12 + 6n$$
$$324 = 6n$$
$$54 = n$$

41) How many 3 digit numbers are divisible by 4 and 6.

＃ 3 digit #'s divisible by 12

$t_1 = 108$ $108, 120, 132, \ldots, 996$
$t_n = 996$ $+12$

$$996 = 108 + 12(n-1)$$
$$n = 75$$

49) $y, 2x+y, 7y, 20$ arithmetic
     $+d \quad +d \quad +d$

$y + d = 2x+y \longrightarrow d = 2x$
$2x + y + d = 7y \longrightarrow 2x + y + 2x = 7y$
$7y + d = 20$ $4x - 6y = 0$ ...
        $\downarrow$ $-6y + 4x = 0$

$-2 (7y + 2x = 20)$
$\underline{-6y + 4x = 0}$
$-14y - 4x = -40$
$-6y + 4x = 0$

$-20y = -40$ $7(2) + 2x = 20$
$y = 2$ $2x = 6$
             $x = 3$