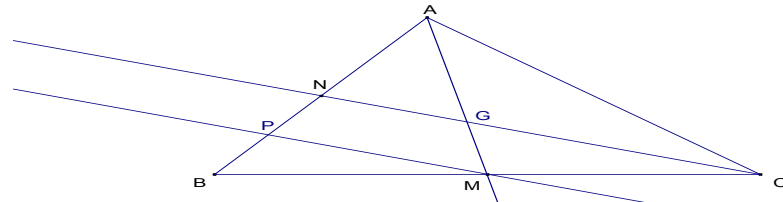


$$2^x = -\frac{1}{8} \quad 2^x = 8 \quad :$$

$$2^x = 2^3 \quad : \quad x \quad 2^x$$

$$x = 3 \quad :$$

:3 _____ إذن حسب مبرهنة طاليس المباشرة فإن: (PM)//(NG)



$$: \quad \frac{AM - MG}{AM} = \frac{AN}{AP} \quad ; \quad \frac{AG}{AM} = \frac{AN}{AP}$$

$$\frac{MG}{AM} = \frac{AP - AN}{AP} : \quad \frac{MG}{AM} = 1 - \frac{AN}{AP} : \quad 1 - \frac{MG}{AM} = \frac{AN}{AP}$$

$$\textcircled{1} \frac{MG}{AM} = \frac{NP}{AP} :$$

[NB] P

$$BN = 2NP \quad :$$

$$AN = BN \quad : \quad [AB] \quad N$$

$$\textcircled{2} AP = AN + NP = BN + NP = 2NP + NP = 3NP :$$

$$AM = 3MG \quad : \quad \frac{MG}{AM} = \frac{NP}{3NP} = \frac{1}{3} \quad : \quad \textcircled{2} \quad \textcircled{1}$$

:1 _____

$$\sqrt{3 + \sqrt{5}} \sqrt{4 + \sqrt{13 + \sqrt{5}}} \sqrt{4 - \sqrt{13 + \sqrt{5}}} = \sqrt{(3 + \sqrt{5})(4 + \sqrt{13 + \sqrt{5}})(4 - \sqrt{13 + \sqrt{5}})}$$

$$= \sqrt{(3 + \sqrt{5})\left(4^2 - (\sqrt{13 + \sqrt{5}})^2\right)}$$

$$= \sqrt{(3 + \sqrt{5})(16 - 13 - \sqrt{5})}$$

$$= \sqrt{(3 + \sqrt{5})(3 - \sqrt{5})}$$

$$= \sqrt{3^2 - (\sqrt{5})^2}$$

$$= \sqrt{4}$$

$$= 2$$

:2 _____

$$2^{2x} - \frac{63}{8}2^x - 1 = 0 \quad :$$

$$2^{x+x} - \frac{64-1}{8}2^x - 8 \times \frac{1}{8} = 0 \quad :$$

$$2^x \times 2^x - 8 \times 2^x + \frac{1}{8}2^x - 8 \times \frac{1}{8} = 0 \quad :$$

$$2^x(2^x - 8) + \frac{1}{8}(2^x - 8) = 0 \quad :$$

$$(2^x - 8) \left(2^x + \frac{1}{8}\right) = 0 \quad :$$

$$2^x + \frac{1}{8} = 0$$

$$2^x - 8 = 0 \quad :$$

تمرين 4:

$$1 + \frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \dots + \frac{1}{\sqrt{n}+\sqrt{n+1}} \geq 20\sqrt{5}$$

لدينا :

نضرب في المرافق :

$$1 + \frac{1 \times (\sqrt{2}-1)}{(\sqrt{2}+1)(\sqrt{2}-1)} + \frac{1 \times (\sqrt{3}-\sqrt{2})}{(\sqrt{3}+\sqrt{2})(\sqrt{3}-\sqrt{2})} + \dots + \frac{1 \times (\sqrt{n+1}-\sqrt{n})}{(\sqrt{n+1}+\sqrt{n})(\sqrt{n+1}-\sqrt{n})} \geq 20\sqrt{5}$$

$$1 + \frac{\sqrt{2}-1}{2-1} + \frac{\sqrt{3}-\sqrt{2}}{3-2} + \frac{\sqrt{4}-\sqrt{3}}{4-3} + \dots + \frac{\sqrt{n+1}-\sqrt{n}}{n+1-n} \geq 20\sqrt{5}$$

يعني :

$$1 + \sqrt{2}-1 + \sqrt{3}-\sqrt{2} + \sqrt{4}-\sqrt{3} + \dots + \sqrt{n+1}-\sqrt{n} \geq 20\sqrt{5}$$

يعني :

$$\sqrt{n+1} \geq 20\sqrt{5}$$

يعني :

$$(\sqrt{n+1})^2 \geq (20\sqrt{5})^2$$

يعني :

$$n+1 \geq 2000$$

يعني :

$$n \geq 2000-1$$

يعني :

$$n \geq 1999$$

يعني :

إذن أصغر عدد صحيح طبيعي يحقق الشرط هو 1999

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