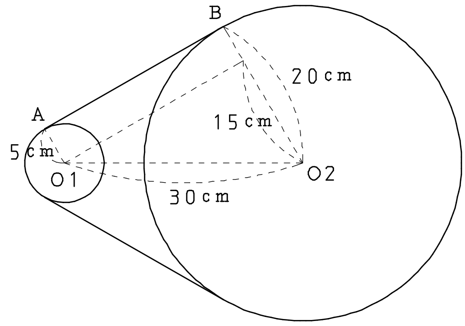
三平方の定理-3 解答　　目次3へ　問題へ

1．　$AB^2 = 30^2 - (20-5)^2$

$AB^2 = 900 - 225 = 675$

$AB = \sqrt{675} = 15\sqrt{3}\,cm$



2．(1)　$\dfrac{VA}{1} = \dfrac{VA+5}{4}$　より，$VA = \dfrac{5}{3}$

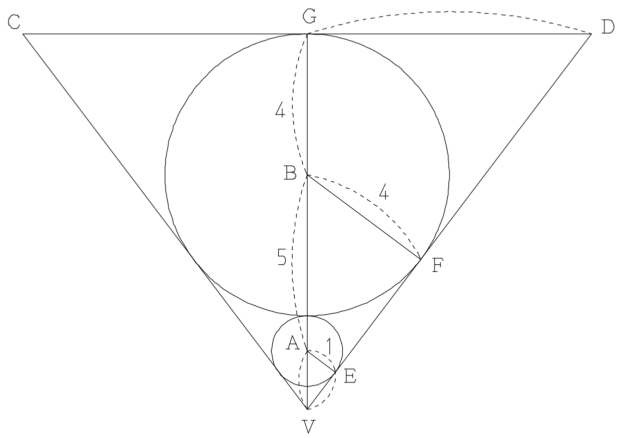
$VG = VA + 5 + 4$

$= \dfrac{5}{3} + 5 + 4 = \dfrac{32}{3}cm$

(2)　$VE^2 = VA^2 - AE^2$　より

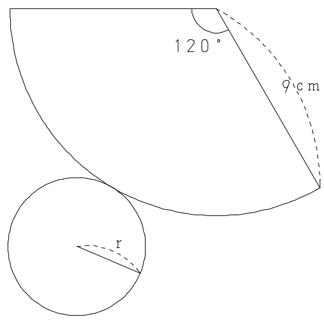
$VE = \sqrt{\left(\dfrac{5}{3}\right)^2 - 1} = \dfrac{4}{3}$

$\dfrac{VE}{EA} = \dfrac{VG}{GD}$　より　$\dfrac{\frac{4}{3}}{1} = \dfrac{\frac{32}{3}}{GD}$　　$GD = 8cm$



3．(1)　底面の半径をrとすると

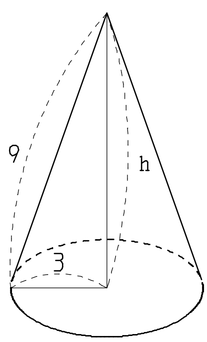
$2\pi \times r = 2\pi \times 9 \times \dfrac{120}{360}$　より　$r = 3cm$



(2)　円すいの高さh＝$\sqrt{9^2 - 3^2}$

＝$\sqrt{72} = 6\sqrt{2}$

体積＝$\dfrac{1}{3} \times \pi \times 3^2 \times 6\sqrt{2} = 18\sqrt{2}\,\pi cm^3$

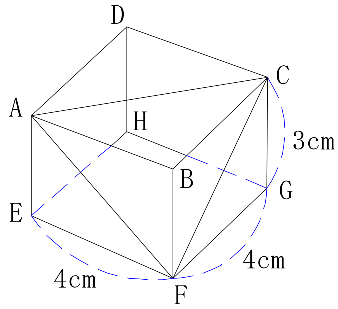


4．　(1)　三角すいB-AFCの底面を△ABF，高さをBCとすると

△ABFの」面積＝$\frac{1}{2}\times 4\times 3 = 6cm^2$

高さBC＝$4cm$

体積＝$\frac{1}{3}\times 6\times 4 = 8cm^3$

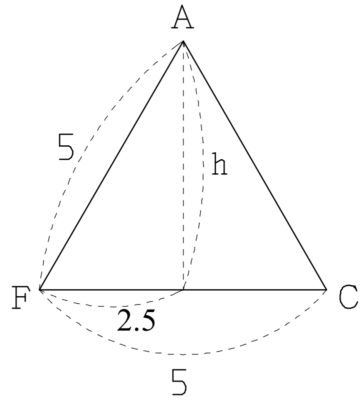


(2)　△AFCは AF＝FC＝CA の正三角形で，一辺の長さは

$$FC = \sqrt{3^2+4^2} = \sqrt{25} = 5cm$$

$$h = \sqrt{5^2-2.5^2} = \sqrt{5^2-\left(\frac{5}{2}\right)^2} = \frac{5\sqrt{3}}{2}$$

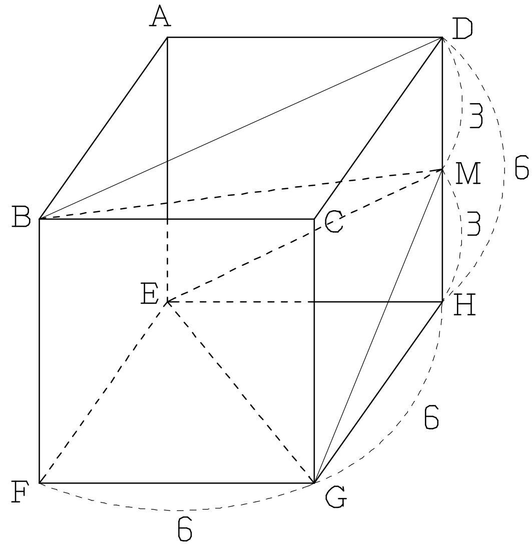
△AFC＝$\frac{1}{2}\times 5\times \frac{5\sqrt{3}}{2} = \frac{25\sqrt{3}}{4}cm^2$



5．　(1)　△EGH＝$\frac{1}{2}\times 6\times 6 = 18cm^2$

$MH = \frac{6}{2} = 3cm$

M-EGH＝$\frac{1}{3}\times 18\times 3 = 18cm^3$



(2)　$BM^2 = BD^2 + DM^2$

$BD^2 = BC^2 + CD^2 = 6^2 + 6^2 = 72$

$DM^2 = \left(\frac{6}{2}\right)^2 = 9$

よって，$BM^2 = 72 + 9 = 81$

$BM = \sqrt{81} = 9cm$

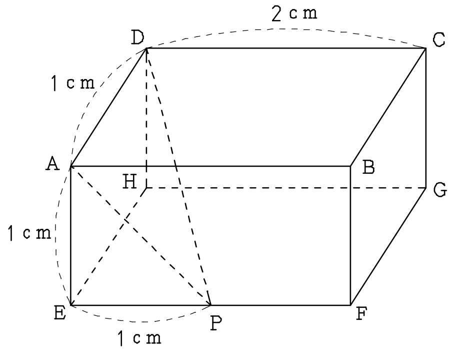
６．　(1)　△ADPは ∠DAP＝90° の直角三角形である。

$EP = 1cm$ 　のとき

$$AP = \sqrt{1^2 + 1^2} = \sqrt{2}cm$$

$$\triangle\text{ADP} = \frac{1}{2} \times AD \times AP = \frac{1}{2} \times 1 \times \sqrt{2} = \frac{\sqrt{2}}{2}$$

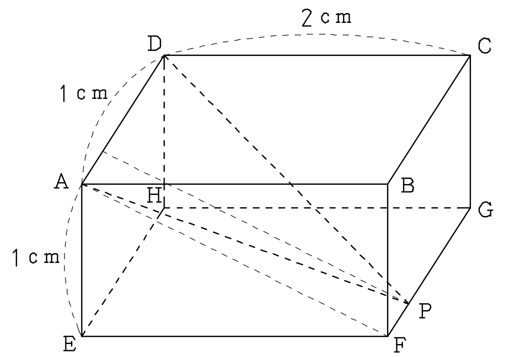
$$\frac{\sqrt{2}}{2}cm^2$$



(2)　AD//FG だから，点Pが辺FG上にあるとき，△APDの面積は一定である。

辺ADと辺FG間の距離＝AF＝$\sqrt{AE^2 + EF^2} = \sqrt{1^2 + 2^2} = \sqrt{5}cm$

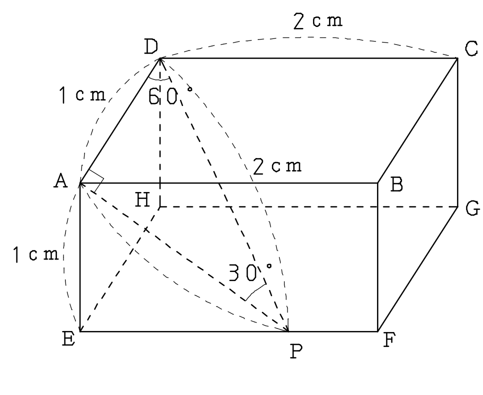
よって，△ADP＝$\frac{1}{2} \times AD \times AF = \frac{1}{2} \times 1 \times \sqrt{5} = \frac{\sqrt{5}}{2}cm^2$

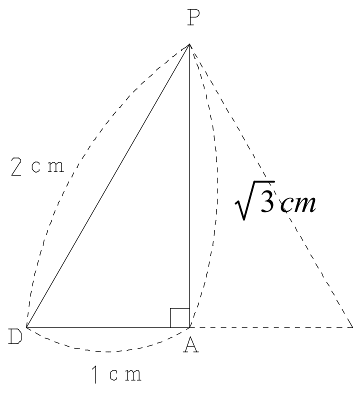


(3)　△ADPは 直角三角形だから ∠ADP＝60° のとき，∠APD＝30° で，
1辺2cmの正三角形の半分である。

$$AP = \sqrt{2^2 - 1^1} = \sqrt{3}cm$$

$$EP^2 = AP^2 - AB^2 = 3 - 1 = 2 \qquad EP = \sqrt{2}cm$$





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