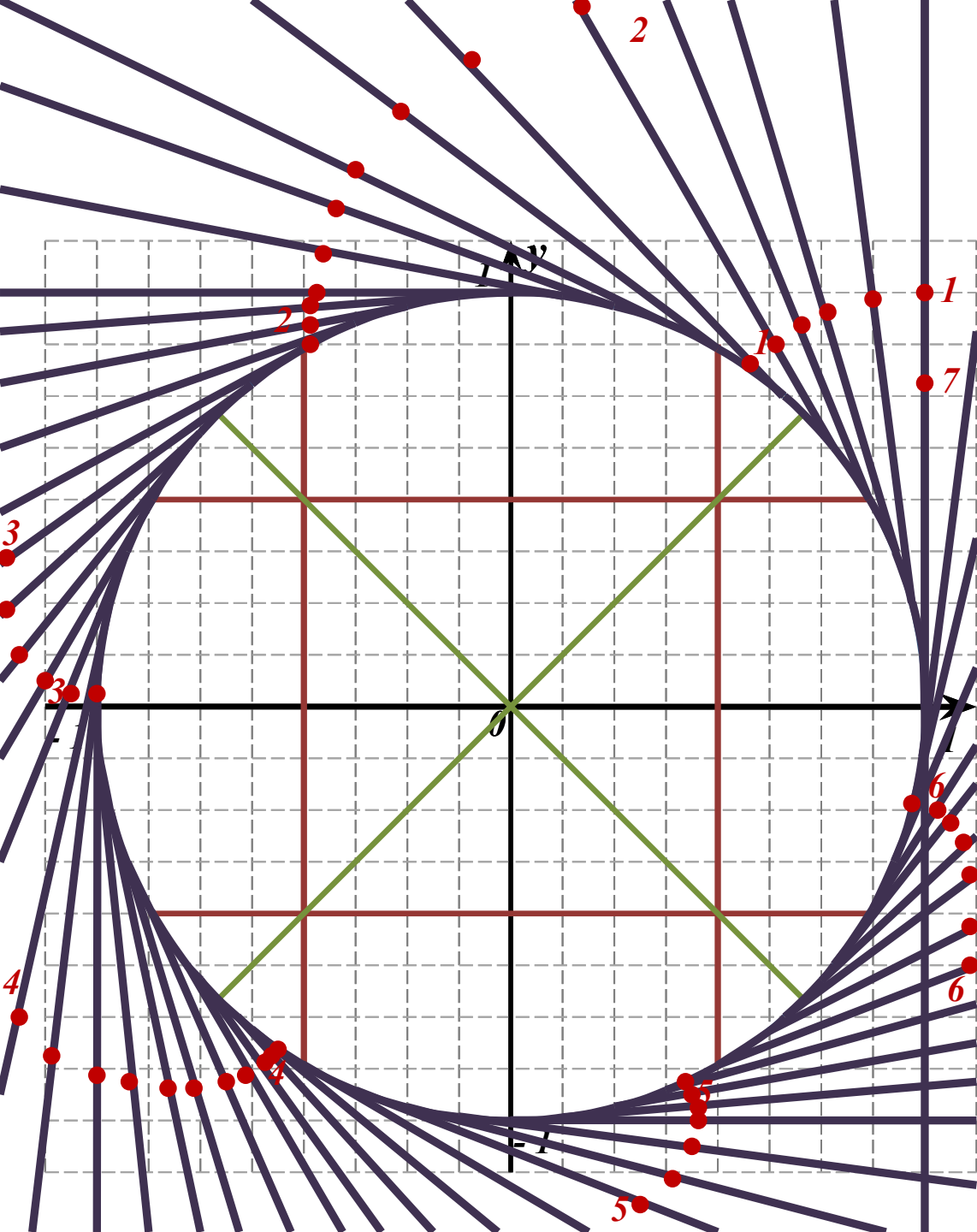


Радианная мера угла

Возьмем числовую ось, начало которой совпадет 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.

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

$$C = 2\pi$$

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

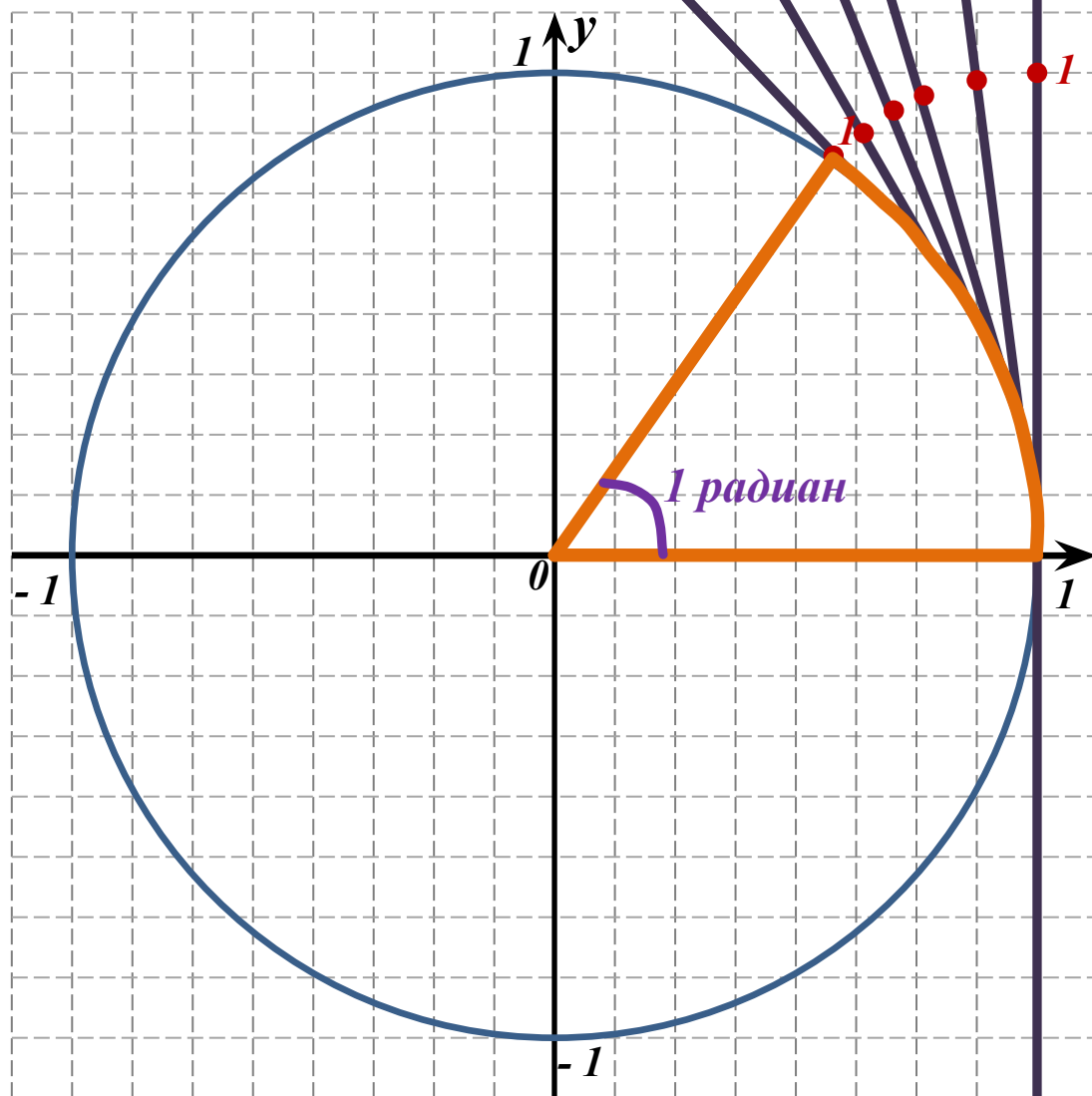
$$1^{\circ} = \frac{2\pi}{360^{\circ}}$$

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

$$1 \text{ рад} \approx 57^{\circ}$$

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

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



№ 1.2.1

$$\alpha^0 = \frac{2\pi}{360^0} \cdot \alpha^0$$

$$30^0 = \frac{2\pi}{360^0} \cdot 30^0 = \frac{\pi}{6}$$

$$45^0 = \frac{\pi}{4}$$

$$-60^0 = -\frac{\pi}{3}$$

$$90^0 = \frac{\pi}{2}$$

$$-135^0 = -\frac{3\pi}{4}$$

$$390^0 = \frac{13\pi}{6}$$

№ 1.2.2

$$\alpha^0 = \frac{2\pi}{360^0} \cdot \alpha^0$$

$$120^0 = \frac{2\pi}{3}$$

$$210^0 = \frac{7\pi}{6}$$

$$180^0 = \pi$$

$$330^0 = \frac{5\pi}{3}$$

$$-225^0 = -\frac{5\pi}{4}$$

$$300^0 = \frac{11\pi}{6}$$

№ 1.2.3

$$\beta \text{ рад} = \frac{360^0}{2\pi} \cdot \beta$$

$$\frac{\pi}{5} = \frac{360^0}{2\pi} \cdot \frac{\pi}{5} = 36^0$$

$$\frac{\pi}{10} = 18^0$$

$$\frac{4\pi}{3} = 240^0$$

$$-\frac{\pi}{12} = -15^0$$

$$\frac{\pi}{36} = 5^0$$

$$-\frac{\pi}{18} = -10^0$$

№ 1.2.4

$$\beta \text{ рад} = \frac{360^0}{2\pi} \cdot \beta$$

$$\frac{\pi}{6} = 30^0$$

$$\frac{\pi}{24} = 7,5^0$$

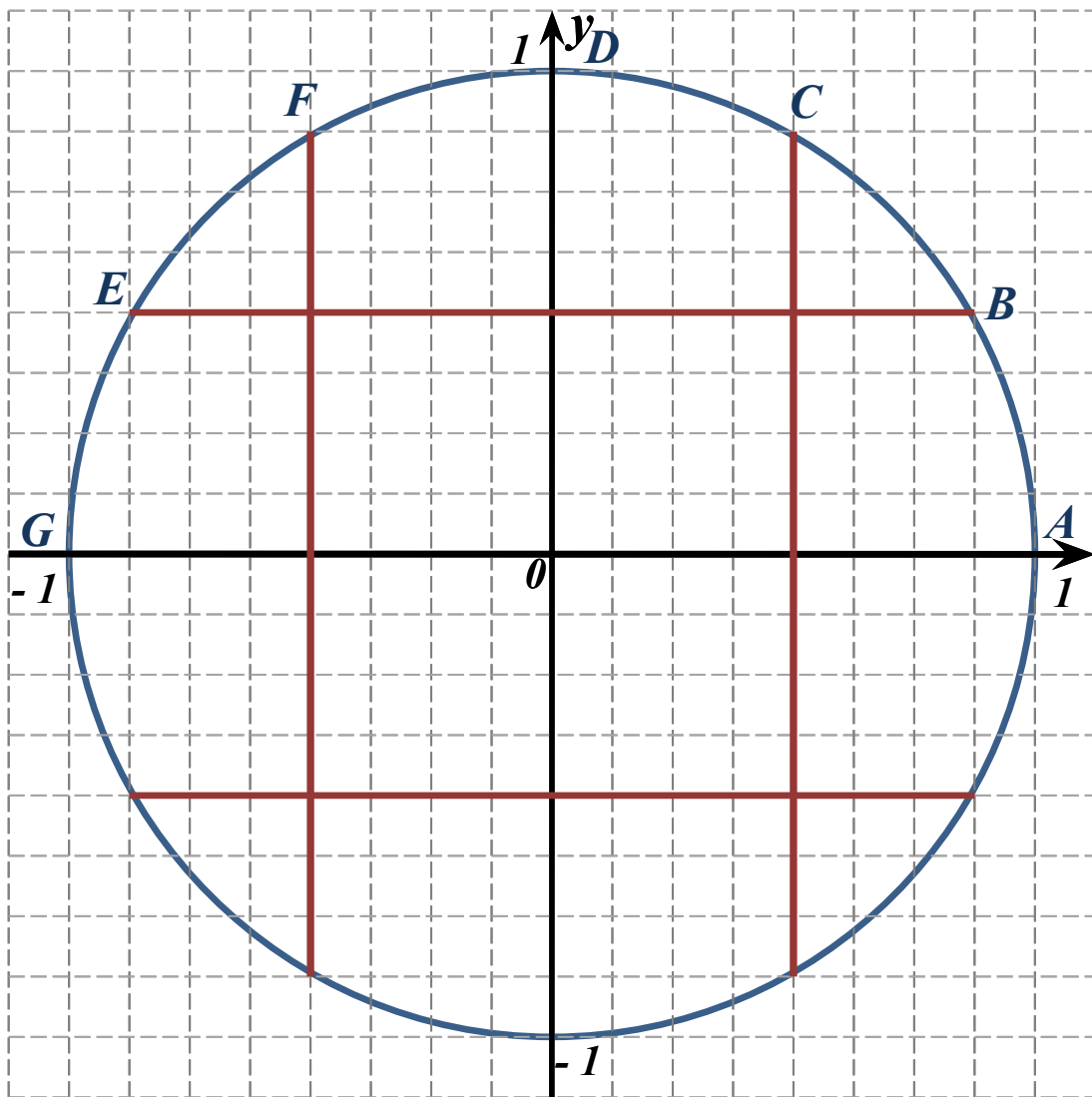
$$\frac{5\pi}{6} = 150^0$$

$$2\pi = 360^0$$

$$\frac{17\pi}{6} = 510^0$$

$$-\frac{\pi}{2} = -90^0$$





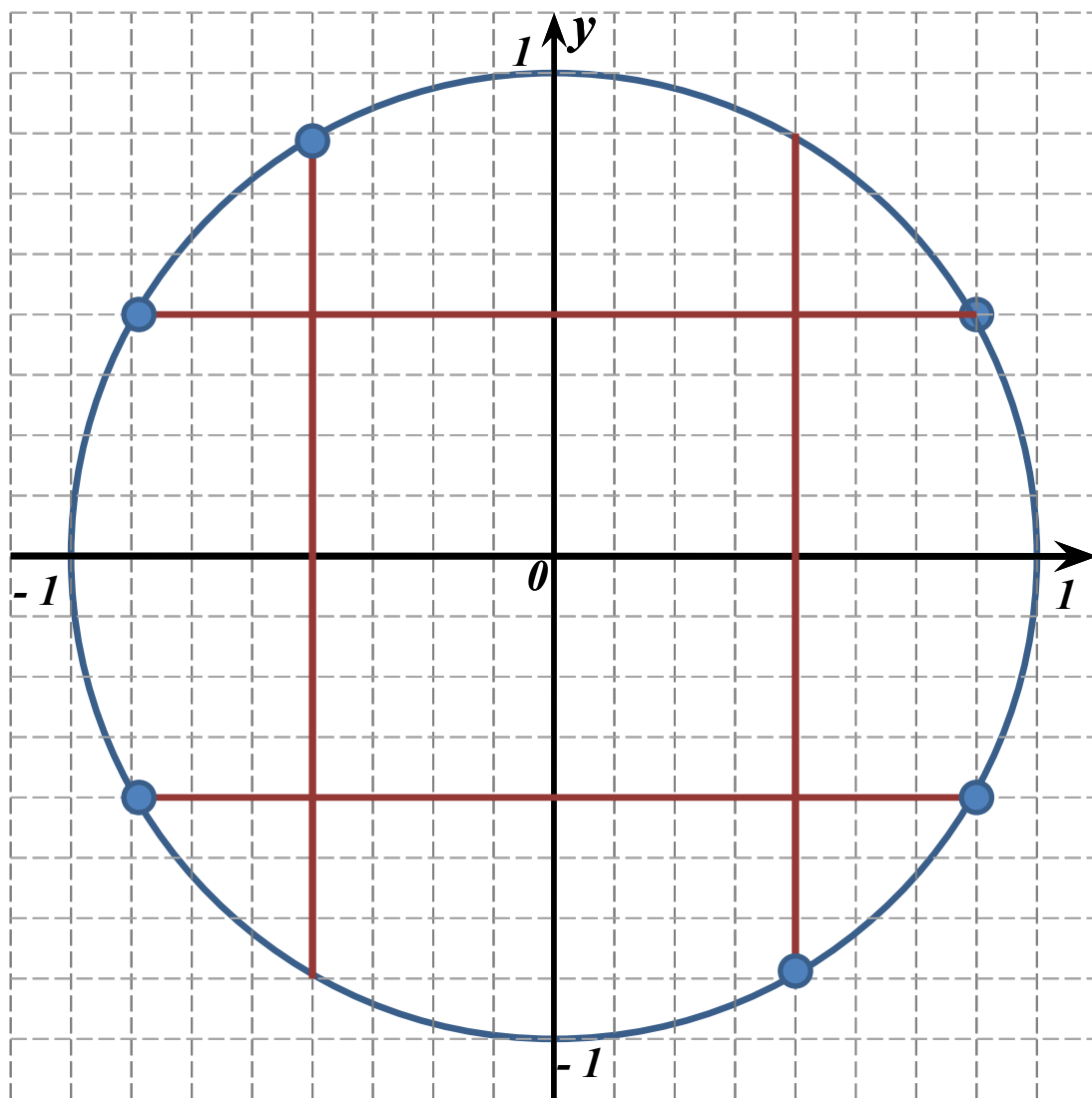
Точки B, C, D, F, E делят дугу AG на равные дуги.

Дуга AG составляет 180^0 или π радиан.

Тогда каждая из дуг AB, BC, CD, DF,

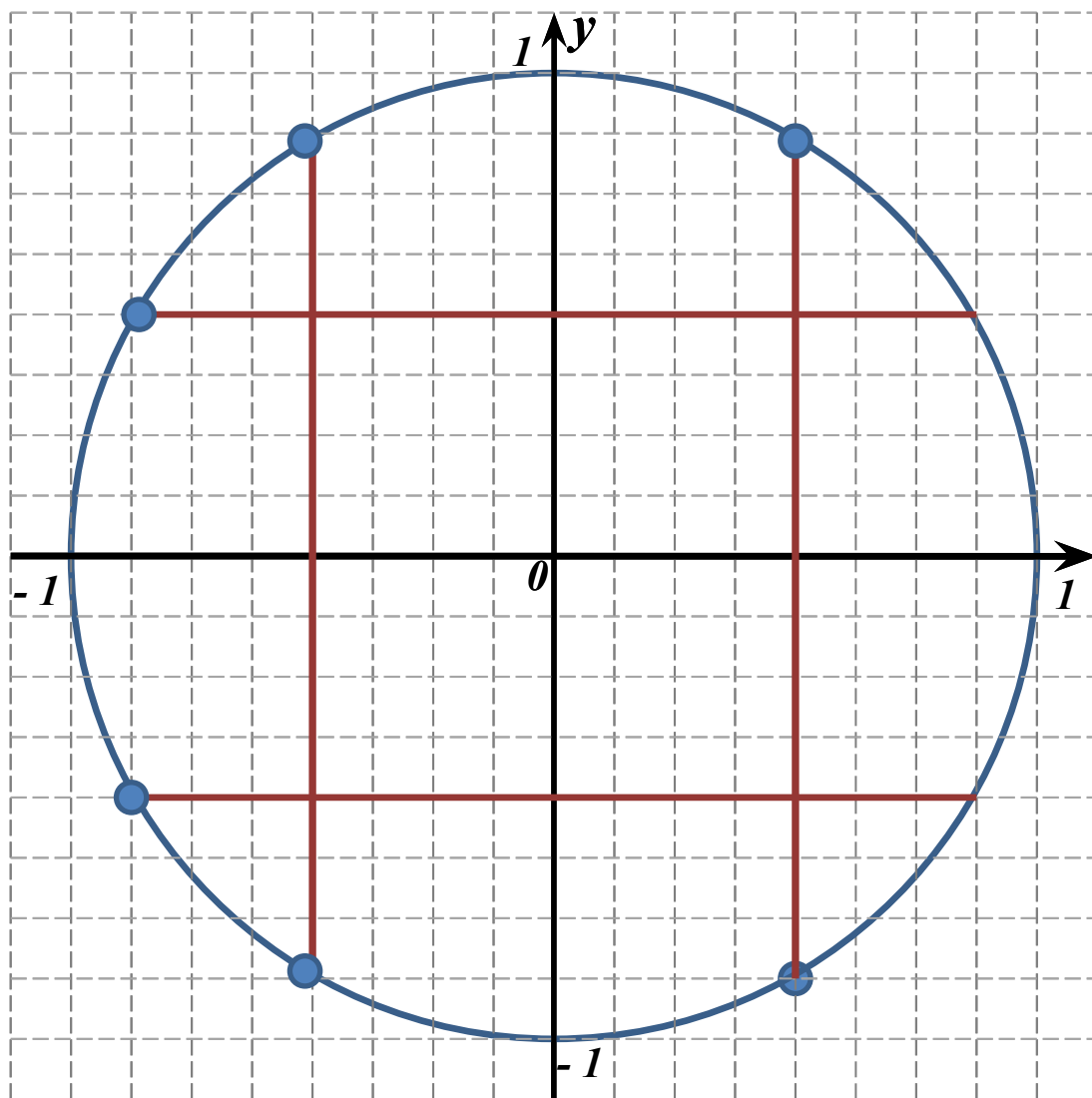
FE и EG равна $\frac{\pi}{6}$

№ 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



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

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

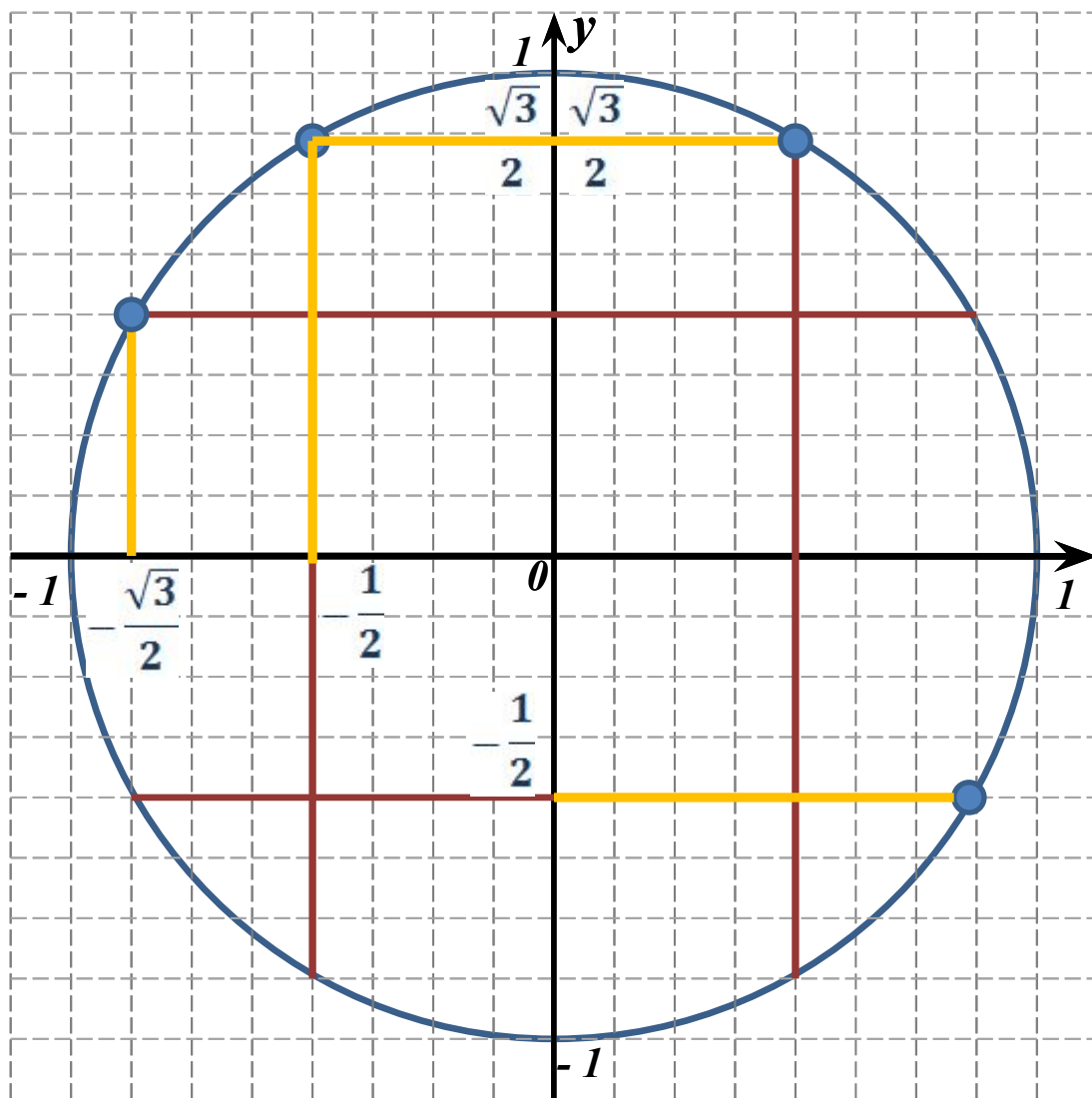
$$\frac{\pi}{3}$$

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

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

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

№ 1.2.7



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

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

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

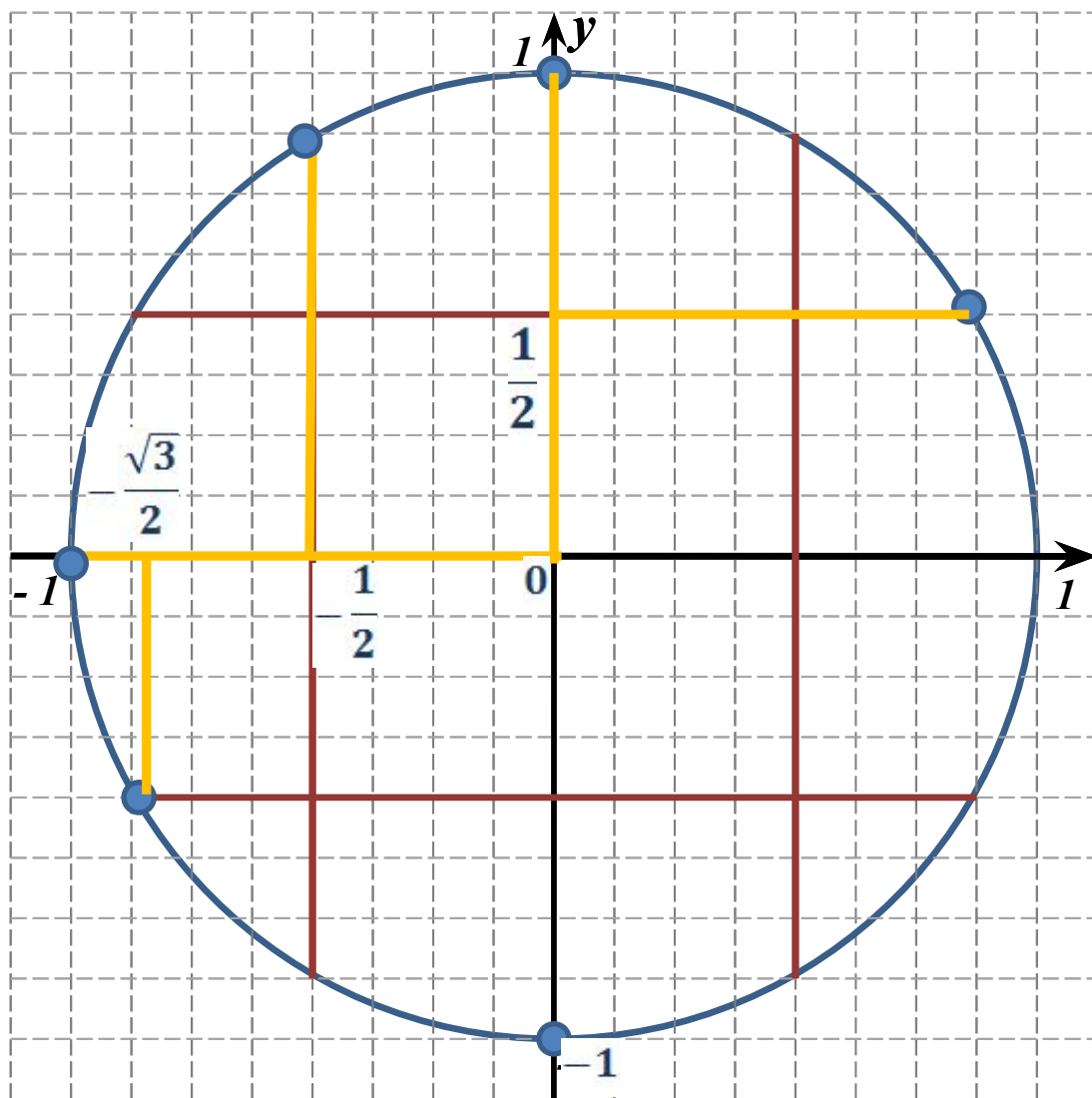
$$\sin \frac{2\pi}{3} =$$

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

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



№ 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

$$\cos 2\pi = 1$$

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

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

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

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

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



№ 1.2.10

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

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

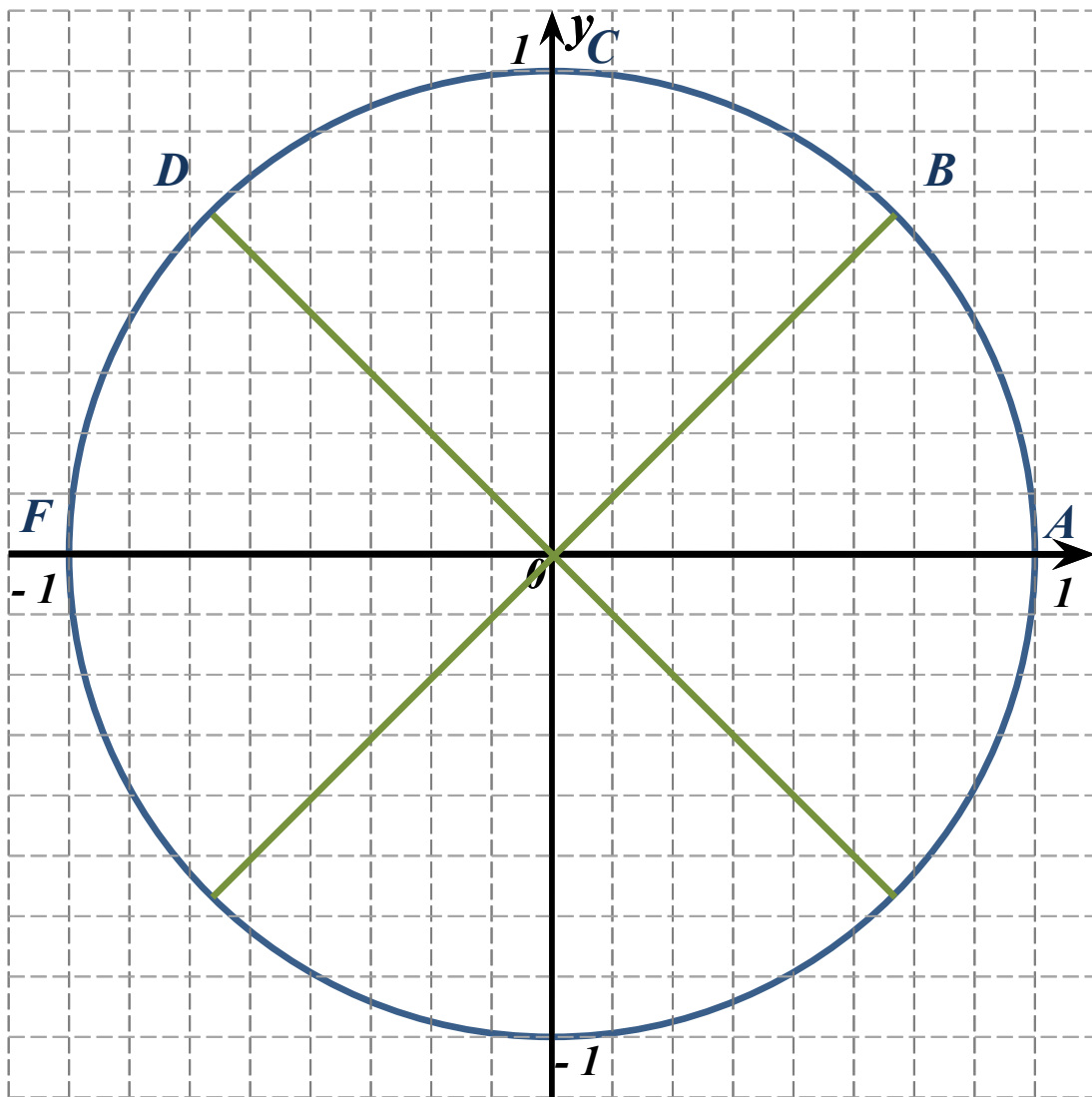
$$\sin\frac{8\pi}{3} = \frac{\sqrt{3}}{2}$$

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

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

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



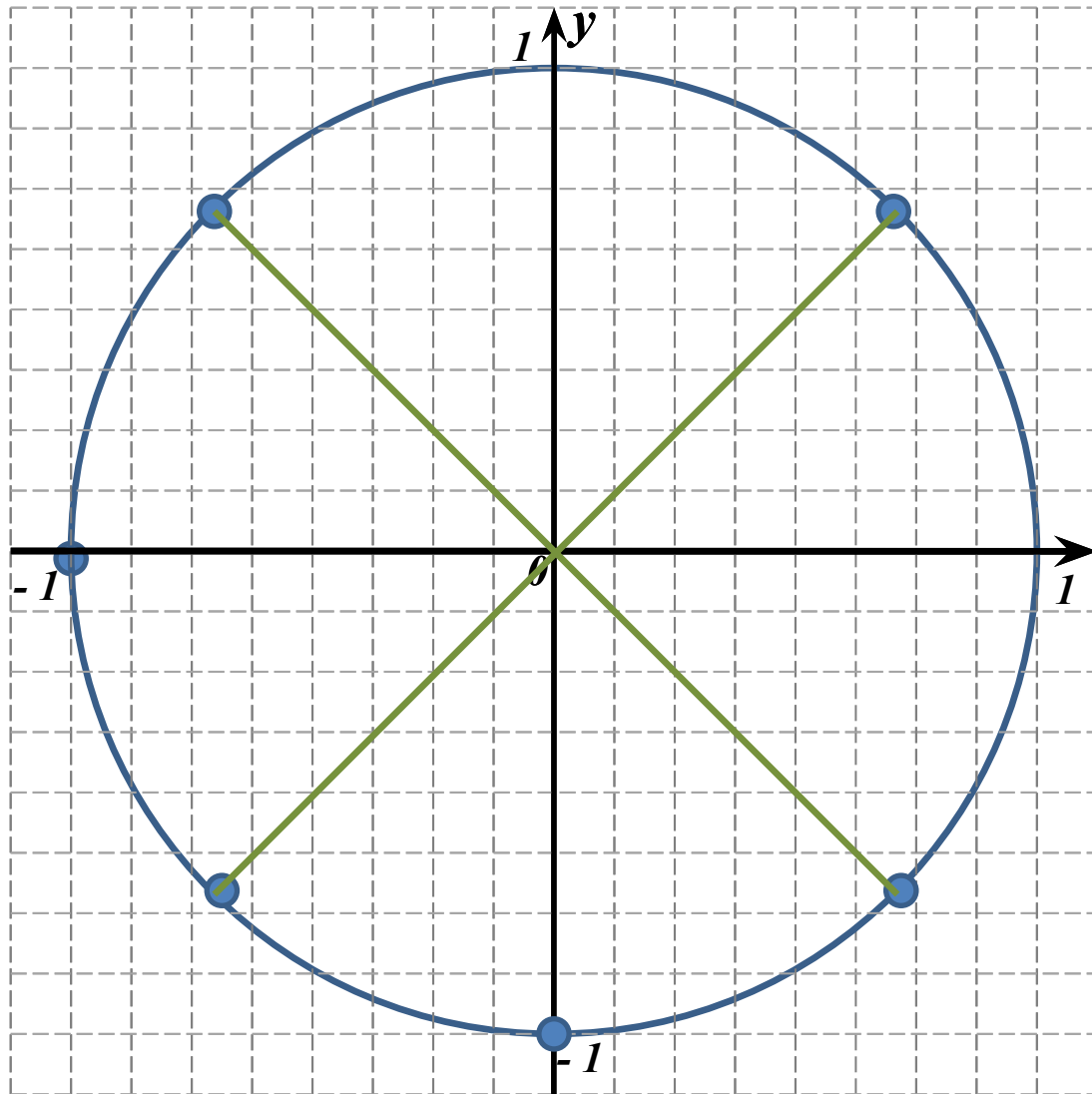


Точки B, C, D делят дугу AF на равные дуги.

Дуга AF составляет 180° или π радиан.

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

№ 1.2.11



$$\frac{3\pi}{4}$$

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

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

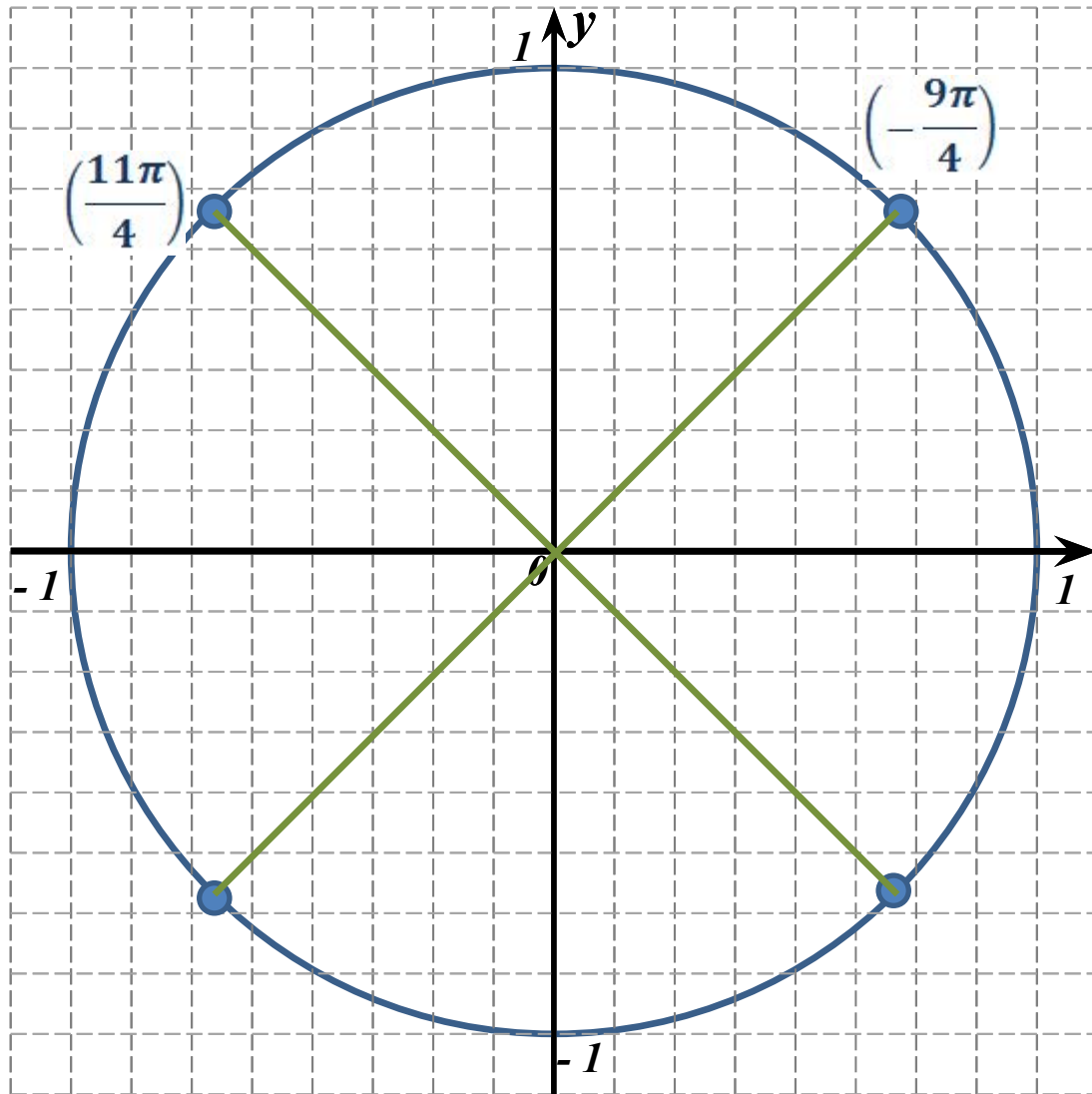
$$\frac{7\pi}{2}$$

$$-5\pi$$

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



№ 1.2.12



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

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

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

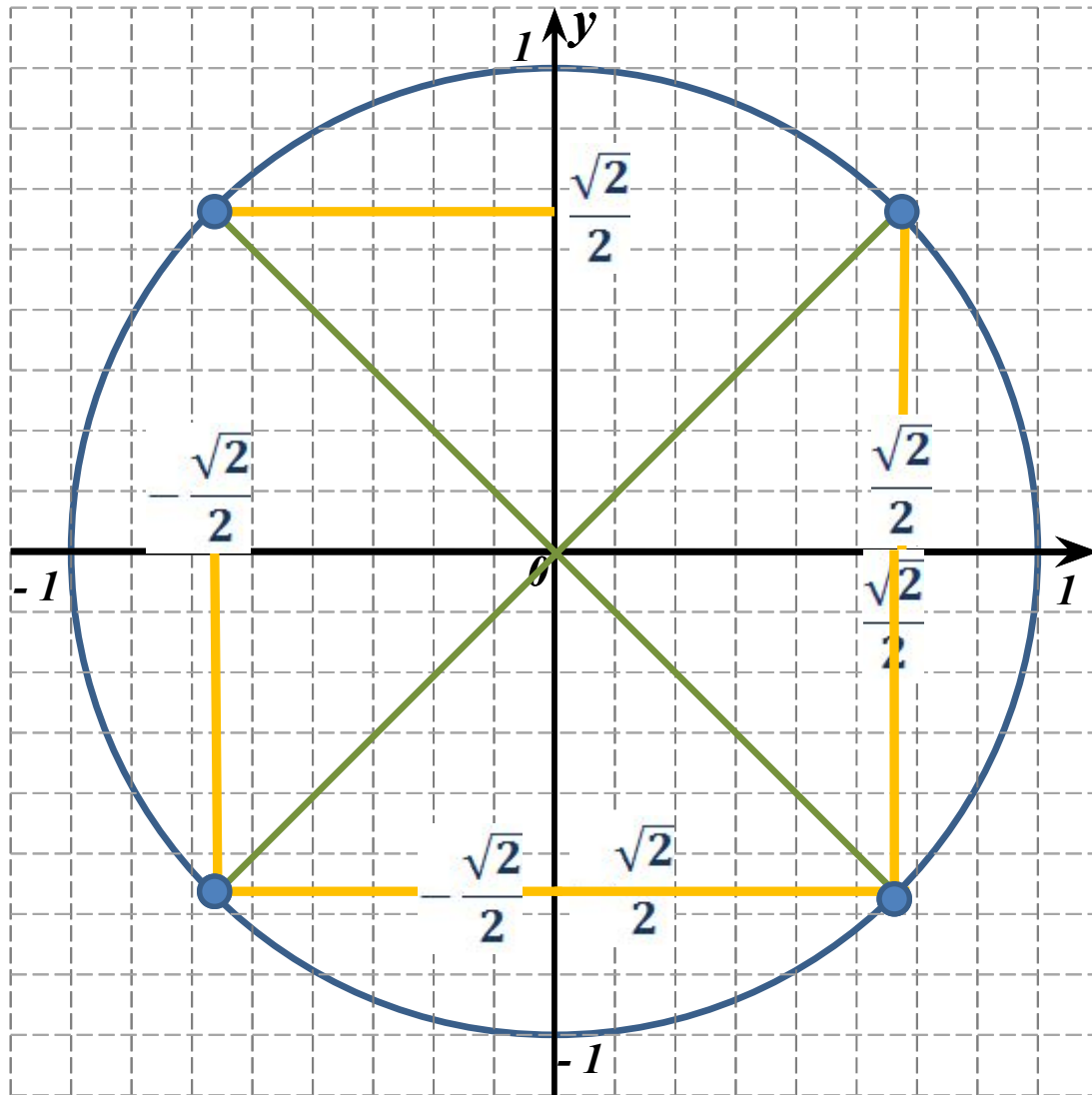
$$\frac{13\pi}{4}$$

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

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



№ 1.2.13



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

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

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

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

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

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



№ 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

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

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

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

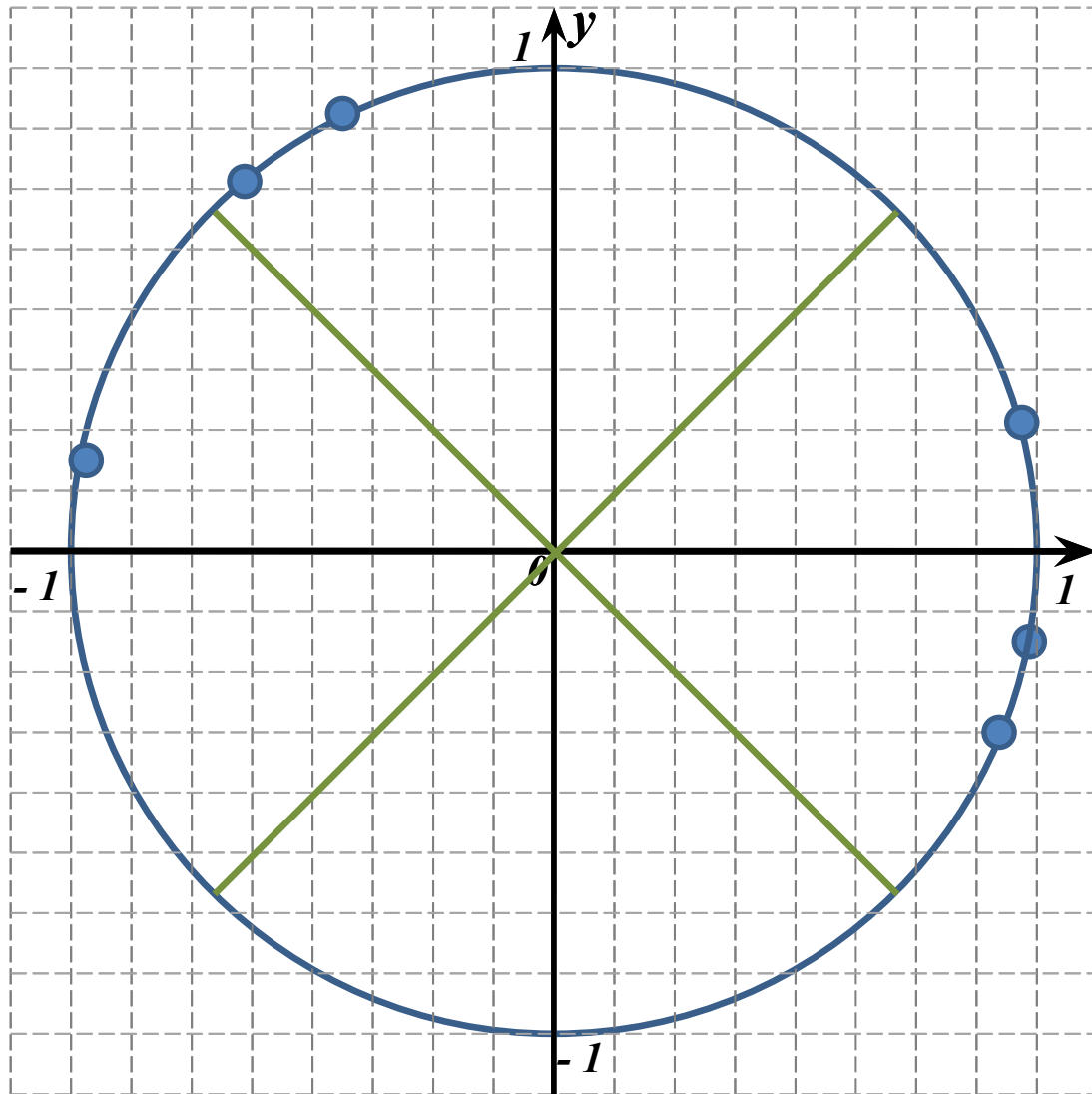
$$\cos 11\pi = -1$$

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

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



№ 1.2.19



2

3

- 4

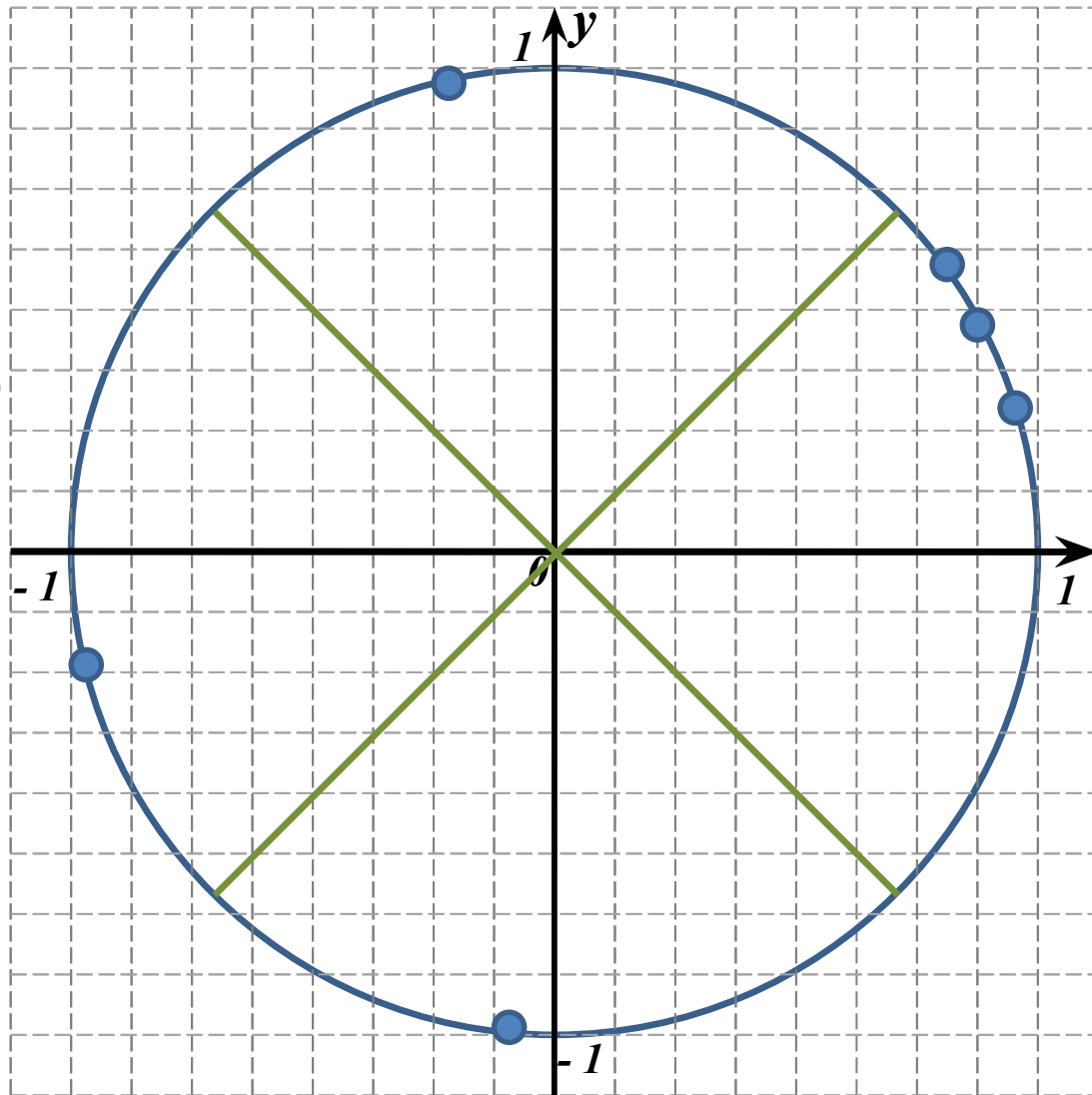
6

- 7

12



№ 1.2.20



1,8

3,6

4,5

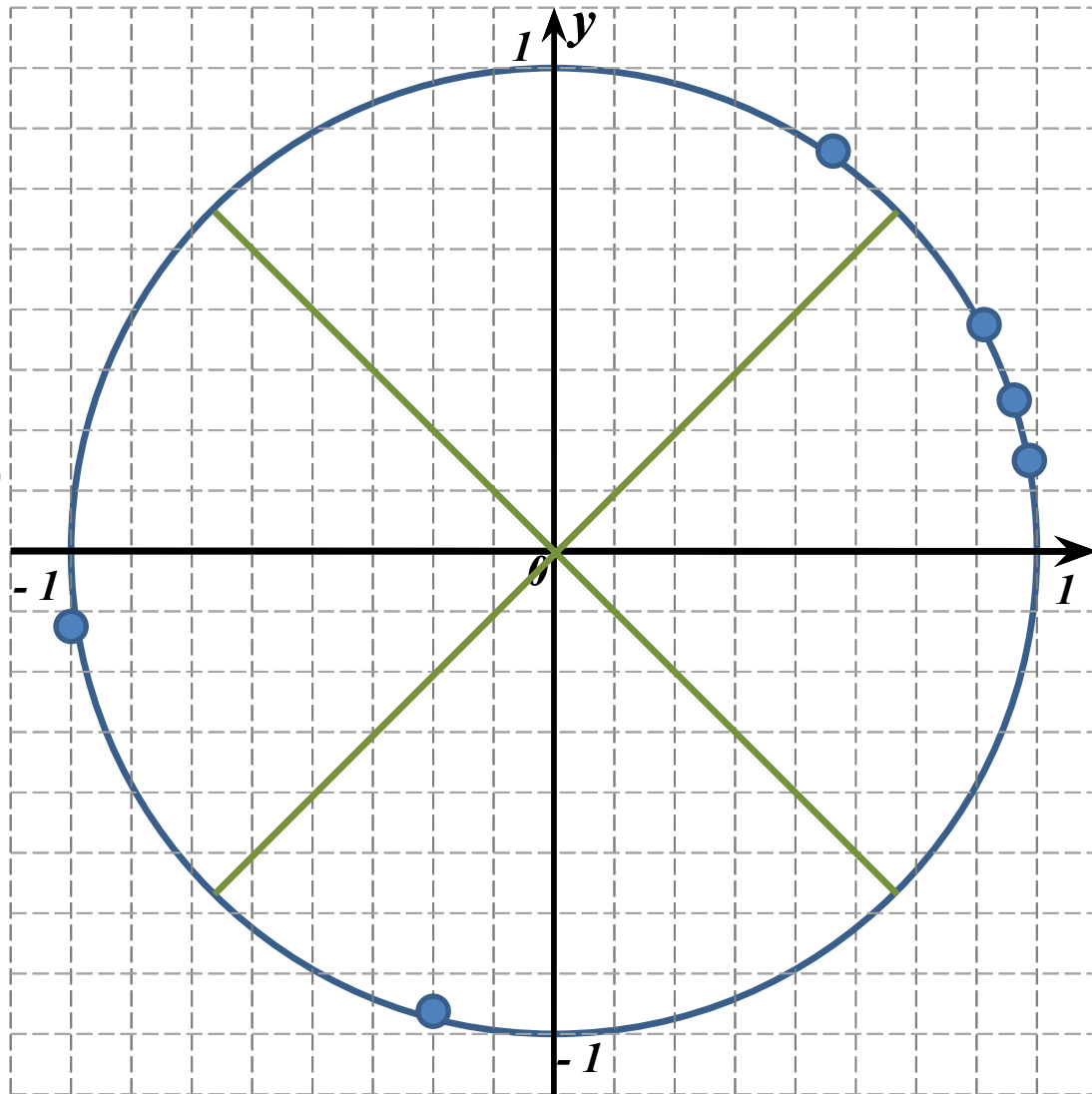
- 5,7

- 7,8

9



№ 1.2.21



1

4

- 3

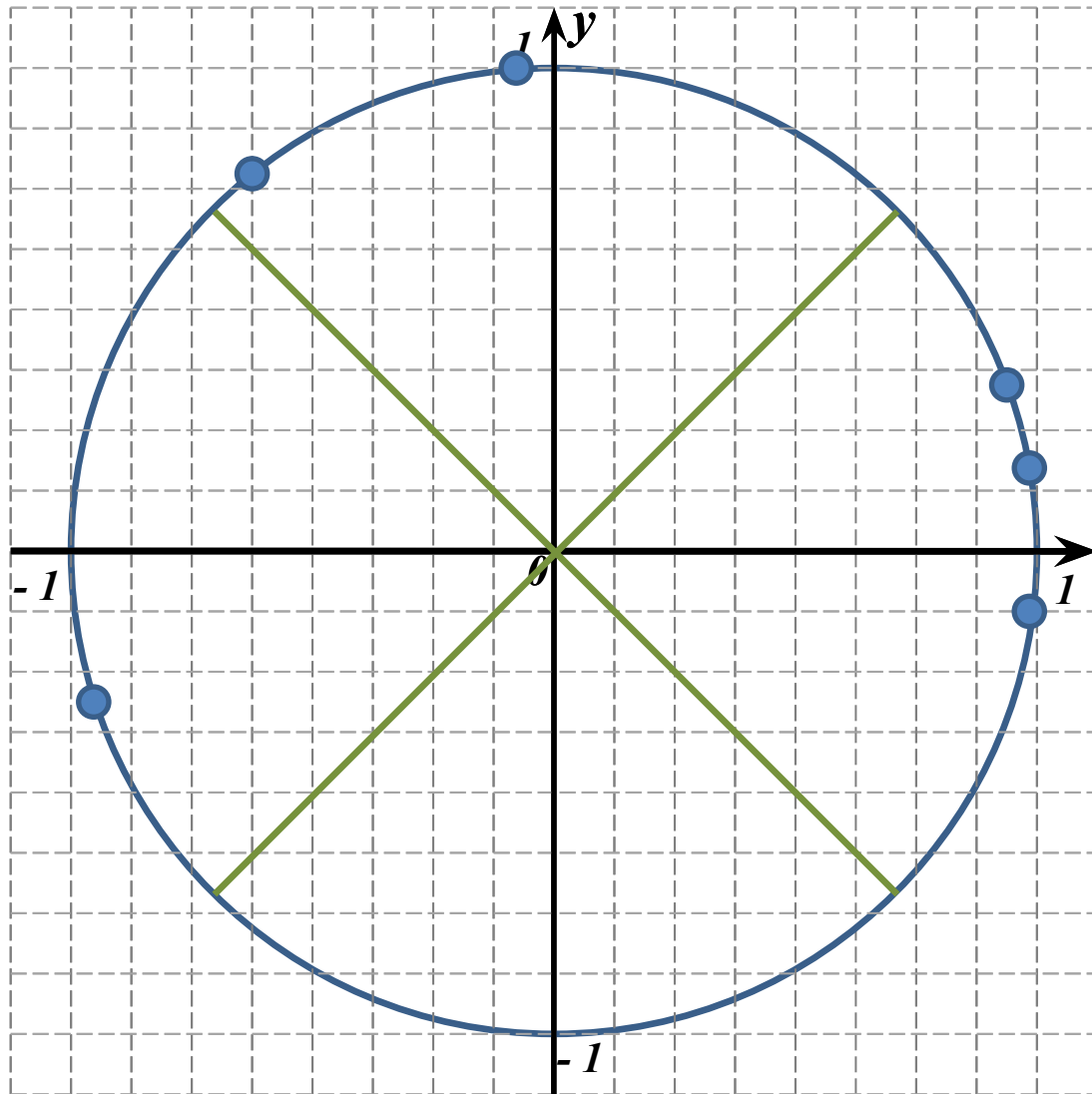
- 6

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

