1

(1) $6 - 9 \times \left(-\frac{1}{3}\right)$

$= 6 + 3 = 9$ //

(2) $8a + b - (a - 7b)$

$= 8a + b - a + 7b$

$= 7a + 8b$ //

(3) $(6 + \sqrt{2})(1 - \sqrt{2})$

$= 6 - 6\sqrt{2} + \sqrt{2} - 2$

$= 4 - 5\sqrt{2}$ //

(4) $3(x+5) = 4x + 9$

$3x + 5 = 4x + 9$

$x = -4$

$\begin{cases} 5 - 9 = 4x - 3x \\ -4 = x \end{cases}$

(5) $\begin{cases} x + y = 7 \\ 4x - y = 8 \end{cases}$

$5x = 15$

$x = 3$ //

$3 + y = 7$

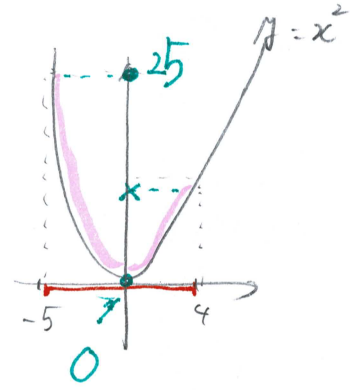
$y = 4$ //

(6) $x^2 + 5x + 2 = 0$

$x = \dfrac{-5 \pm \sqrt{25 - 8}}{2}$

$= \dfrac{-5 \pm \sqrt{17}}{2}$ //

(7)

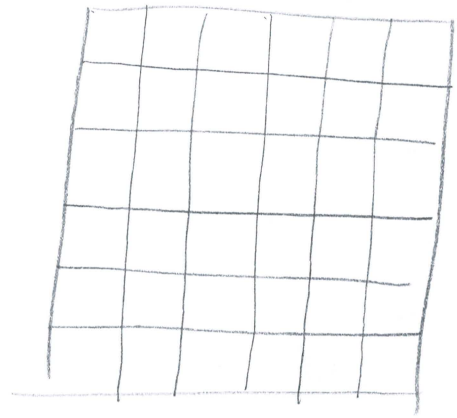


ウ //

(8)

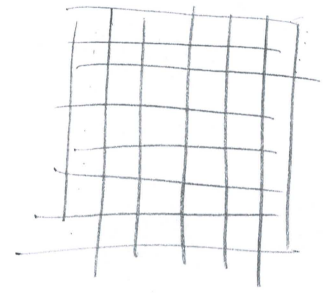
	1	2	3	4	5	6
1	2	3	4			7
2						8
3						9
4						10
5					10	11
6				10	11	12

大 6パターン

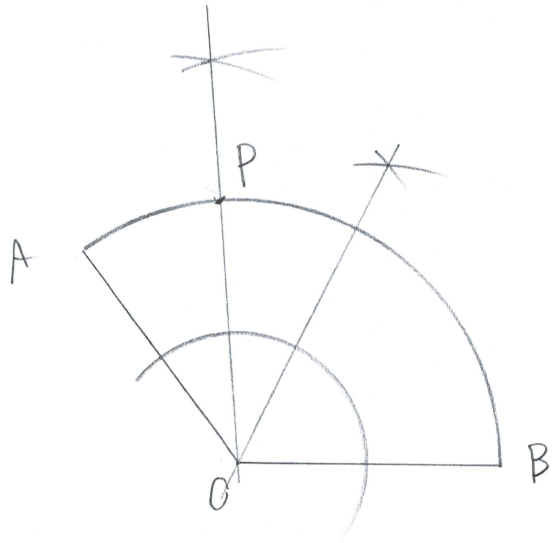


確率 = 向かい合うパターン / 全部のパターン

$= \frac{6}{36} = \frac{1}{6}$



(9)



2

(1)

1	1	5	−3	
2	2	−2	−3	$-6 = -3\times 2$
3	3	−1	−3	$-9 = -3\times 3$
4	4	−4		
⋮	⋮	⋮		
9	−10	−22		$-27 = -3\times 9$

P_4

(2)

1	a	b				
2	a	a+b	b			
3	a	2a+b	a+2b	b		
4	a	3a+b	3a+3b	a+3b	b	
5	a	4a+b	6a+4b	4a+6b	a+4b	b

上図より 5段目にある6個のマスの数の和は

$a + (4a+b) + (6a+4b) + (4a+6b) + (a+4b) + b$

$= 16a + 16b$

$= 16(a+b)$

$a+b$ は整数なので 1段目の2個のマスに入っている数の和の16倍といえる。

3

H29

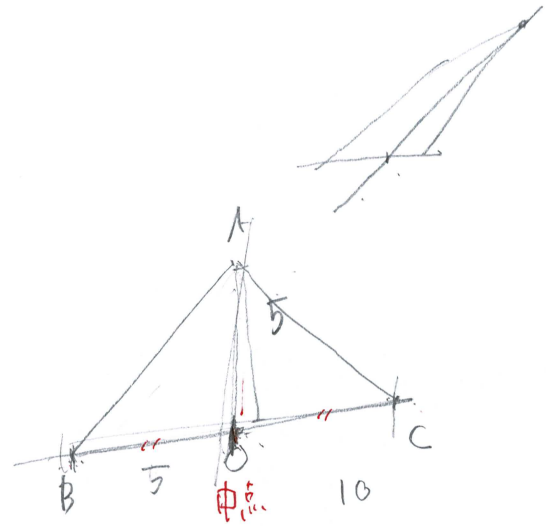
(1) $P(-1, ?)$

$\ell : y = -3x + 9$.

$y = -3 \times (-1) + 9$

$= 3 + 9$

$= 12$

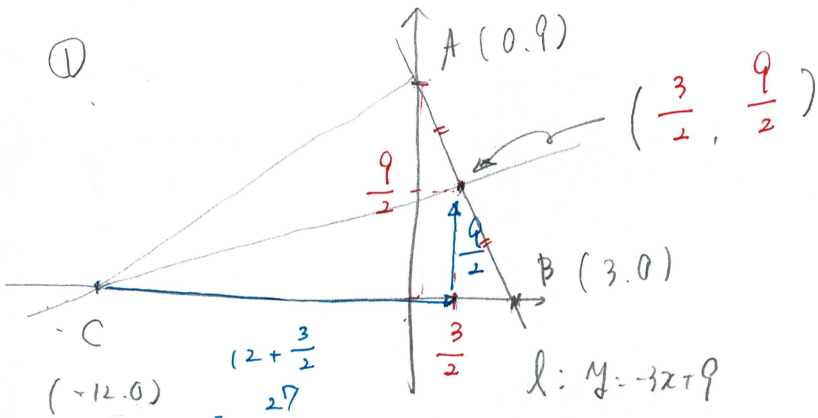


$10 \times 5 \times \frac{1}{2} = 25$

$5 \times 5 \times \frac{1}{2} = \frac{25}{2}$

(2)

①



$\frac{3}{2} = 3 \div 2$.

$y = ax + b$

$y = \frac{1}{3}x + b$

$0 = \frac{1}{3}(-12) + b$

$b = 4$.

傾き $= \frac{y\text{の進む分}}{x\text{の進む分}} = \frac{\frac{9}{2}}{\frac{27}{2}} = \frac{9}{2} \div \frac{27}{2}$

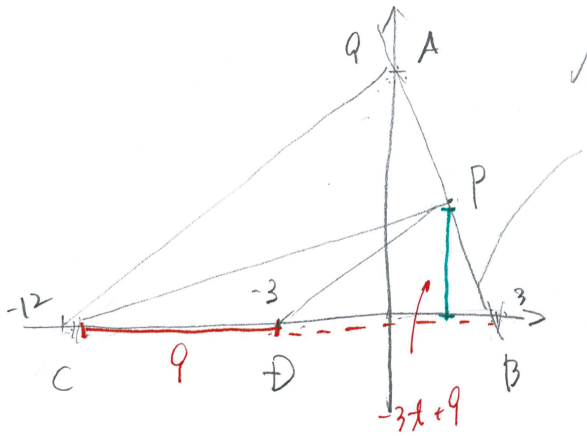
$= \frac{9}{2} \times \frac{2}{27}$

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

$y = \frac{1}{3}x + 4$

(2)

②



$y=-3x+9$

$\triangle CDP = \triangle ACP \times \frac{2}{5}$

⇩

Pのx座標は？

① Pのx座標を t とおく。

② $\triangle CDP$ と $\triangle ACP$ を求める

$\triangle CDP = \triangle ACP \times \frac{2}{5}$ の方程式をつくる

$\triangle CDP = 9 \times (-3t+9) \times \frac{1}{2}$

$\triangle ACP = \triangle ABC - \triangle PCB$

$= 15 \times 9 \times \frac{1}{2} - 15 \times (-3t+9) \times \frac{1}{2}$

$= \frac{15}{2}\{9-(-3t+9)\}$

$= \frac{15}{2}(3t) = \frac{45}{2}t$

Pのyは $y=-3t+9$

$P(t, -3t+9)$

$9 \times (-3t+9) \times \frac{1}{2} = \frac{45}{2}t \times \frac{2}{5}$

$-3t+9 = 2t$

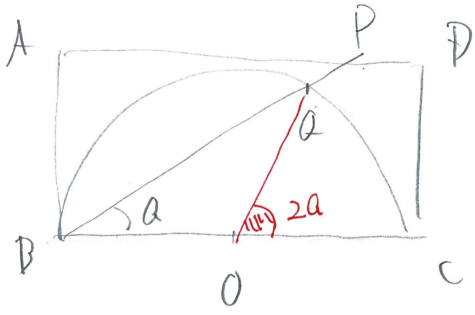
$5t = 9$

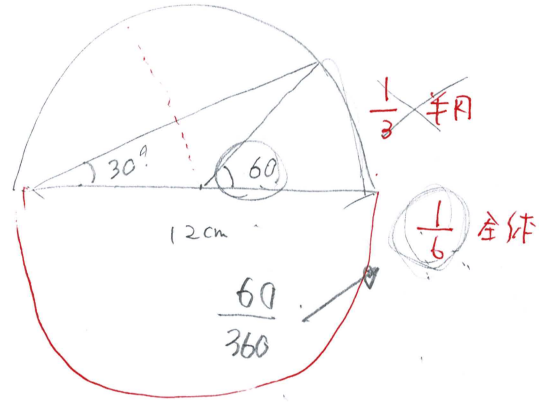
$t = \frac{9}{5}$

H29

4

(1)



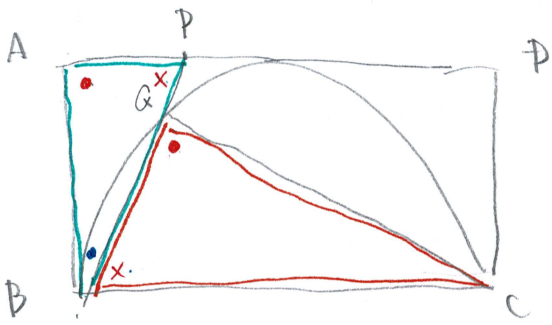


$\overset{\frown}{QC}$ は円周に対してどのくらいか？

$\frac{2a}{360} \times 12\pi = \frac{1}{15}\pi a$ (エ)

$12\pi \times \frac{1}{6} = 2\pi$

(2) ①



△ABP ∽ △QCB

△ABPと△QCBにおいて

四角形ABCDは長方形なので

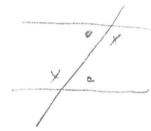
$\angle BAP = 90°$ …①

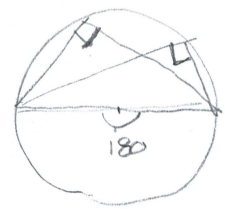
$\angle CQB$ は直径BCに対する円周角なので

$\angle CQB = 90°$ …②

①②より

$\angle BAP = \angle CQB$ …③





また AD∥BCより錯角が等しいため

$\angle APB = \angle QBC$ …④

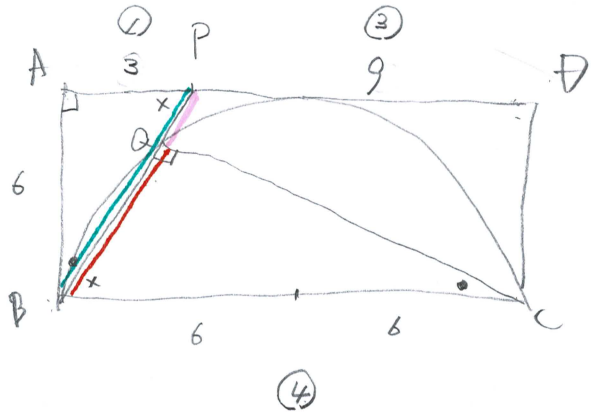
③④より

2つの角がそれぞれ等しいため

△ABP ∽ △QCB

(2)

②

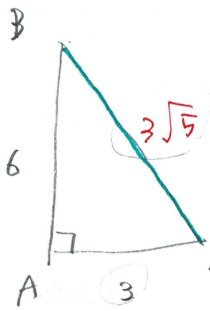


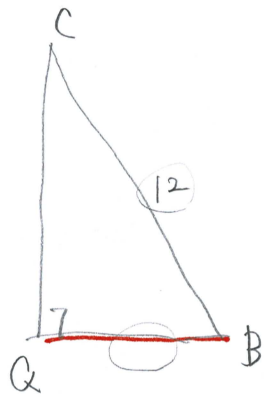
④

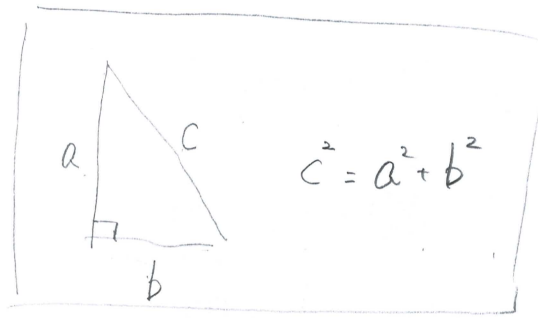
PQ = ?

④ → 12cm

① → 3cm







$BP^2 = 6^2 + 3^2$

$= 36 + 9$

$BP^2 = 45$

$9 \times 5 = 3^2 \times 5$

$BP = \pm\sqrt{45}$

$= \pm 3\sqrt{5}$

$= 3\sqrt{5}$

$3\sqrt{5} : 12 = 3 : QB$

$3\sqrt{5} \times QB = 3 \times 12$

$QB = \frac{12}{\sqrt{5}} \times \sqrt{\frac{5}{5}}$

$= \frac{12\sqrt{5}}{5}$

$PQ = BP - QB$

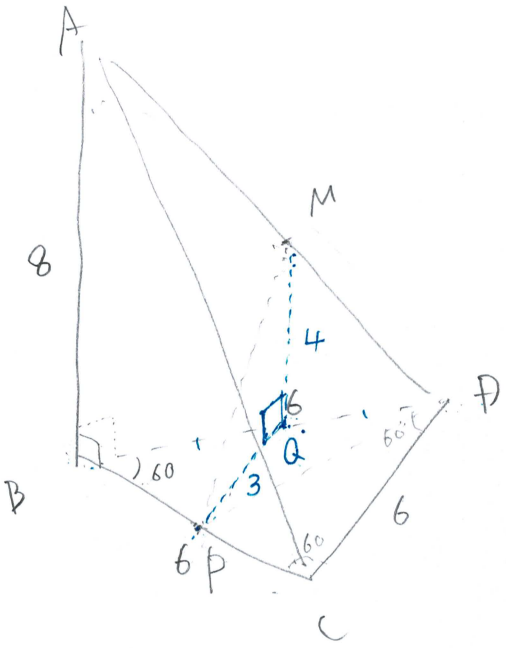
$= 3\sqrt{5} - \frac{12\sqrt{5}}{5}$

$= \frac{15\sqrt{5}}{5} - \frac{12\sqrt{5}}{5} = \frac{3\sqrt{5}}{5}$

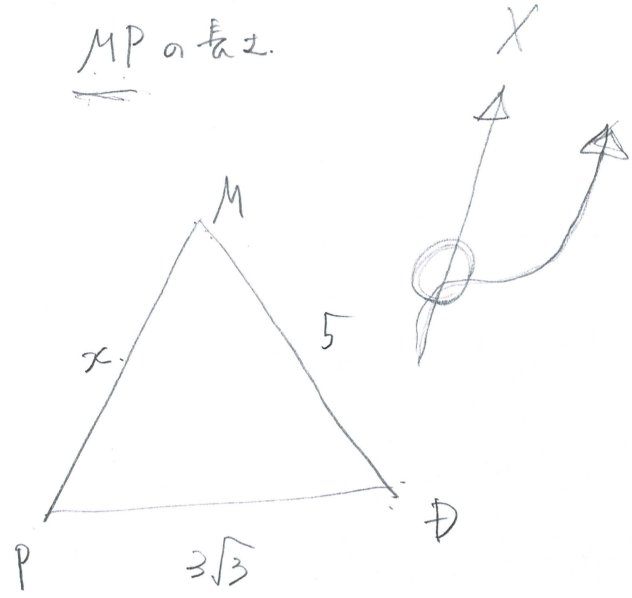
4.

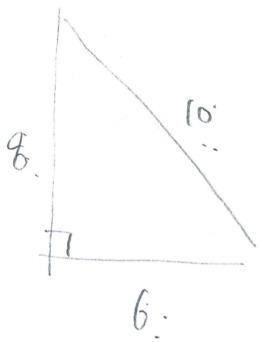
H29 ①

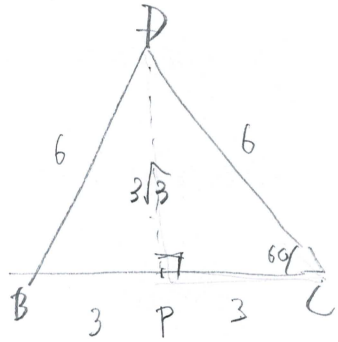
5

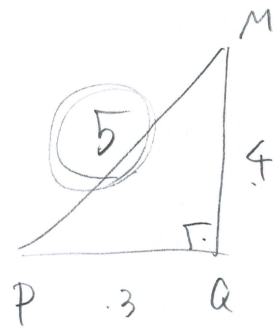


(1) MPの長さ

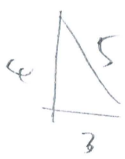


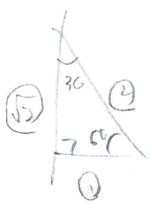






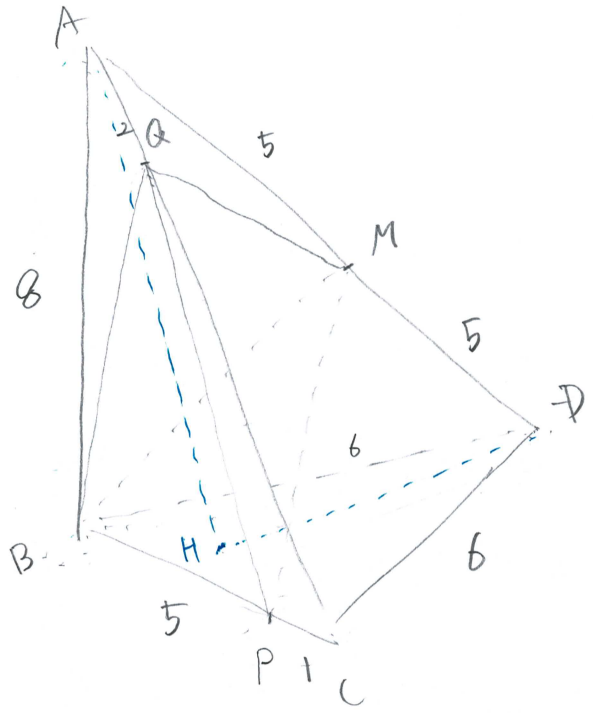
MP=5





5
(2)

H29 (2)



M-QBP = ?

立体 A-BCD の体積

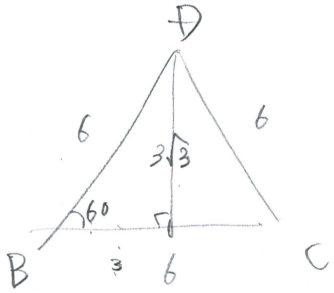
↓

立体 D-ABC と捉える

$= \underset{\times\frac{2}{3}}{\text{底面}} \times \underset{\times\frac{1}{2}}{\text{高さ}} \times \frac{1}{3}$

ABC
↓
QBP

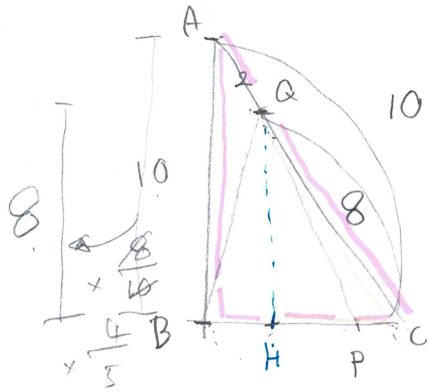
△BCD



$6 \times 3\sqrt{3} \times \frac{1}{2} = 9\sqrt{3}$

$A\text{-}BCD = 9\sqrt{3} \times 8 \times \frac{1}{3}$

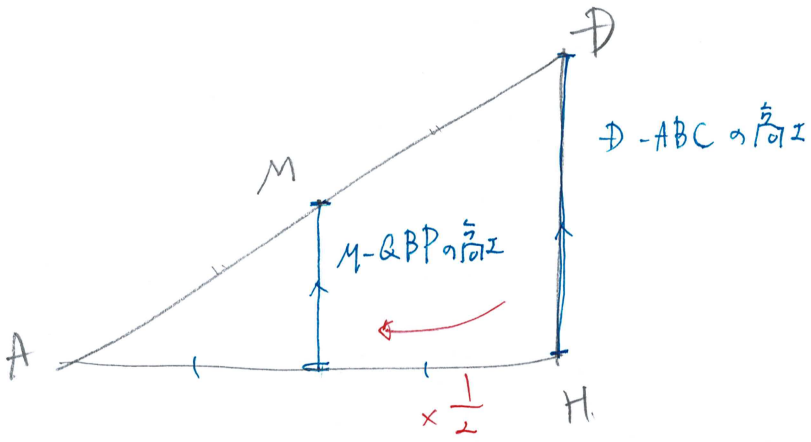
$= 24\sqrt{3}$.



$\triangle ABC = \overset{6}{BC} \times AB \times \frac{1}{2}$

$\triangle QBP = \overset{5}{BP} \times QH \times \frac{1}{2}$.

$\times \frac{5}{6} \times \frac{4}{5} (\times 1) = \times \frac{2}{3}$



立体D-ABCは
- 底面を $\frac{2}{3}$ 倍
- 高さを $\frac{1}{2}$ 倍

にすると M-QBP になる

↓

$$\text{立体D-ABC} \times \frac{2}{3} \times \frac{1}{2} = \text{M-QBP}$$

$$24\sqrt{3} \times \frac{2}{3} \times \frac{1}{2} = 8\sqrt{3}$$