

$$\textcircled{1} \text{ b) } \underline{2} + \frac{2}{3} + \frac{2}{9} + \frac{2}{27} + \dots$$

$$a = 2$$

$$r = \frac{1}{3}$$

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

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

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

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

③ c) 81 + 27 + 9 ...

$a = 81$

$r = \frac{1}{3}$

$n = 6$

$$S_6 = \frac{81 \left(\left(\frac{1}{3} \right)^6 - 1 \right)}{\frac{1}{3} - 1}$$

$$= \frac{81 \left(\frac{1}{729} - \frac{729}{729} \right)}{\frac{1}{3} - \frac{3}{3}}$$

$$= \frac{\cancel{81} \left(\frac{-728}{\cancel{729}} \right)}{-\frac{2}{3}}$$

$$\frac{-2184}{-18}$$

$$= \frac{-728}{\cancel{9}} \times \frac{\cancel{3}^1}{-\cancel{2}^1}$$

$$= \boxed{\frac{364}{3}} = \boxed{121 \frac{1}{3}}$$

$$\textcircled{a} \quad 30 - 5 + \frac{5}{6} - \dots$$

$$a = 30$$

$$r = -\frac{1}{6}$$

$$S_7 = ?$$

$$n = 7$$

$$S_7 = \frac{30 \left(\left(-\frac{1}{6} \right)^7 - 1 \right)}{-\frac{1}{6} - 1}$$

$$= \frac{30 \left(\frac{-1}{279936} - \frac{279936}{279936} \right)}{-\frac{1}{6} - \frac{6}{6}}$$

$$= \frac{30 \left(\frac{-279937}{279936} \right)}{-\frac{7}{6}}$$

$$= \frac{-8398110}{279936} \times \frac{6}{-7}$$

$$= \frac{-50388660}{-1959552}$$

$$= \boxed{\frac{199955}{7776}}$$

or $\frac{25 \frac{5555}{7776}}$

$$\textcircled{6} S_7 = 1093$$

$$r = \frac{1}{3}$$

$$a = ?$$

$$1093 = \frac{a \left(\left(\frac{1}{3} \right)^7 - 1 \right)}{\frac{1}{3} - 1}$$

$$1093 = \frac{a \left(\frac{1}{2187} - \frac{2187}{2187} \right)}{\frac{1}{3} - \frac{3}{3}}$$

$$1093 = \frac{a \left(\frac{-2186}{2187} \right)}{-\frac{2}{3}}$$

$$1093 = \frac{-2186a}{2187} \times \frac{3}{-2}$$

$$1093 = \frac{6558a}{4374}$$

$$6558a = 4780782$$

$$\boxed{a = 729}$$

$$b) t_1 = 729$$

$$t_2 = 243$$

$$t_3 = 81$$

$$\boxed{t_4 = 27}$$

$$729 + 243 + 81 + 27 \dots$$

$$⑥ \quad S_7 = 1093$$

$$r = \frac{1}{3}$$

$$a = ?$$

$$n = 7$$

$$S_n = \frac{a(r^n - 1)}{r - 1}$$

$$1093 = \frac{a\left(\left(\frac{1}{3}\right)^7 - 1\right)}{\frac{1}{3} - 1}$$

$$1093 = \frac{a\left(\frac{1}{2187} - \frac{2187}{2187}\right)}{\frac{1}{3} - \frac{3}{3}}$$

$$1093 = \frac{a\left(\frac{-2186}{2187}\right)}{-\frac{2}{3}}$$

$$1093 = \frac{-2186a}{2187} \times \frac{3}{-2}$$

$$1093 = \frac{-6558a}{-4374}$$

$$-6558a = -4780782$$

$$a = 729$$

$$b) \quad t_n = ar^{n-1}$$

$$t_4 = 729\left(\frac{1}{3}\right)^{4-1}$$

$$t_4 = 729\left(\frac{1}{3}\right)^3$$

$$t_4 = 729\left(\frac{1}{27}\right)$$

$$t_4 = 27$$

Review

$$\textcircled{10} \quad t_7 = 192$$

$$a = t_1 = 3$$

$$S_8 = ?$$

$$t_7 = ar^{7-1}$$

$$t_7 = ar^6$$

$$ar^6 = 192$$

$$3r^6 = 192$$

$$r^6 = 64$$

$$r = \pm 2$$

$$S_8 = \frac{3(2^8 - 1)}{2 - 1}$$

$$= \frac{3(256 - 1)}{1}$$

$$= 3(255)$$

$$= 765$$

$$S_8 = \frac{3((-2)^8 - 1)}{(-2) - 1}$$

$$= \frac{3(256 - 1)}{-3}$$

$$= \frac{3(255)}{-3}$$

$$= -255$$