1

$-4^2 = -4\times4$

$(-4)^2 = (-4)\times(-4)$

(1) $-6-4^2\times\frac{1}{8}$

$=-6-16\times\frac{1}{8}$

$=-6-2$

$=-8$

(2) $7a-b-5(a-2b)$

$=7a-b-5a+10b$

$=2a+9b$

(3) $\sqrt{48}+\frac{9}{\sqrt{3}}\times\sqrt{\frac{3}{3}}$

$=4\sqrt{3}+\frac{3\cdot9\sqrt{3}}{3}$

$=4\sqrt{3}+3\sqrt{3}$

$=7\sqrt{3}$

(4) $x+6=2(x+1)$

$x+6=2x+2$

$x=4$

$\begin{cases}6-2=2x-x\\4=x\end{cases}$

(5) $\begin{cases}9x-5y=-7\\-3x+2y=4\end{cases}$

$\begin{cases}9x-5y=-7\\-9x+6y=12\end{cases}$

$y=5$

$-3x+2\cdot5=4$

$-3x+10=4$

$-3x=-6$

$x=2$

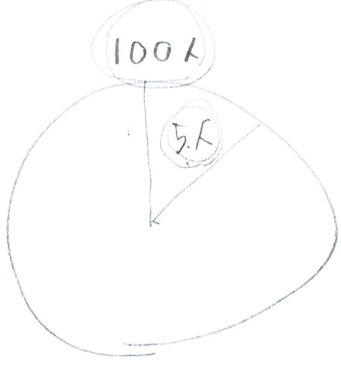
(6) $x^2+5x-6=0$

$6\quad -1$

$(x+6)(x-1)=0$

$x=1,-6$

(7)




$5\% = 0.05$

$5\div100$

$\frac{12}{50}$

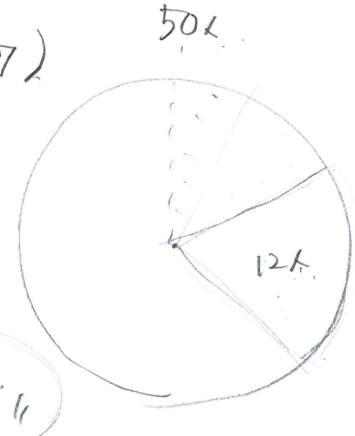
$12\div50=0.24$

$0.2\%$

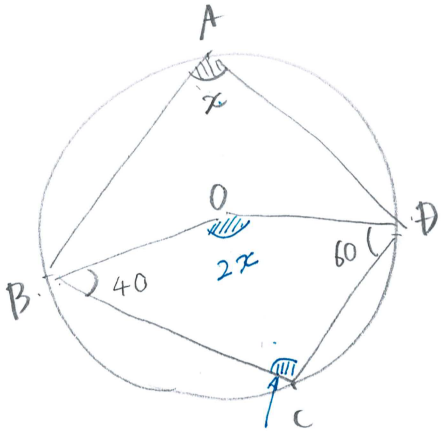
$50\overline{)120}$

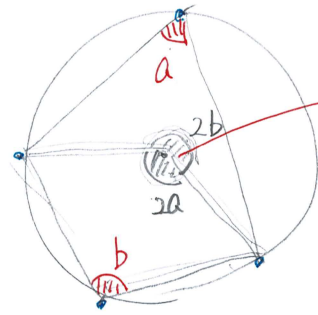
$100$

$200$



(8)




$a+b=180^\circ$

$2a+2b=360$

$a+b=180$

$180-x$

$\angle A+\angle C=180$

$\angle C=180-\angle A$

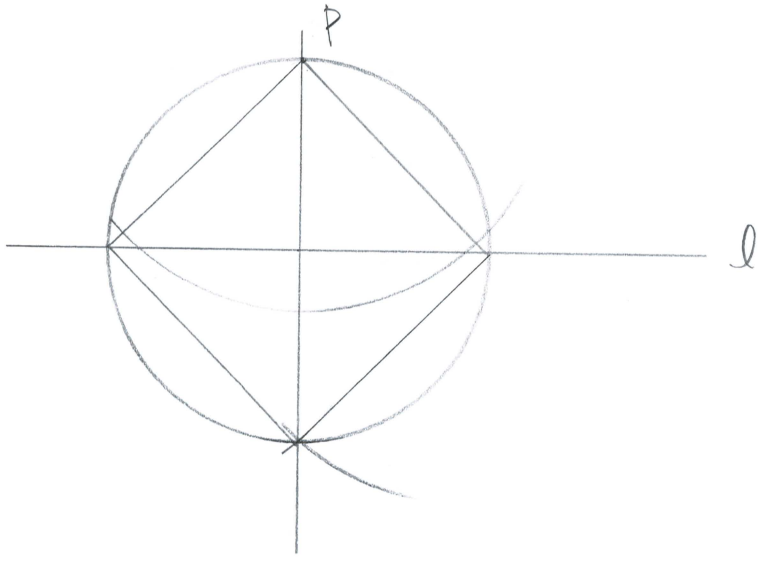
$100 \quad 280 \qquad\qquad x$

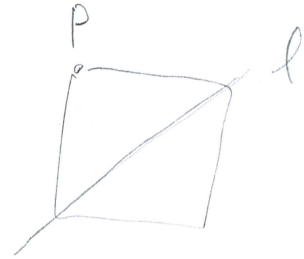
$2x+40+(180-x)+60=360$

$x=360-280$

$x=80^\circ$

(9)



H28

2

4) 16

2 4 6 12 → 24
14
10

3 5 15 9 → 32
12
20

2 6 4 12 → 24
14
10

4 8 16 8 → 36
16
20

6 10 12 20 → 48
30
18

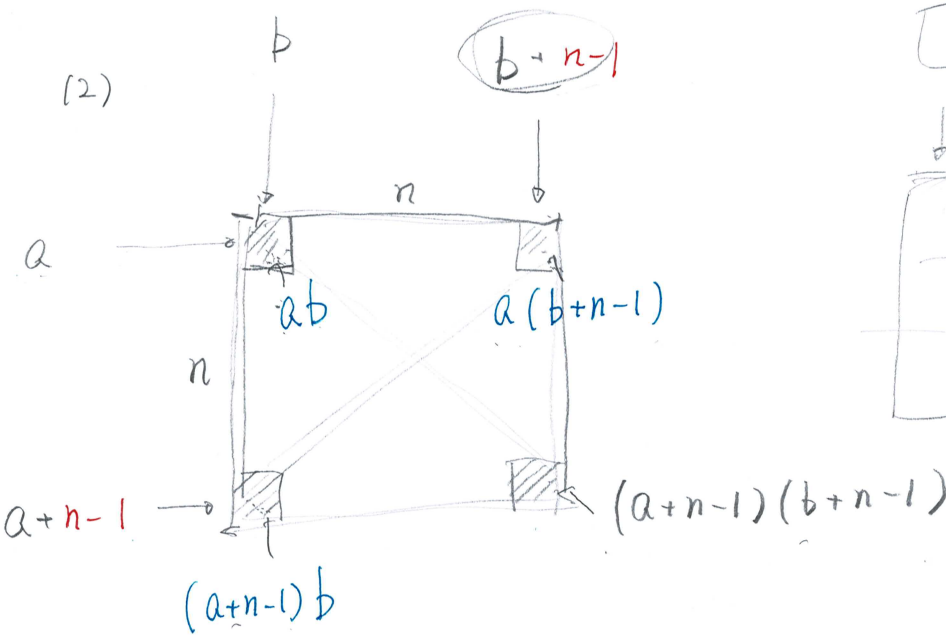
3 8 5 15 → 32
12 20

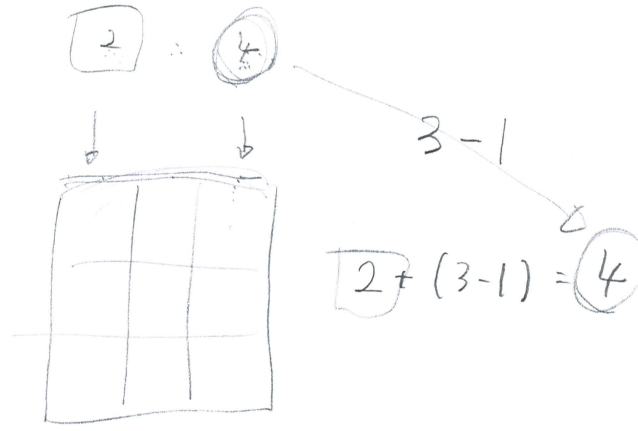
6 12 10 20 → 48
18 30

4 15 15 25 → 64
30
55

3通り

(2)




左上 $ab$

右上 $a(b+n-1)$

左下 $(a+n-1)b$

右下 $(a+n-1)(b+n-1)$

$n-1=A$.

よって

$$P = ab + (a+n-1)(b+n-1)$$

$$Q = (a+n-1)b + a(b+n-1)$$

$$P-Q = ab + (a+n-1)(b+n-1) - \{(a+n-1)b + a(b+n-1)\}$$

$$\begin{aligned}
&= ab + (a+A)(b+A) - \{(a+A)b + a(b+A)\} \\
&= ab + ab + aA + bA + A^2 - (ab + bA + ab + aA) \\
&= 2ab + aA + bA + A^2 - 2ab - bA - aA \\
&= A^2 \\
&= (n-1)^2
\end{aligned}$$

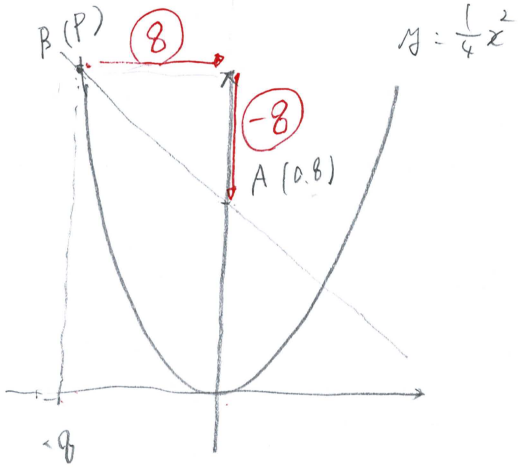
よって

$$P-Q = (n-1)^2$$

H28

3

(1)




点P = 点B.

(-8, ?)

$y=\frac{1}{4}x^2$

$y=\frac{1}{4}\cdot(-8)^2$

$=\frac{1}{4}\cdot 64 = 16.$

B(-8, 16)

$y=ax+b$

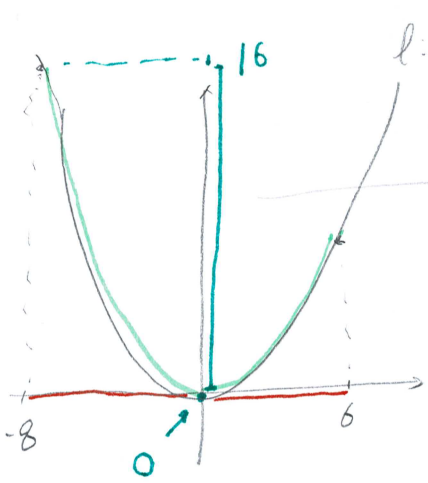
傾き　切片

$y=ax+8$　　傾き $=\frac{y\text{の増加分}}{x\text{の増加分}}=\frac{-8}{8}=-1$

$y=-x+8$ (ア)

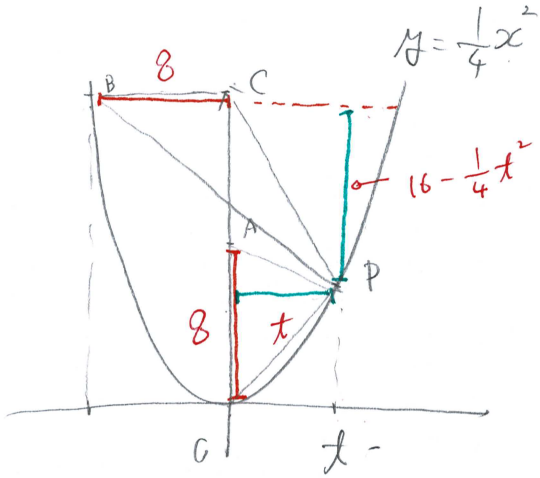
(2). P(a, b).

$-8\leqq a\leqq 6$ ?




$0\leqq y\leqq 16$ (ウ)

(3)




$\triangle CBP = \triangle AOP \times 3$ のとき

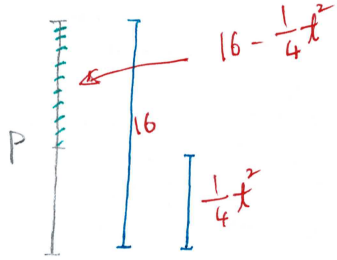
⇩

Pのx座標

① Pのx座標 $t$ とおく

② $\triangle CBP$ と $\triangle AOP$ の面積を求めて

$\triangle CBP = \triangle AOP \times 3$ の方程式をつくる




$y=\frac{1}{4}t^2$ $P\left(t, \frac{1}{4}t^2\right)$

$A(0, 8)$

$B(-8, 16)$

$C(0, 16)$

$$\triangle CBP = 8\times\left(16-\frac{1}{4}t^2\right)\times\frac{1}{2}$$

$$\triangle AOP = 8\times t\times\frac{1}{2}$$

$$8\times\left(16-\frac{1}{4}t^2\right)\times\frac{1}{2} = 8\times t\times\frac{1}{2}\times 3$$

$$16-\frac{1}{4}t^2 = 3t$$

$\times 2$ ( $64\times 1$, $32\times 2$, $16\times 4$ )

$$\frac{1}{4}t^2+3t-16 = 0$$

$$t^2+12t-64 = 0$$

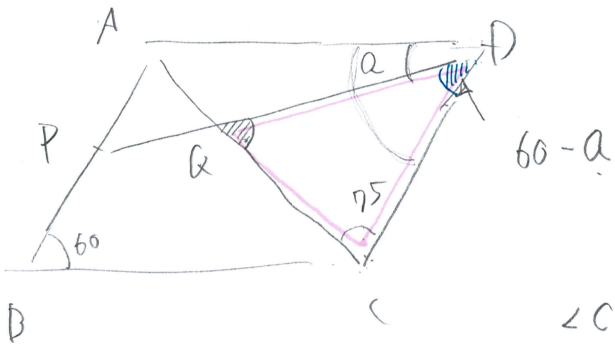
$$(t+16)(t-4) = 0$$

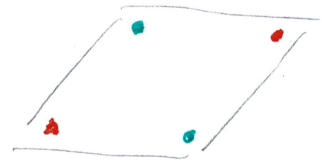
$$t = 4, -16$$

4 //

4

(1)



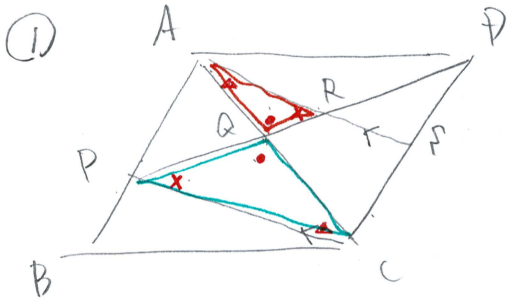
$\angle CQD = 180 - 75 - (60-a)$

$= 105 - 60 + a$

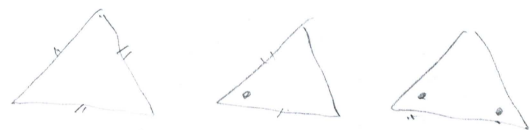
$= 45 + a$ (2)

(2)

①




△AQR ∽ △CQP



△AQRと△CQPにおいて

対頂角より

$\angle AQR = \angle CQP$ … ①

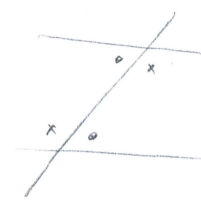
仮定より AD // PC なので 錯角が等しく

$\angle ARQ = \angle CPQ$ … ②

①, ②より

2つの角がそれぞれ等しいので

△AQR ∽ △CQP

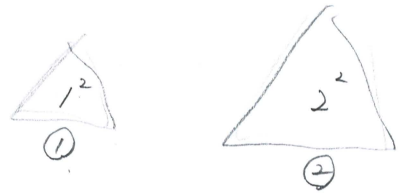


$\angle AQR = \angle CQP$ (対頂角) … ①

仮定より AD // PC なので

$\angle ARQ = \angle CPQ$ (錯角) … ②

$\triangle QPC \backsim \triangle QRA$




相似比　$3 : 2$

面積比　$3^2 : 2^2$

$9 : 4$

$\triangle QPC : \triangle QRA = 9 : 4$

$\triangle QRA \times 9 = \triangle QPC \times 4$

$\triangle QRA = \triangle QPC \times \frac{4}{9}$

$\triangle QRA = \triangle QPC \times \frac{4}{9}$

$\triangle AQR = \triangle QPC \times \frac{4}{9}$

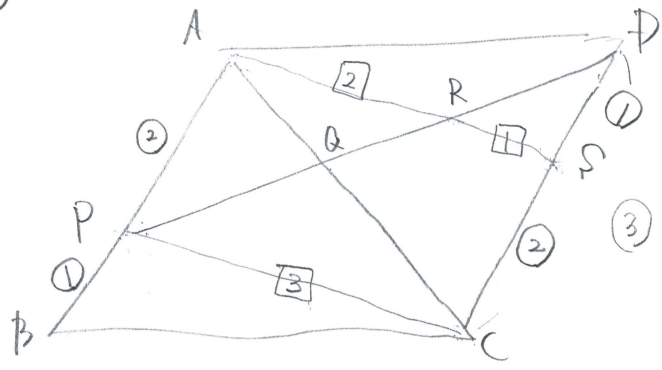
$= S \times \frac{3}{10} \times \frac{4^2}{9_3}$

$= S \times \frac{2}{15}$

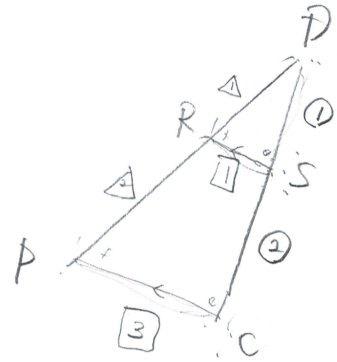
$\triangle AQR = \square APCS \times \frac{2}{15}$

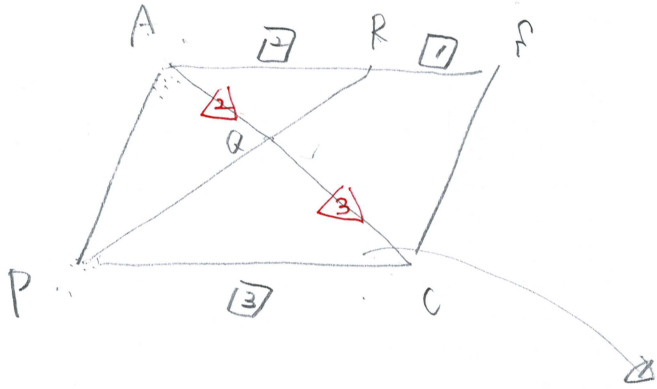
[2]

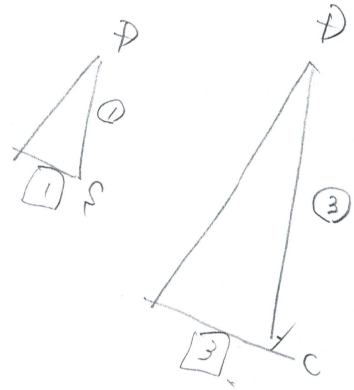
②

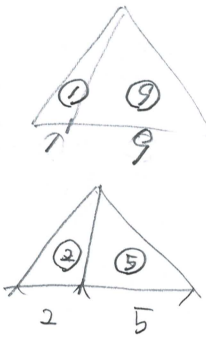



△AQR = □APCS × □




□APCSの面積を $S$ とする

$$\triangle APC = S \times \frac{1}{2}$$

$$\triangle QPC = \triangle APC \times \frac{3}{5}$$

$$= S \times \frac{1}{2} \times \frac{3}{5}$$

$$= S \times \frac{3}{10}$$