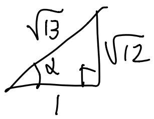
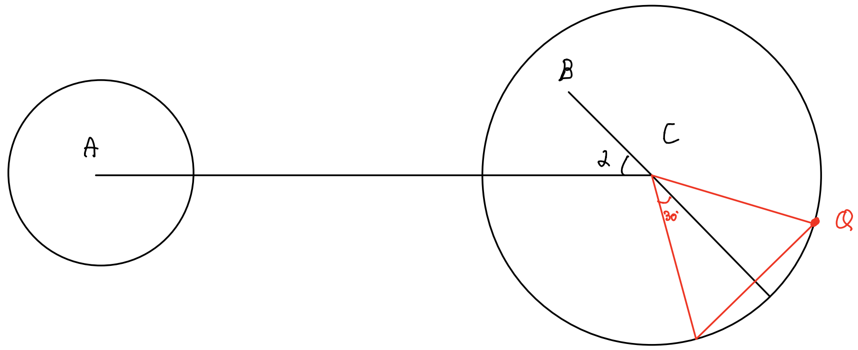
29.





$|\overrightarrow{AC}|^2 = 52$

$|\overrightarrow{CQ}|^2 = 12$

$|\overrightarrow{PA} + \overrightarrow{AQ}| \le 2 + |\overrightarrow{AQ}| = 2 + \sqrt{|\overrightarrow{AC} + \overrightarrow{CQ}|^2}$

$2 + \sqrt{|\overrightarrow{AC} + \overrightarrow{CQ}|^2} = 2 + \sqrt{52 + 12 - 2\underbrace{\overrightarrow{CA} \cdot \overrightarrow{CQ}}_{\text{최소}}} \le 2 + \sqrt{64 + 36} = 12$

$\overrightarrow{CA} \cdot \overrightarrow{CQ}$ 최소 $= \overrightarrow{CA} \cdot \overrightarrow{CQ_1} = 2\sqrt{13} \times 2\sqrt{3} \cos\left(\pi - \alpha + \frac{\pi}{6}\right)$

$= 2\sqrt{13} \times 2\sqrt{3} \times \left(-\frac{1}{\sqrt{13}} \times \frac{\sqrt{3}}{2} - \frac{\sqrt{12}}{\sqrt{13}} \times \frac{1}{2}\right)$

$= -18$

12

30. $g(1)=0$

$g(x+1)-g(x) = -\pi(e+1)e^{x}\sin(\pi x)$

$g'(x+1)-g'(x) = -\pi(e+1)e^{x}(\sin(\pi x)+\pi\cos(\pi x))$

$g'(x+1) = (f(x+1)-f(x))e^{x}+g(x)$

$g'(x+1)-g'(x) = (f(x+1)-f(x))e^{x}+g(x)-g'(x)$

$-\pi(e+1)e^{x}(\sin(\pi x)+\pi\cos(\pi x)) = (f(x+1)-f(x))e^{x}+g(x)-g'(x)$

양변 e^{x}로 나눔

$-\pi(e+1)(\sin(\pi x)+\pi\cos(\pi x)) = (f(x+1)-f(x)) + (g(x)-g'(x))e^{-x}$

$(g(x)e^{-x})' = (g(x)-g'(x))e^{-x}$

기출 아이디어 (190630, 150930)

적분

$(e+1)(\cos(\pi x)-\sin(\pi x))+C = \int_{x}^{x+1} f(x)\,dx + g(x)e^{-x}$

$g(1)=0$ 이고 이외에도 조건 (가)에 의해 x가 정수이면 $g(x)=0$ 이다!!!

$x=0$ 대입 $\quad e+1+C = \frac{10}{9}e+4 \qquad C=\frac{e}{9}+3$

$\int_{1}^{2} f(x)\,dx = -(e+1)+C$

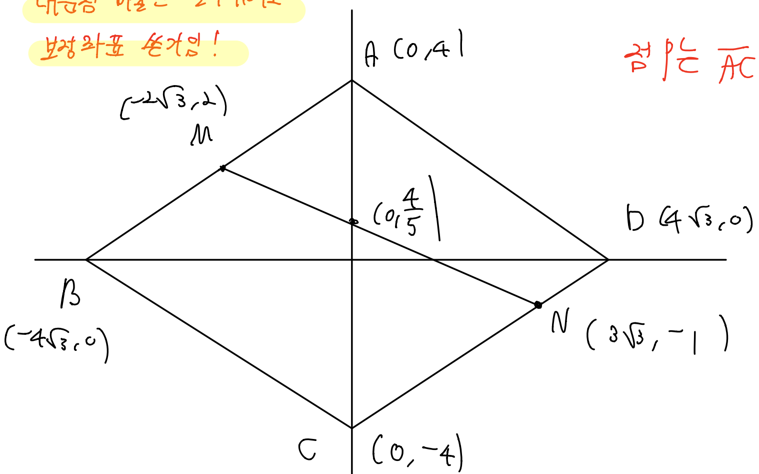
$\int_{2}^{3} f(x)\,dx = +(e+1)+C$

$\int_{3}^{4} f(x)\,dx = -(e+1)+C$

$\int_{1}^{10} f(x)\,dx = 9C-(e+1) = e+27-e-1 = 26$

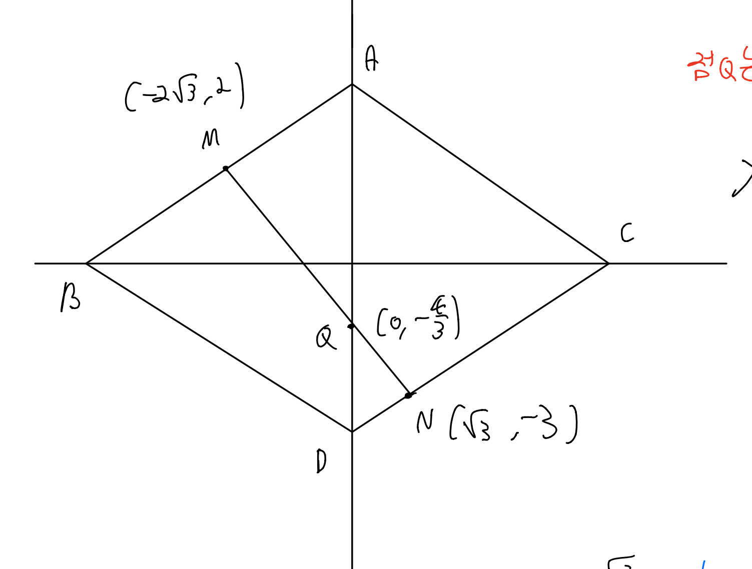
26

19. 내분점 비율만 알아내여고 보정좌표 쓴거임!



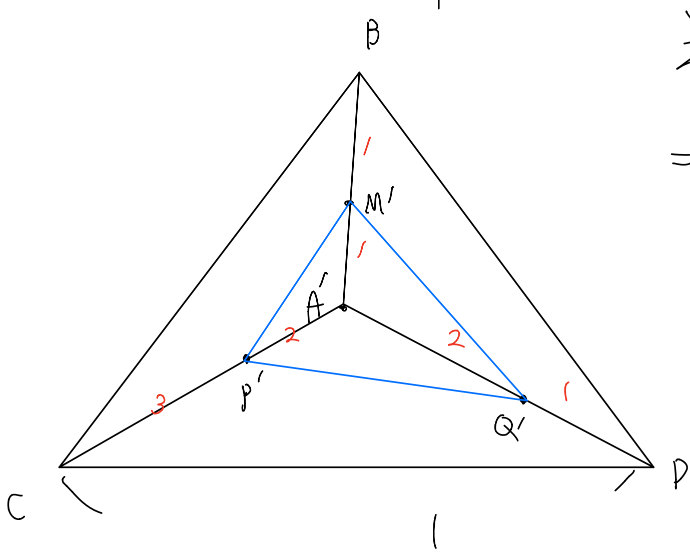
점 P는 $\overline{AC}$ 2:3 내분점

$$y = -\frac{\sqrt{3}}{5}x + \frac{4}{5}$$



점 Q는 $\overline{AD}$ 2:1 내분점

$$y = -\frac{5}{3\sqrt{3}}x - \frac{4}{3}$$



$$\frac{\sqrt{3}}{4} \times \frac{1}{3} \times \left(\frac{2}{5} \times \frac{1}{2} + \frac{2}{3} \times \frac{1}{2} + \frac{2}{5} \times \frac{2}{3}\right)$$

$$= \frac{\sqrt{3}}{4} \times \frac{1}{3} \times \frac{4}{5} = \frac{\sqrt{3}}{15}$$

$\frac{\sqrt{3}}{15}$, ②