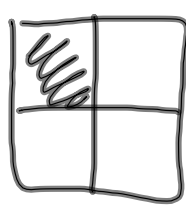
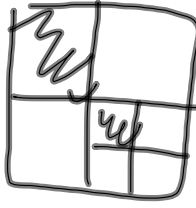


Q20

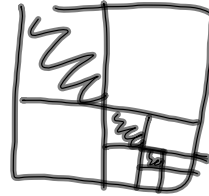
Topic 1
Paper 2,



$$U_1 = \frac{1}{4}$$



$$U_2 = \frac{1}{4} + \frac{1}{16}$$



$$U_3 = \frac{1}{4} + \frac{1}{16} + \frac{1}{64}$$

$$B = \frac{1}{16} \quad C = \frac{1}{64}$$

$$A_1 = U_1 = \frac{1}{4}$$

$$U_2 = \frac{1}{16}$$

$$U_3 = \frac{1}{64}$$

$$\text{Area} = \frac{1}{4} + \frac{1}{16} = \frac{5}{16}$$

Diagram 2

$$r = \frac{U_2}{U_1} = \frac{\frac{1}{16}}{\frac{1}{4}}$$

$$r = \frac{U_3}{U_2} = \frac{\frac{1}{64}}{\frac{1}{16}} = \frac{1}{4}$$

$$S_8 = \frac{U_1 (r^8 - 1)}{r - 1}$$

$$n = 8 \quad U_1 = \frac{1}{4}$$
$$r = \frac{1}{4}$$

$$S_8 = \frac{\frac{1}{4} (\frac{1}{4}^8 - 1)}{\frac{1}{4} - 1} = 0.333328$$

$$S_\infty = \frac{U_1}{1 - r}$$

$$= \frac{\frac{1}{4}}{1 - \frac{1}{4}} = \frac{1}{3}$$

T1, P2, Q10

(B)

$$\sum_{r=4}^{30} 2^r$$

$$= 2^4 + 2^5 + 2^6 + \dots + 2^{30}$$

$$U_1 = 2^4 = 16$$

$$U_{27} = 2^{30}$$

$$r = \frac{2^5}{2^4} = 2$$

$$n = 27$$

$$S_{27} =$$

b iii

$$S_{27} = \frac{U_1 (r^n - 1)}{r - 1}$$

$$= \frac{16(2^{27} - 1)}{2 - 1}$$

$$2 - 1$$

$r > 1 \Rightarrow$ divergent

$$f(x) = 2 \log_3 \left(\frac{x}{2} - 1 \right)$$
$$g(x) = \log_3 (x^2 - 4x + 4)$$

$\left. \begin{matrix} \{ \\ \{ \\ \{ \end{matrix} \right\}$

$$\bullet g(x) = \log (x^2 - 4x + 4)$$
$$= \log (x - 2)(x - 2)$$
$$= \log (x - 2)^2$$

$$= 2 \log (x - 2) \quad f(x) = \log \left(\frac{x}{2} - 1 \right)$$

$$= 2 \log 2 \cdot \left(\frac{x}{2} - 1 \right)$$

$$= 2 \left[\log 2 + \log \frac{x}{2} - 1 \right]$$

$$= 2 \log 2 + 2 \log \left(\frac{x}{2} - 1 \right)$$

$$= \log 4 + 2 \log \frac{x}{2} - 1$$

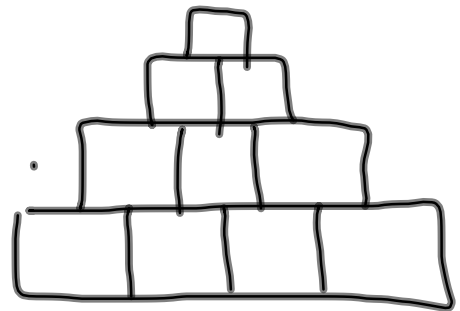
$$S_n = 171$$

$$d = -1$$

$$U_n = 1$$

$$n = ?$$

$$S_n = \frac{n}{2} (U_1 + U_n)$$



$$U_n = U_1 + (n-1)d$$
$$1 = U_1 - n + 1$$
$$n = U_1$$

$$171 = \frac{n}{2} (n+1) \quad \times 2$$

$$342 = n^2 + n$$

$$0 = n^2 + n - 342$$

$$n = 18$$

~~$$n = 19$$~~

