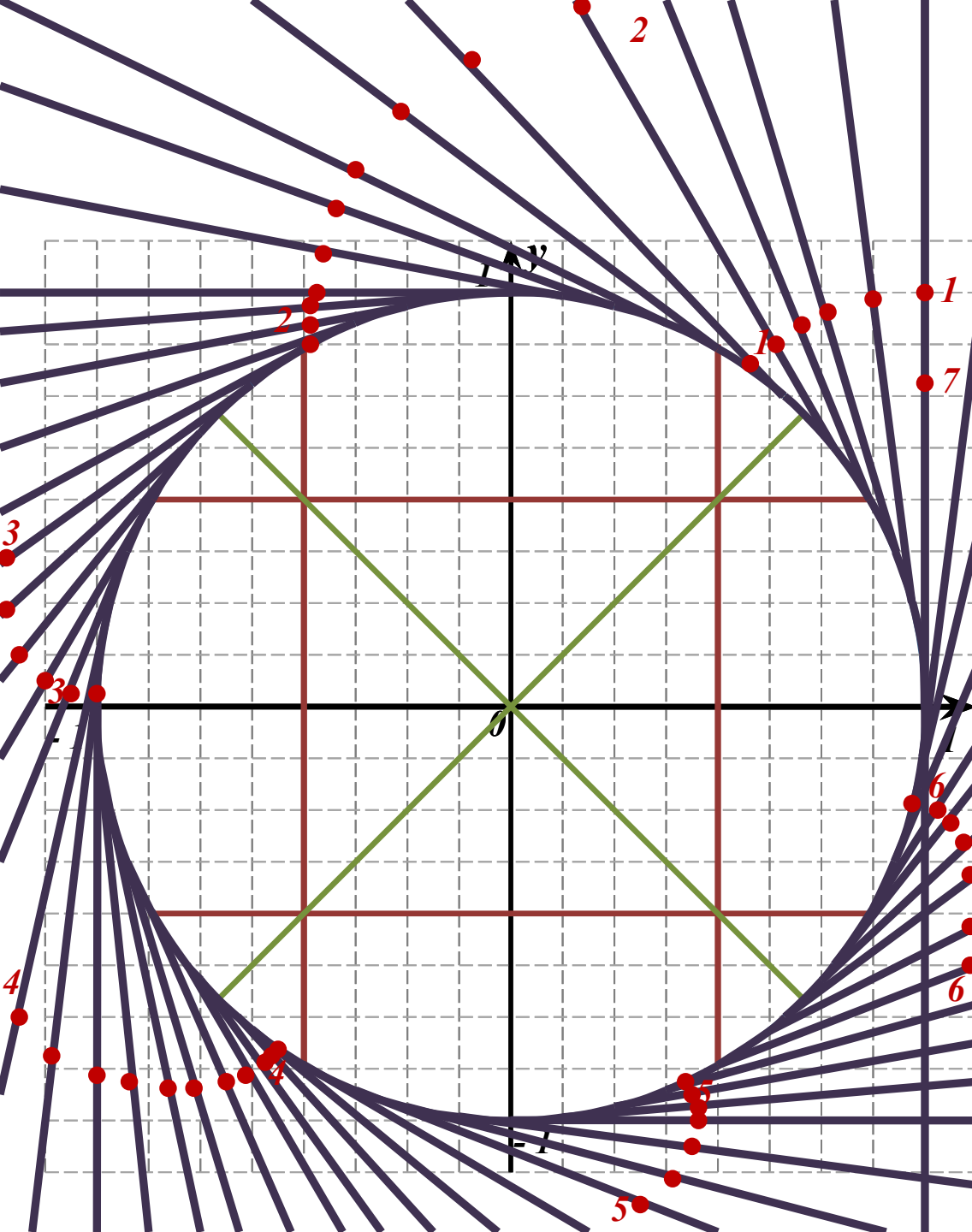


Радианная мера угла

Возьмем числовую ось, начало которой совпадает с концом начального радиуса.

«Накрутим» положительную полуось на окружность против часовой стрелки, а отрицательную полуось «накрутим» на окружность по часовой стрелке.



Радианная мера угла

Угол в 1 радиан – это центральный угол окружности, который соответствует дуге, равной радиусу.

$$C = 2\pi R, \quad R = 1$$

$$C = 2\pi$$

$$360^\circ = 2\pi$$

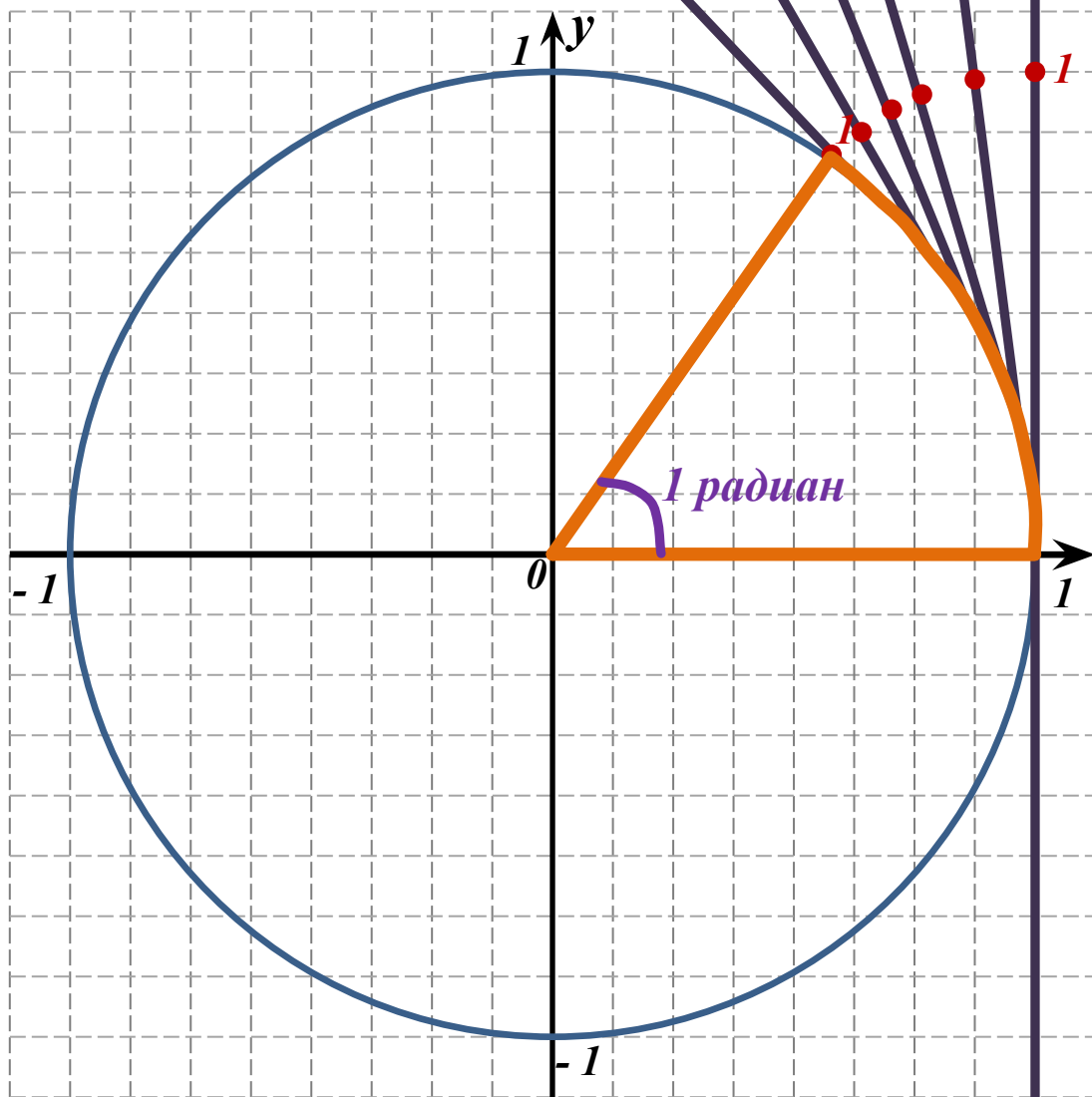
$$1^\circ = \frac{2\pi}{360^\circ}$$

$$1 \text{ рад} = \frac{360^\circ}{2\pi}$$

$$1 \text{ рад} \approx 57^\circ$$

$$\alpha^\circ = \frac{2\pi}{360^\circ} \cdot \alpha^\circ$$

$$\beta \text{ рад} = \frac{360^\circ}{2\pi} \cdot \beta$$



№ 1.2.1

$$\alpha^{\circ} = \frac{2\pi}{360^{\circ}} \cdot \alpha^{\circ}$$

$$30^{\circ} = \frac{2\pi}{360^{\circ}} \cdot 30^{\circ} = \frac{\pi}{6}$$

$$45^{\circ} = \frac{\pi}{4}$$

$$-60^{\circ} = -\frac{\pi}{3}$$

$$90^{\circ} = \frac{\pi}{2}$$

$$-135^{\circ} = -\frac{3\pi}{4}$$

$$390^{\circ} = \frac{13\pi}{6}$$

№ 1.2.2

$$\alpha^{\circ} = \frac{2\pi}{360^{\circ}} \cdot \alpha^{\circ}$$

$$120^{\circ} = \frac{2\pi}{3}$$

$$210^{\circ} = \frac{7\pi}{6}$$

$$180^{\circ} = \pi$$

$$330^{\circ} = \frac{5\pi}{3}$$

$$-225^{\circ} = -\frac{5\pi}{4}$$

$$300^{\circ} = \frac{11\pi}{6}$$

№ 1.2.3

$$\beta \text{ рад} = \frac{360^{\circ}}{2\pi} \cdot \beta$$

$$\frac{\pi}{5} = \frac{360^{\circ}}{2\pi} \cdot \frac{\pi}{5} = 36^{\circ}$$

$$\frac{\pi}{10} = 18^{\circ}$$

$$\frac{4\pi}{3} = 240^{\circ}$$

$$-\frac{\pi}{12} = -15^{\circ}$$

$$\frac{\pi}{36} = 5^{\circ}$$

$$-\frac{\pi}{18} = -10^{\circ}$$

№ 1.2.4

$$\beta \text{ рад} = \frac{360^{\circ}}{2\pi} \cdot \beta$$

$$\frac{\pi}{6} = 30^{\circ}$$

$$\frac{\pi}{24} = 7,5^{\circ}$$

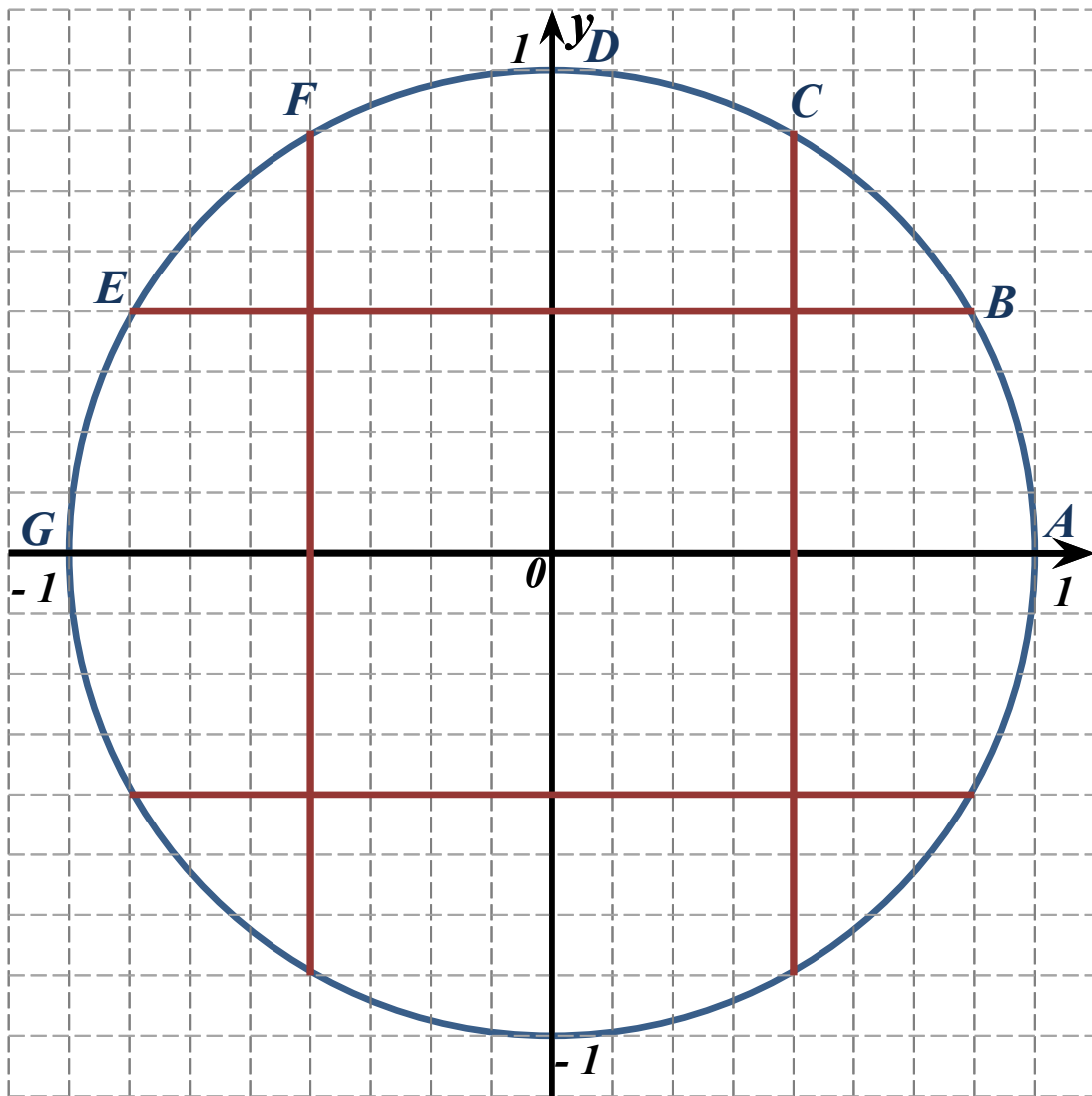
$$\frac{5\pi}{6} = 150^{\circ}$$

$$2\pi = 360^{\circ}$$

$$\frac{17\pi}{6} = 510^{\circ}$$

$$-\frac{\pi}{2} = -90^{\circ}$$





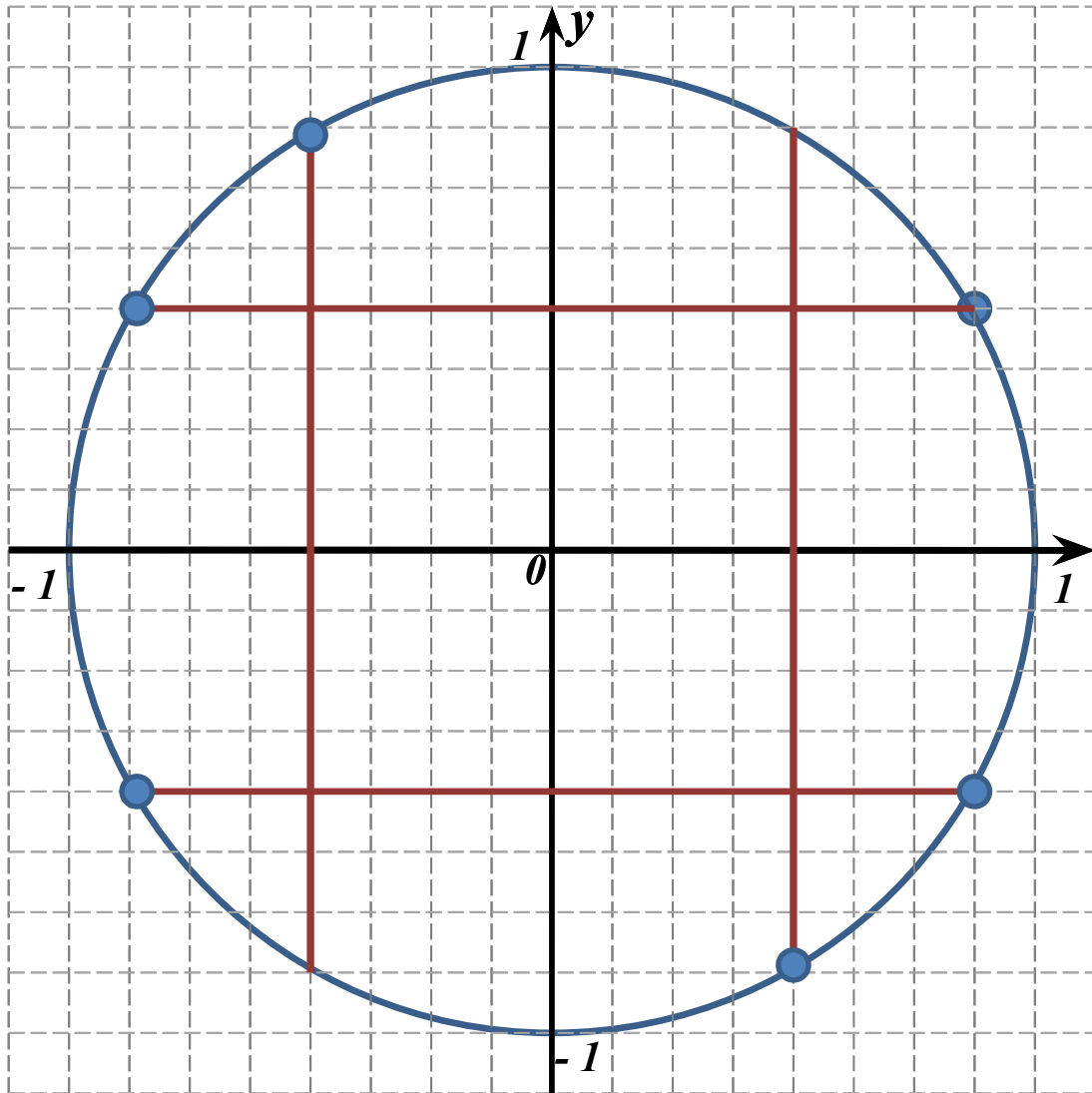
Точки B, C, D, F, E делят дугу AG на равные дуги.

Дуга AG составляет 180° или π радиан.

Тогда каждая из дуг AB, BC, CD, DF,

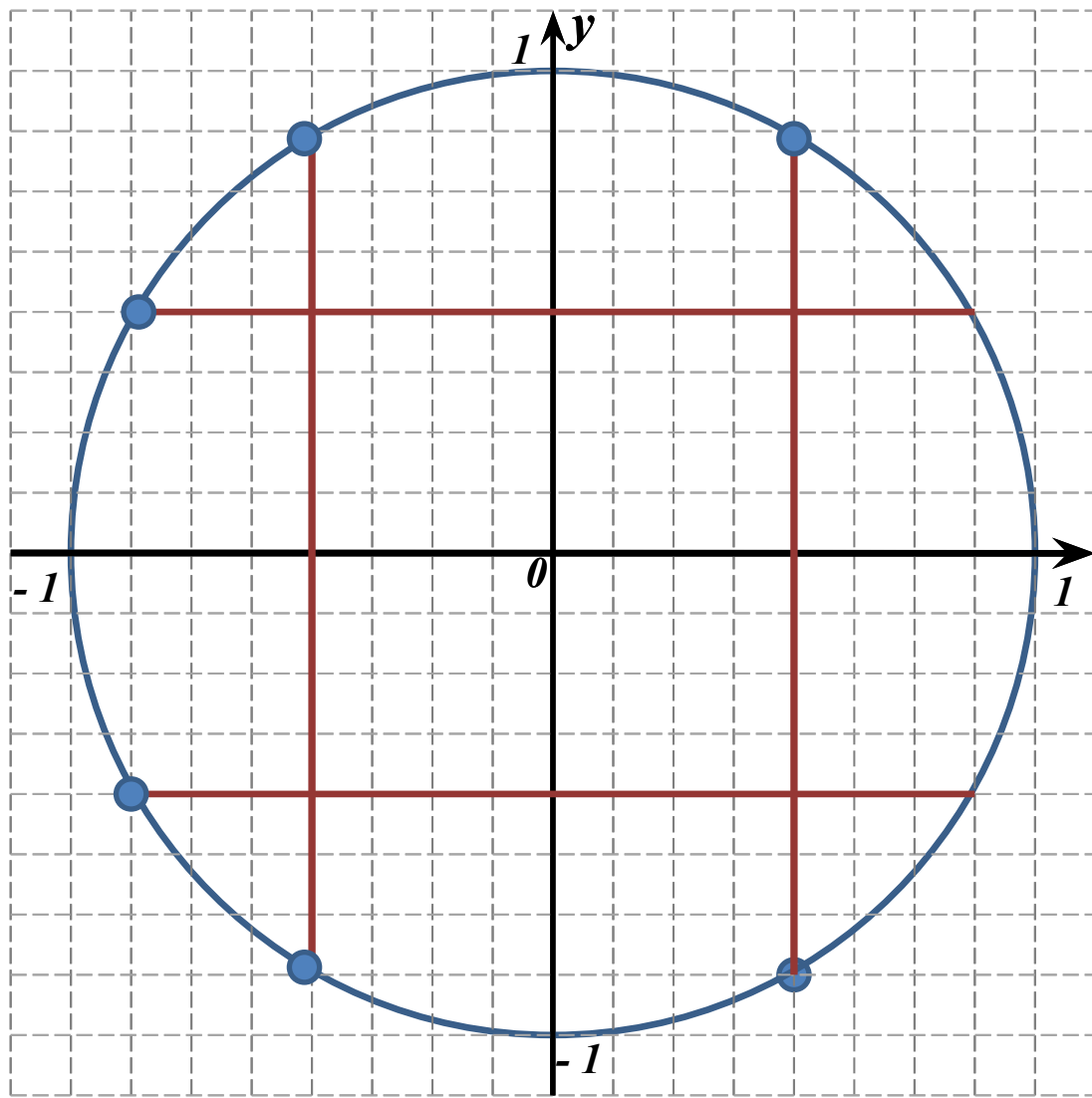
FE и EG равна $\frac{\pi}{6}$

№ 1.2.5



- $\frac{\pi}{6}$
- $\frac{5\pi}{6}$
- $-\frac{\pi}{3}$
- $\frac{2\pi}{3}$
- $\frac{7\pi}{6}$
- $\frac{11\pi}{6}$

№ 1.2.6



$$-\frac{2\pi}{3}$$

$$-\frac{7\pi}{6}$$

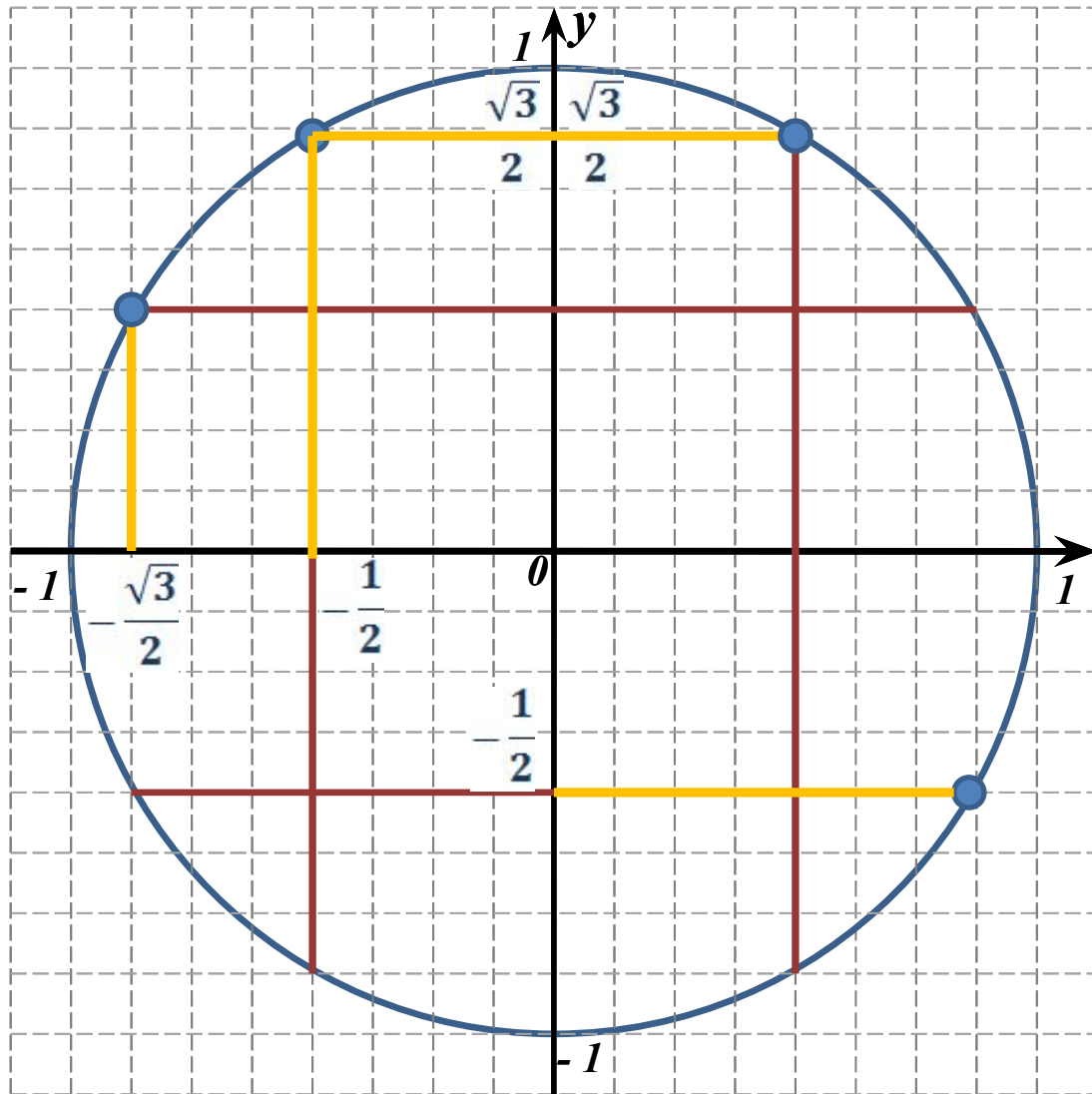
$$\frac{\pi}{3}$$

$$-\frac{5\pi}{6}$$

$$\frac{5\pi}{3}$$

$$\frac{2\pi}{3}$$

№ 1.2.7



$$\cos \frac{5\pi}{6} =$$

$$\sin \frac{\pi}{3} =$$

$$\cos \left(-\frac{7\pi}{6} \right) =$$

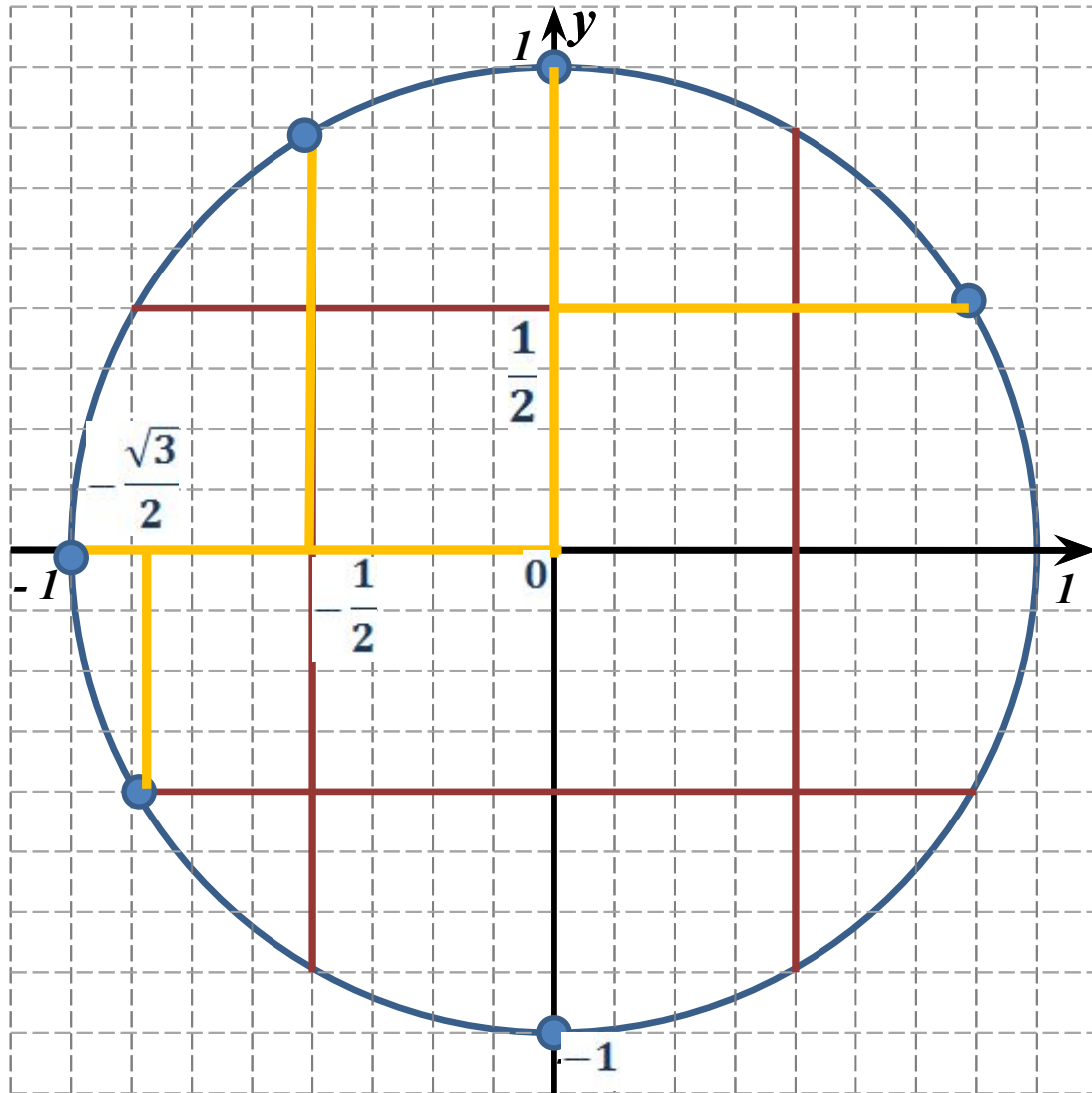
$$\sin \frac{2\pi}{3} =$$

$$\cos \left(-\frac{4\pi}{3} \right) =$$

$$\sin \left(-\frac{\pi}{6} \right) =$$



№ 1.2.8



$$\sin \frac{13\pi}{6} =$$

$$\cos \frac{\pi}{2} =$$

$$\sin \frac{3\pi}{2} =$$

$$\cos \left(-\frac{5\pi}{3} \right) =$$

$$\sin \pi =$$

$$\cos \frac{7\pi}{6} =$$



Nº 1.2.9

$$\cos 2\pi = 1$$

$$\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$$

$$\cos \frac{4\pi}{3} = -\frac{1}{2}$$

$$\sin \frac{5\pi}{2} = 1$$

$$\cos(-\pi) = -1$$

$$\sin\left(-\frac{5\pi}{6}\right) = -\frac{1}{2}$$



Nº 1.2.10

$$\sin\left(-\frac{11\pi}{6}\right) = \frac{1}{2}$$

$$\cos\frac{13\pi}{6} = \frac{\sqrt{3}}{2}$$

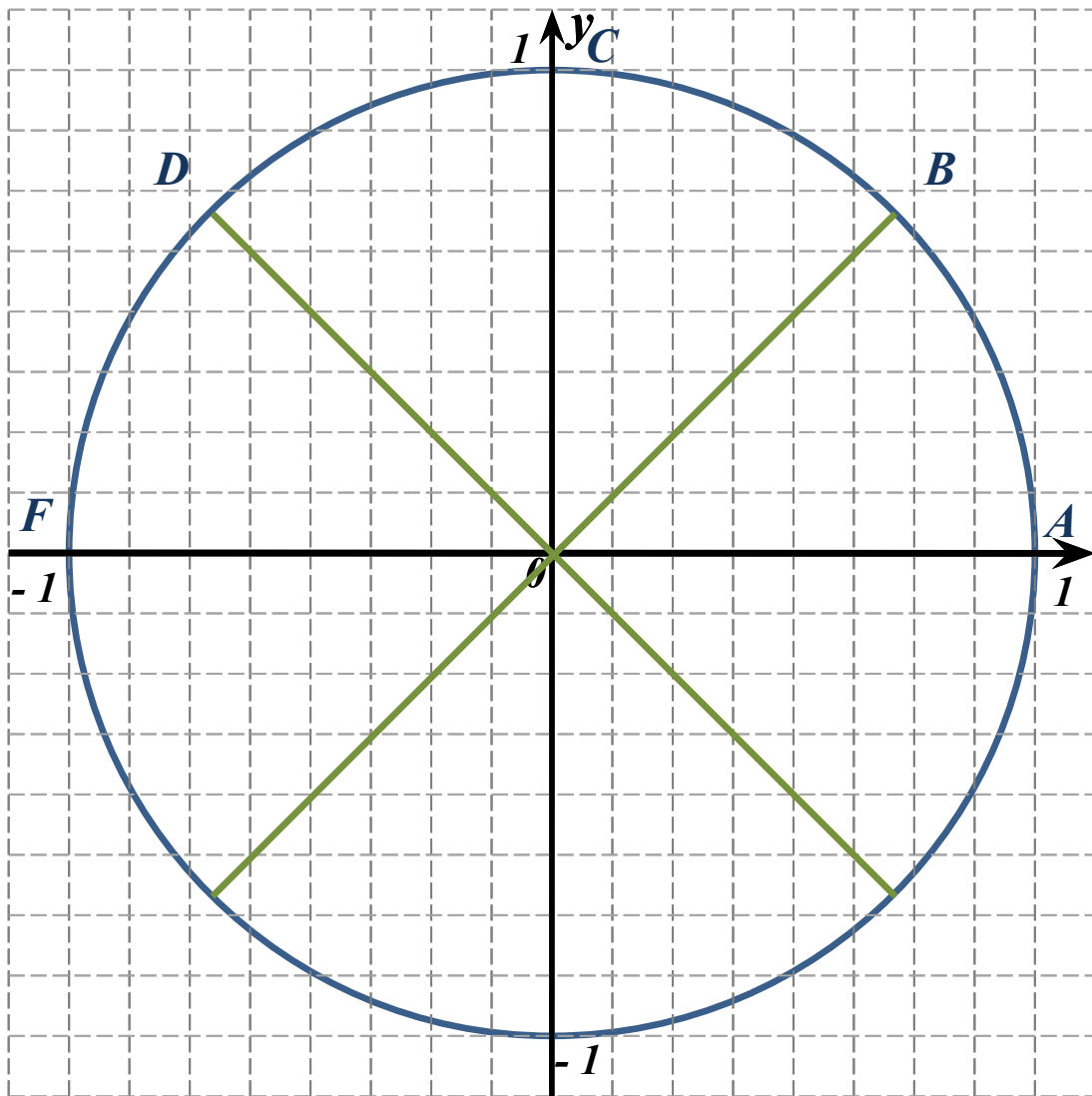
$$\sin\frac{8\pi}{3} = \frac{\sqrt{3}}{2}$$

$$\cos\left(-\frac{\pi}{2}\right) = 0$$

$$\sin\left(-\frac{7\pi}{3}\right) = \frac{\sqrt{3}}{2}$$

$$\cos(-3\pi) = -1$$



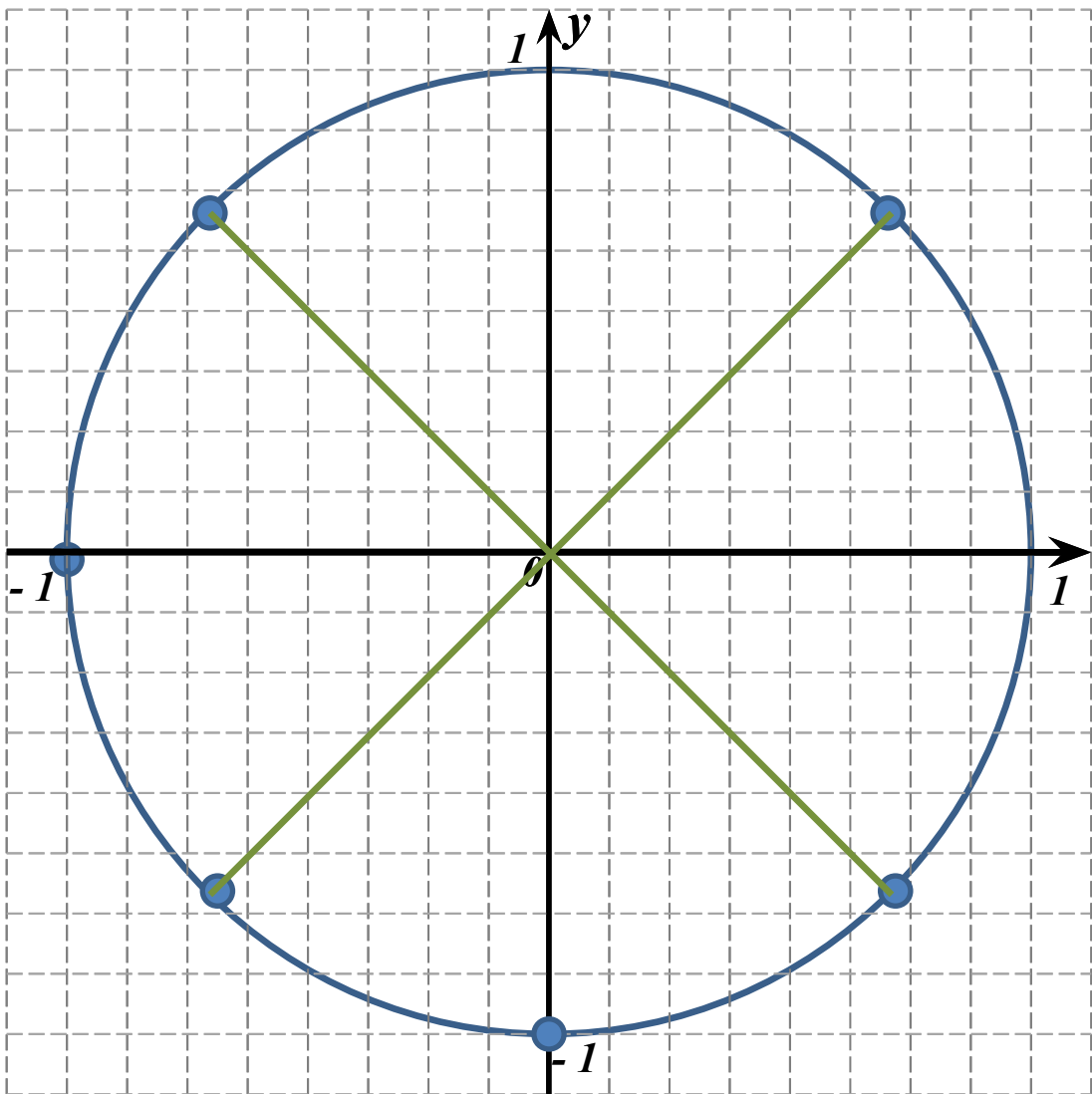


Точки B, C, D делят дугу AF на равные дуги.

Дуга AF составляет 180° или π радиан.

Тогда каждая из дуг AB, BC, CD, DF равна $\frac{\pi}{4}$.

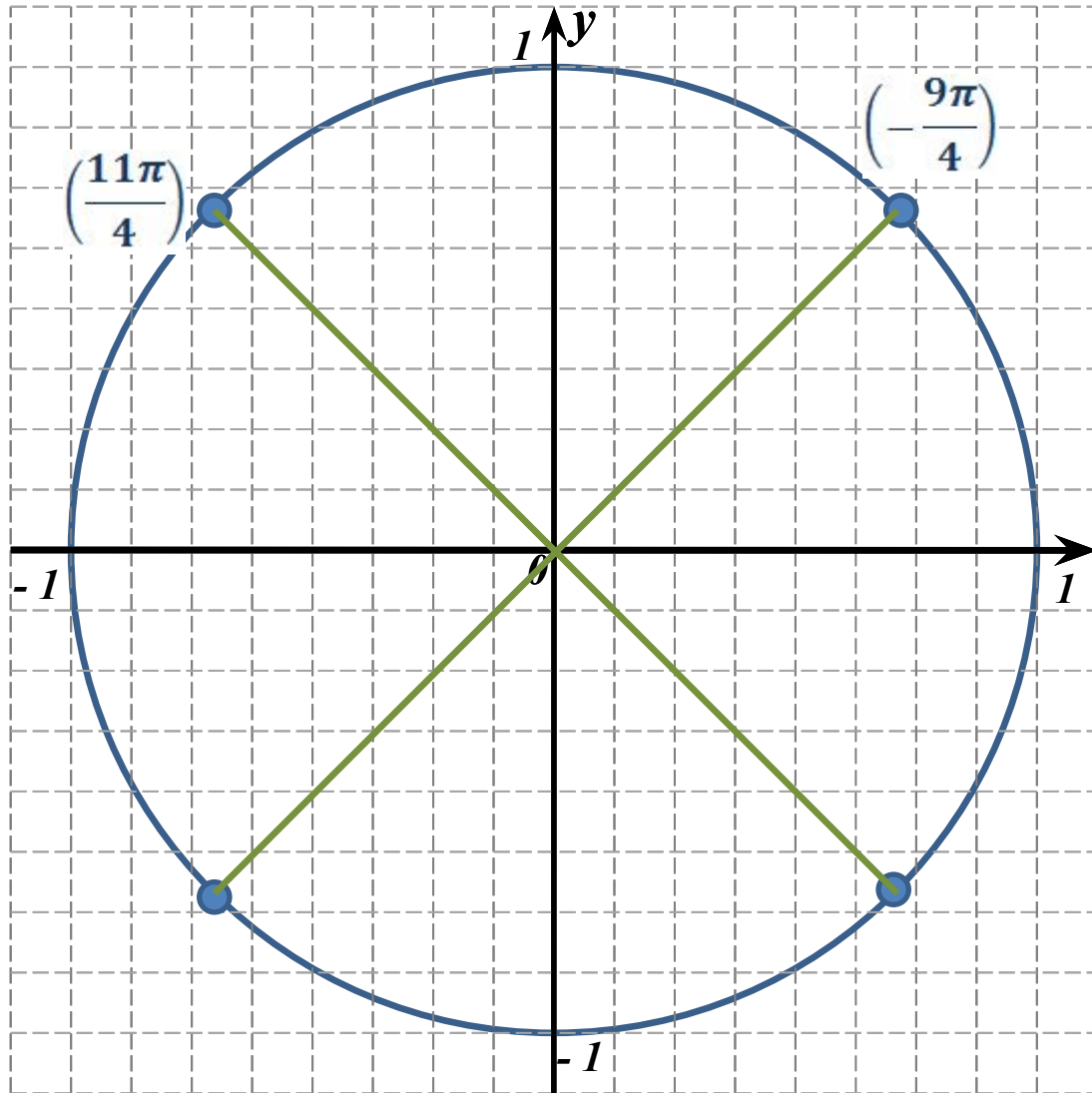
№ 1.2.11



- $\frac{3\pi}{4}$
- $-\frac{\pi}{4}$
- $\frac{5\pi}{4}$
- $\frac{7\pi}{2}$
- -5π
- $\frac{9\pi}{4}$



№ 1.2.12



$$-\frac{5\pi}{4}$$

$$\frac{11\pi}{4}$$

$$-\frac{7\pi}{4}$$

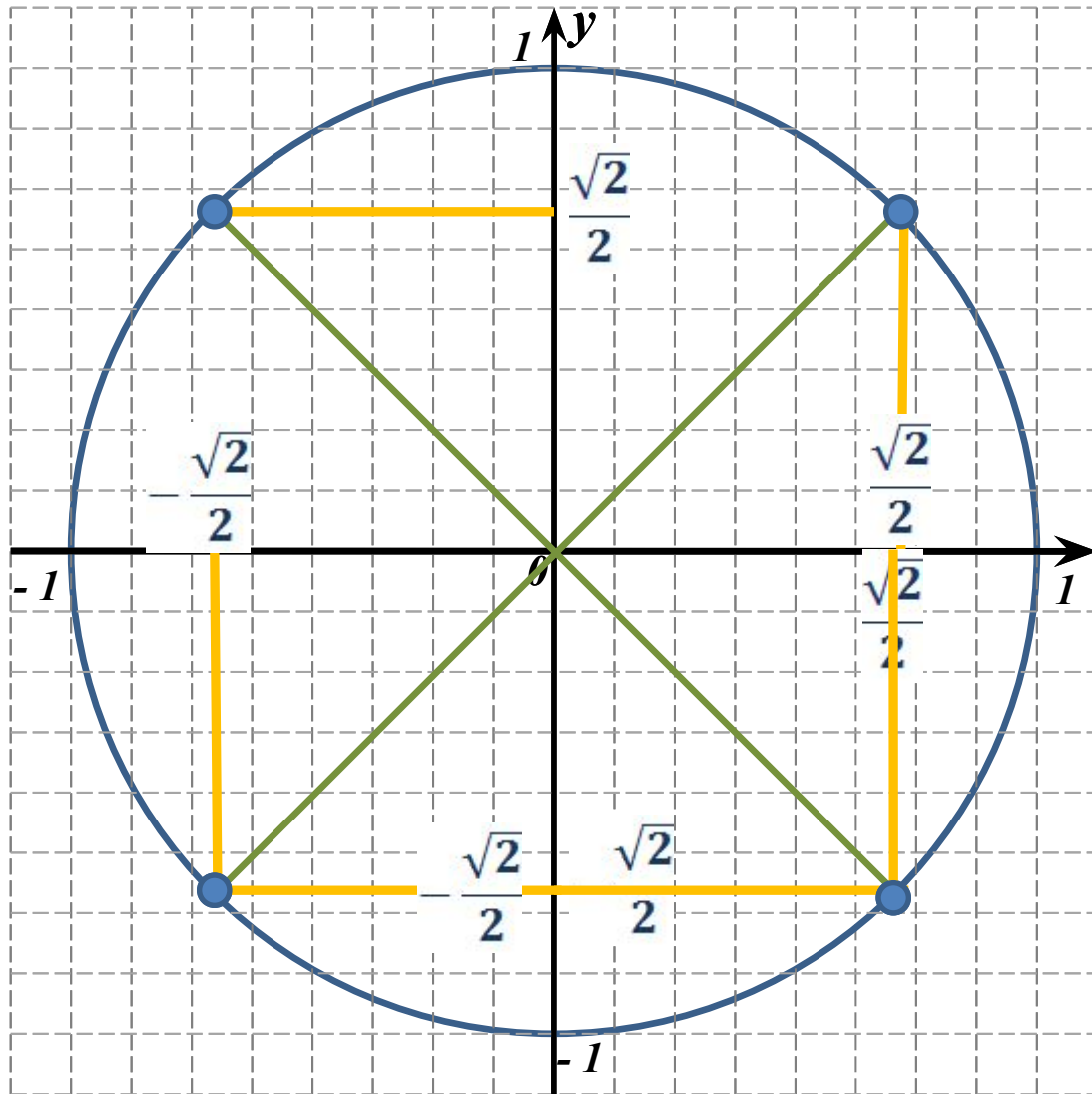
$$\frac{13\pi}{4}$$

$$-\frac{9\pi}{4}$$

$$\frac{15\pi}{4}$$



№ 1.2.13



$$\cos \frac{\pi}{4} =$$

$$\sin \left(-\frac{3\pi}{4} \right) =$$

$$\cos \frac{5\pi}{4} =$$

$$\sin \left(-\frac{9\pi}{4} \right) =$$

$$\cos \frac{7\pi}{4} =$$

$$\sin \frac{19\pi}{4} =$$



Nº 1.2.14

$$\sin\left(-\frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2}$$

$$\cos\left(-\frac{5\pi}{4}\right) = -\frac{\sqrt{2}}{2}$$

$$\sin\frac{7\pi}{4} = -\frac{\sqrt{2}}{2}$$

$$\cos\frac{11\pi}{4} = -\frac{\sqrt{2}}{2}$$

$$\sin\left(-\frac{5\pi}{2}\right) = \mathbf{0}$$

$$\cos\frac{13\pi}{4} = -\frac{\sqrt{2}}{2}$$



Nº 1.2.15

$$\cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\sin \left(-\frac{3\pi}{4} \right) = -\frac{\sqrt{2}}{2}$$

$$\cos \frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$$

$$\sin \left(-\frac{9\pi}{4} \right) = -\frac{\sqrt{2}}{2}$$

$$\cos \frac{7\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\sin \frac{19\pi}{4} = \frac{\sqrt{2}}{2}$$



Nº 1.2.16

$$\sin\left(-\frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2}$$

$$\cos\left(-\frac{5\pi}{4}\right) = \frac{\sqrt{2}}{2}$$

$$\sin\frac{7\pi}{4} = -\frac{\sqrt{2}}{2}$$

$$\cos\frac{11\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\sin\left(-\frac{5\pi}{2}\right) = -1$$

$$\cos\frac{13\pi}{4} = -\frac{\sqrt{2}}{2}$$



Nº 1.2.17

$$\cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\sin \left(-\frac{3\pi}{4} \right) = -\frac{\sqrt{2}}{2}$$

$$\cos \frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$$

$$\sin \left(-\frac{9\pi}{4} \right) = -\frac{\sqrt{2}}{2}$$

$$\cos \frac{7\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\sin \frac{19\pi}{4} = \frac{\sqrt{2}}{2}$$



№ 1.2.18

$$\sin\left(-\frac{7\pi}{4}\right) = \frac{\sqrt{2}}{2}$$

$$\cos\left(-\frac{5\pi}{2}\right) = 0$$

$$\sin\frac{17\pi}{4} = -\frac{\sqrt{2}}{2}$$

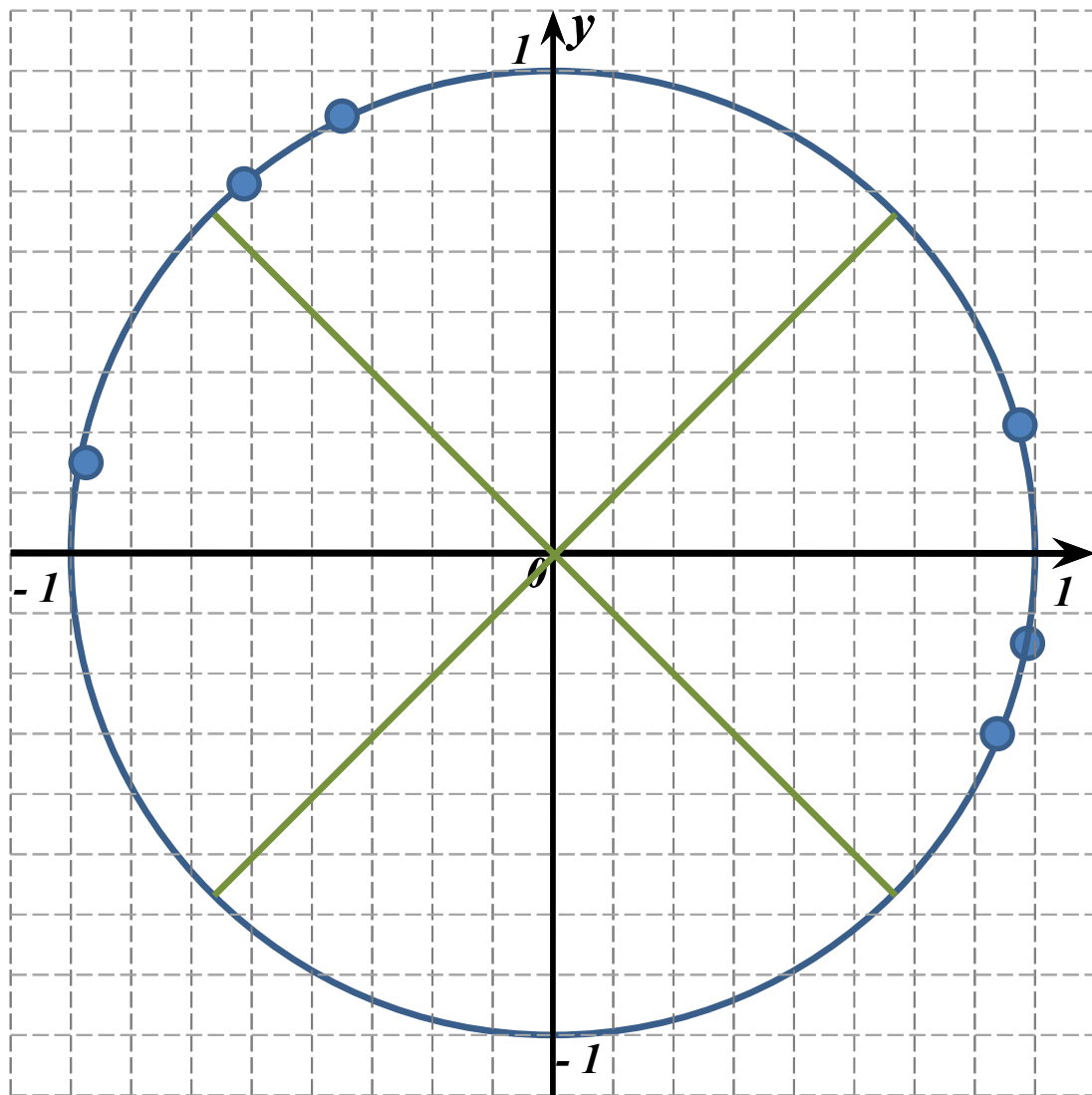
$$\cos 11\pi = -1$$

$$\sin\left(-\frac{15\pi}{4}\right) = \frac{\sqrt{2}}{2}$$

$$\cos\frac{21\pi}{4} = -\frac{\sqrt{2}}{2}$$



№ 1.2.19



2

3

- 4

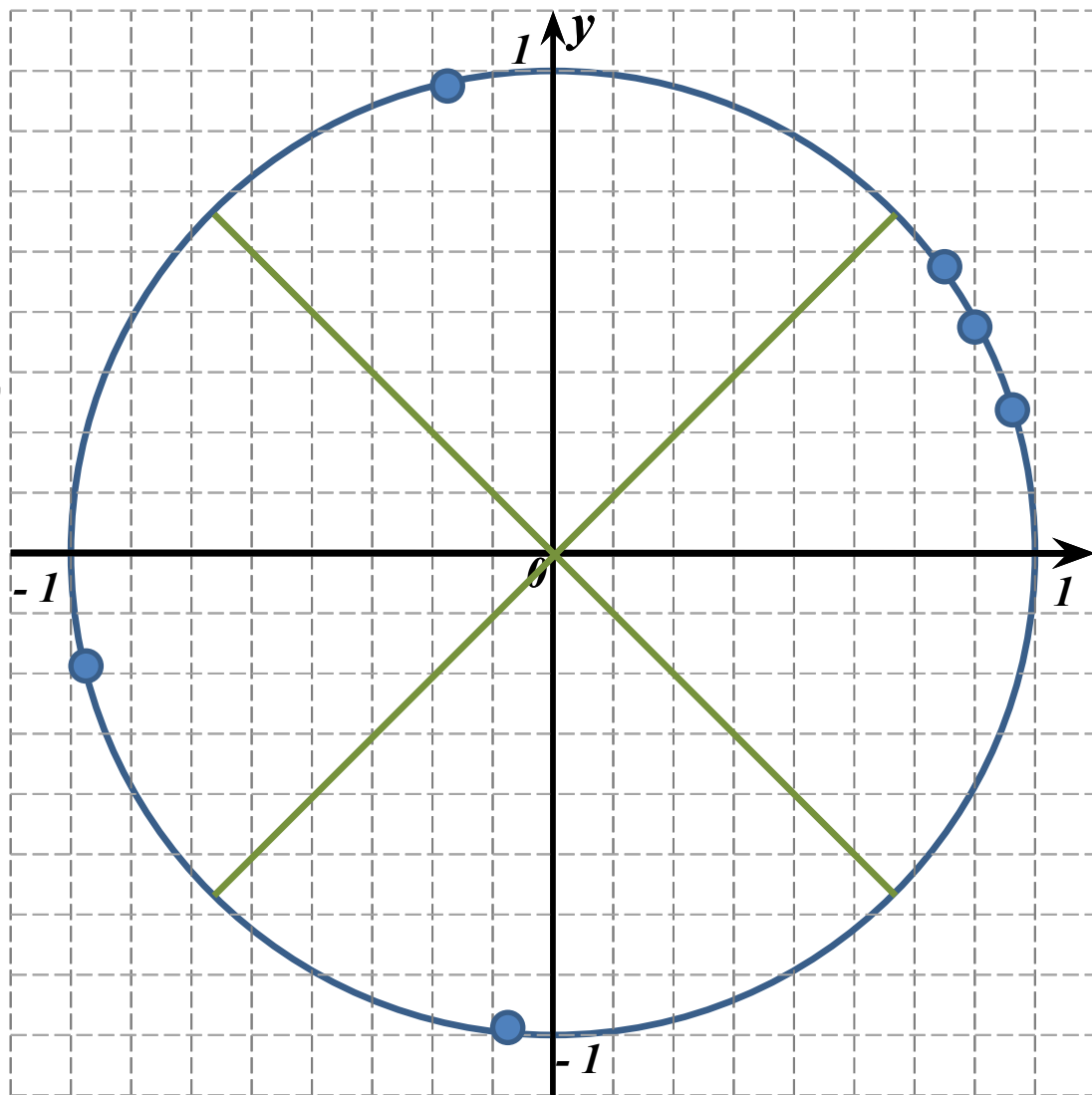
6

- 7

12



№ 1.2.20



1,8

3,6

4,5

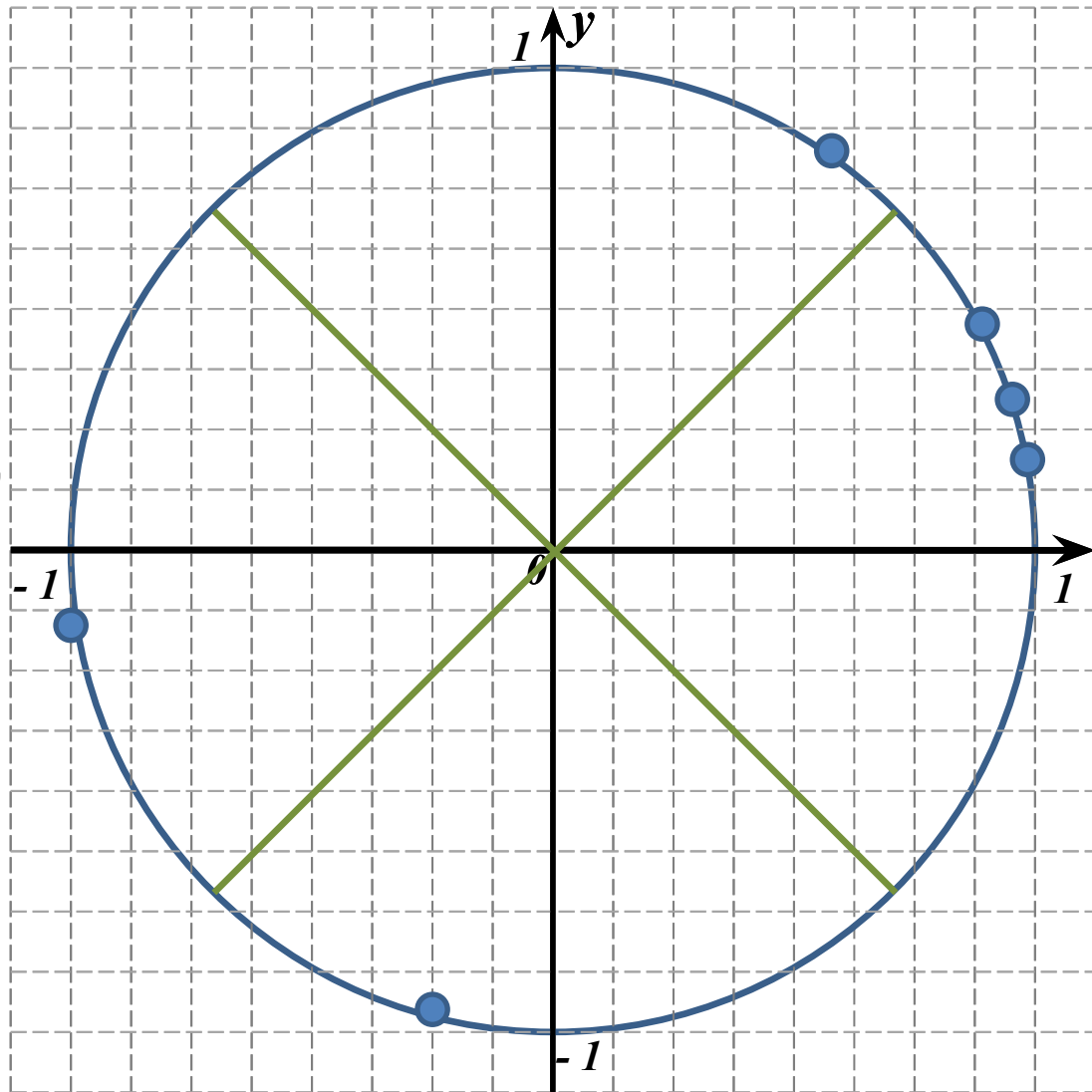
- 5,7

- 7,8

9



№ 1.2.21



1

4

- 3

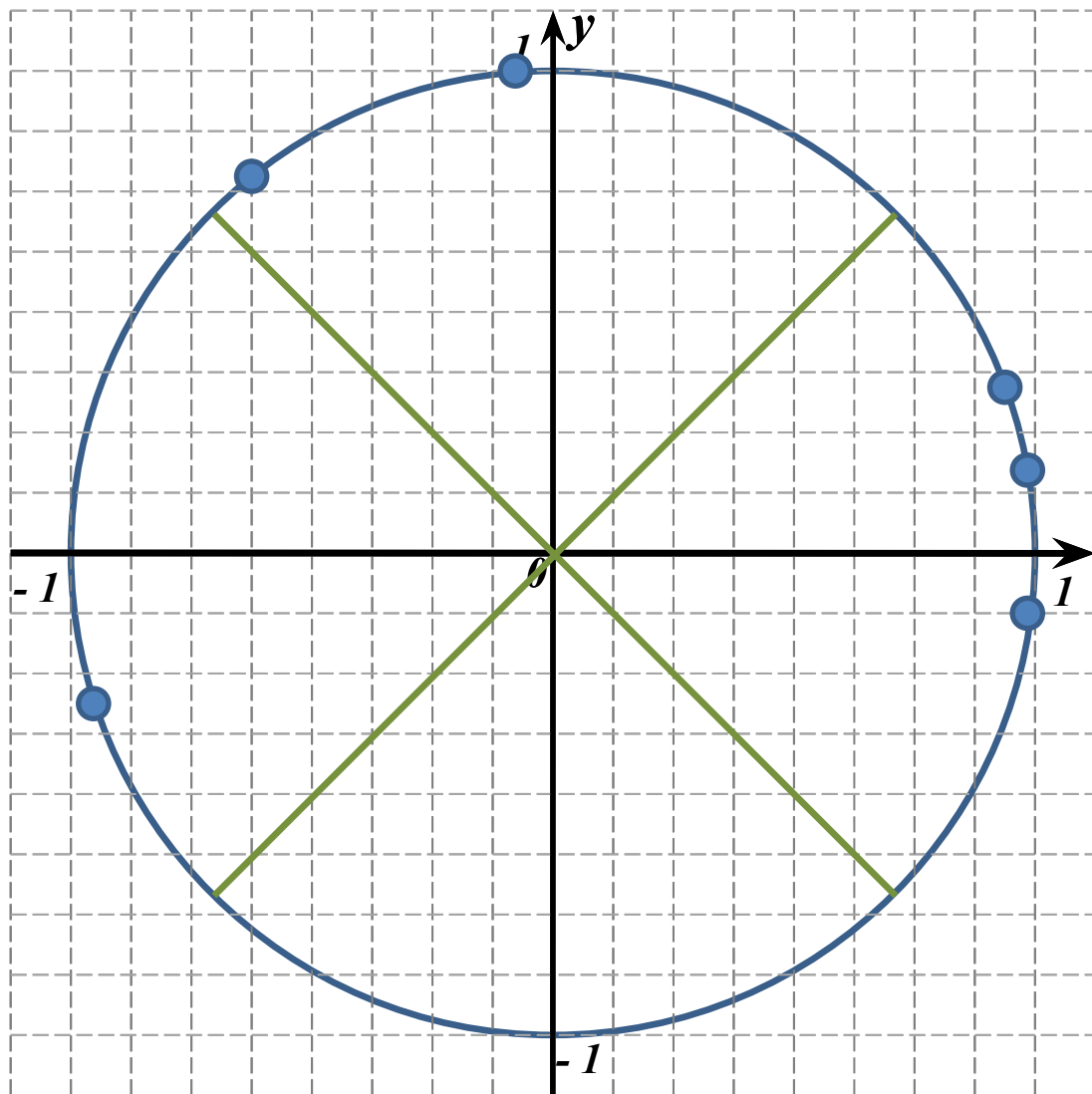
- 6

7

- 12



№ 1.2.22



- 2,3

3,7

- 4,5

- 8

- 10

13



№ 1.2.23

1,9 € II четверти

- 3,8 € IV четверти

5 € IV четверти

17 € IV четверти

- 1,3 € IV четверти

- 2,8 € III четверти



№ 1.2.24

– 5,4 € I четверти

2,8 € II четверти

3,4 € III четверти

– 9 € I четверти

16 € IV четверти

– 10 € IV четверти

