Arithmetic (common difference "d")	Geometric (Common Ratio "r")
$t_n = a + (n-1)d$	$t_n = ar^{n-1}$
$S_n = \frac{n}{2}(2a + (n-1)d)$	$S_n = \frac{a(r^n - 1)}{r - 1}$
$S_n = \frac{n}{2}(a + t_n)$	* $\boxed{S_n = \frac{a}{1 - r}}$

-1<r<1

Ex 1.7

① b) $1 - \frac{2}{3} + \frac{4}{9} - \frac{8}{27} + \dots$

$a = 1$

$r = -\frac{2}{3}$

$S_\infty = \frac{a}{1-r}$

$= \frac{1}{1-(-\frac{2}{3})}$ → $1 + \frac{2}{3}$

$= \frac{1}{5/3}$ ← $\frac{3}{3} + \frac{2}{3}$

$= 1 \times \frac{3}{5}$

$= \boxed{\frac{3}{5}}$

c) $\frac{1}{4} - \frac{5}{16} + \frac{25}{64} - \frac{125}{256} + \dots$

$a = \frac{1}{4}$

$r = -\frac{5}{4}$

Divergent (r is too small)

② b) $\sum_{n=1}^{\infty} \left(-\frac{2}{5}\right)^n = \frac{-2}{5} + \frac{4}{25} - \frac{8}{125} + \frac{16}{625} - \dots$

$a = -\frac{2}{5}$

$r = \frac{4}{25} \div -\frac{2}{5}$

$= \frac{4}{25} \times -\frac{5}{2}$

$= -\frac{2}{5}$

$S_n = \frac{-2/5}{1-(-2/5)}$

$= \frac{-\frac{2}{5}}{\frac{7}{5}}$

$= -\frac{2}{5} \times \frac{5}{7}$

$= \boxed{\frac{-2}{7}}$

Series and Sequence Review

① $t_{12} = 15$

$t_n = a + (n-1)d$

$t_{12} = a + (12-1)d$

$t_{12} = a + 11d$

$a + 11d = 15$

$S_{15} = 105$

$S_n = \frac{n}{2}(2a + (n-1)d)$

$S_{15} = \frac{15}{2}(2a + (15-1)d)$

$S_{15} = 7.5(2a + 14d)$

$S_{15} = 15a + 105d$

$15a + 105d = 105$

Elimination Method:

$a + 11d = 15$

② $a + 7d = 7$

$4d = 8$

$d = 2$

$a + 7d = 7$

$a + 7(2) = 7$

$a + 14 = 7$

$a = -7$

$-7 \quad -5 \quad -3$