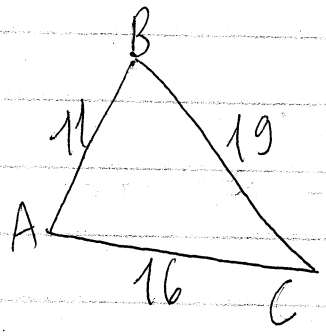
Quiz 6

① 

- Here we are given all side lengths. Thus we should use the law of cosine to find the angles.

- By the law of cosine, we have $\cos A = \frac{b^2+c^2-a^2}{2bc}$

$$= \frac{16^2+11^2-19^2}{2 \cdot 16 \cdot 11}$$

$$\approx 0.0454$$

Thus $m\angle A = \cos^{-1}(0.0454) \approx 87.35°$

- Apply the law of cosine again, we have

$$\cos B = \frac{c^2+a^2-b^2}{2ca} = \frac{11^2+19^2-16^2}{2 \cdot 11 \cdot 19} \approx 0.5407$$

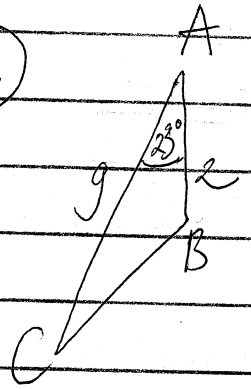
Thus $B = \cos^{-1}(0.5407) \approx 57.27°$

- The angle C is given by $C = 180° - A - B$

$$= 180° - 87.35° - 57.27°$$

$$= 35.33°$$

(2)



∴ Here we are given two side lengths and the angle in between. Thus we should use the following formulas to find the area.

$$\text{Area} = \frac{1}{2}ab\sin C = \frac{1}{2}ac\sin B = \frac{1}{2}bc\sin A$$

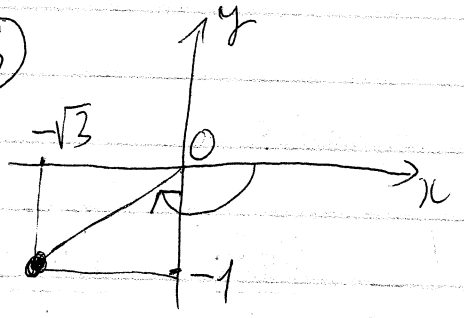
∴ We have

$$\text{Area} = \frac{1}{2}bc\sin A = \frac{1}{2}\cdot 9\cdot 2\cdot \sin 23^\circ$$

$$\approx 3.52$$

Note: In the formula of area, we have sine, not cosine.

(3)



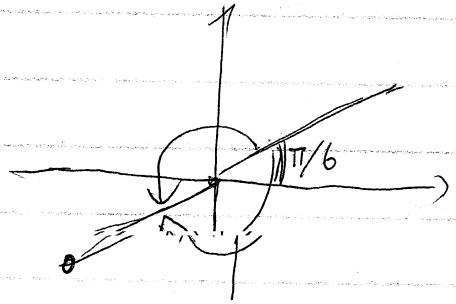
∴ We have $(x, y) = (-\sqrt{3}, -1)$

∴ Then $r = \sqrt{x^2+y^2} = \sqrt{3+1} = 2$

∴ We have $\tan\theta = \frac{y}{x} = \frac{-1}{-\sqrt{3}} = \frac{1}{\sqrt{3}}$

∴ Thus $\theta = \frac{\pi}{6} + k\pi$

∴ Look at the picture, we see that the given point is in the left half plane. Thus $\theta = \frac{\pi}{6} \pm \pi$ (both choices are okay)



∴ Look at the given ~~choo~~ options, we'll choose B, i.e. $(r, \theta) = (2, -\frac{5\pi}{6})$

④ $r\sin\theta = 10$

› Remember that $x = r\cos\theta$ and $y = r\sin\theta$.

› Then the given equation is $y = 10$.

Note All conversion formulas are

$$\begin{cases} x = r\cos\theta \\ y = r\sin\theta \end{cases} \quad \text{and} \quad \begin{cases} r^2 = x^2 + y^2 \\ \tan\theta = \dfrac{y}{x} \end{cases}$$