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E


$V = \frac{1}{3} h s^2$ FOR A PYRAMID WITH HEIGHT h AND SIDE OF SQUARE BASE s . THE ANS. IS THE DIFFERENCE OF VOL. OF TWO PYR.

$$V = \frac{1}{3} h_1 s_1^2 - \frac{1}{3} h_2 s_2^2, h_1 = 9, s_1 = 6, h_2 = 9 - 3, s_2 = \frac{2}{3} s_1 = 4$$

$$VOL = \frac{1}{3} \cdot 9 \cdot 6^2 - \frac{1}{3} \cdot 6 \cdot 4^2 = 76 \text{ m}^3 \text{ ANS E}$$

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B

FOR AN ISOSCELES Δ LET θ BE $\frac{1}{2}$ THE ANGLE BETWEEN THE CONGRUENT SIDES  AREA = $\frac{1}{2} \cdot 2 \cdot s \sin \theta \cdot \cos \theta \cdot s^2 = s^2 \sin \theta \cos \theta$

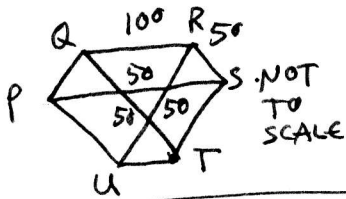
$A = \frac{s^2}{2} \sin 2\theta$, FOR ΔABC AND ΔDEF $AB = 2DE$ SO $(AB)^2 = 4(DE)^2 = 4(D^2)$
AND $\bullet \angle D = 2\angle A$ ($D = 2A$)

$$\frac{\text{AREA } \Delta ABC}{\text{AREA } \Delta DEF} = \frac{(AB)^2 \sin A}{(DE)^2 \sin D} = \frac{4(AB)^2 \sin A}{(AB)^2 \sin 2A} = \frac{4 \sin A}{2 \sin A \cos A} = \frac{2}{\cos A}$$

$$\frac{\text{AREA } \Delta ABC}{\text{AREA } \Delta DEF} = 2 \sec A \text{ ANS. B}$$

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A



THE Δ IS AN EQUILATERAL Δ WITH SIDE 50
AREA = $625 \sqrt{3} \approx 1082.53 \dots$
ANS. A

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C

K	0	1	2
P(K)	20	272	65792
n	$4=2^2$	$16=2^4$	$256=2^8$

GUESS $n = 2^{2^{k+1}}$ FIND k SO THAT
 $n + (n+1) > 10^{1000}$

$$\text{SO } 2 \cdot 2^{2^{k+1}} + 1 > 10^{1000}, 2^{2^{k+1}} \geq \frac{10^{1000} - 1}{2}, \text{ TAKE LN ;}$$

$$\text{LN } 2 \cdot 2^{2^{k+1}} \geq \text{LN}(10^{1000} - 1) - \text{LN } 2 \approx \text{LN } 10^{1000} - \text{LN } 2$$

$$\text{SO } 2^{2^{k+1}} \geq \frac{\text{LN } 10^{1000}}{\text{LN } 2} - 1 = 1000 \frac{\text{LN } 10}{\text{LN } 2} - 1 \approx 3320.9 \dots$$

$$\text{TAKE LN AGAIN } k+1 \geq \frac{1}{\text{LN } 2} \text{LN}(1000 \frac{\text{LN } 10}{\text{LN } 2} - 1), k > -1 + \frac{1}{\text{LN } 2} (1000 \frac{\text{LN } 10}{\text{LN } 2} - 1)$$

$$k > 10.6 \text{ SO } k = 11 \text{ ANS C}$$