1. Өнцөгийн хэмжээг радианаар илэрхийл.

1) $15^0 =$
2) $30^0 =$
3) $40^0 =$
4) $50^0 =$

5) $60^0 =$
6) $800^0 =$
7) $90^0 =$
8) $100^0 =$

9) $135^0 =$
10) $150^0 =$
11) $270^0 =$
12) $360^0 =$

2. Өнцөгийн хэмжээг градусаар илэрхийл.

1) $\frac{\pi}{18} =$
2) $\frac{\pi}{12} =$
3) $\frac{\pi}{10} =$
4) $\frac{\pi}{9} =$
5) $\frac{\pi}{6} =$

6) $\frac{\pi}{4} =$
7) $\frac{\pi}{3} =$
8) $\frac{\pi}{5} =$
9) $\frac{2\pi}{5} =$
10) $\frac{5\pi}{6} =$

11) $\frac{3\pi}{2} =$
12) $\frac{7\pi}{3} =$
13) $\frac{3\pi}{4} =$
14) $\frac{9\pi}{4} =$

3. Адилтгалыг батал.

1) $cos^2\alpha - 1 = -sin^2\alpha$
2) $1 - 2sin^2\alpha = 2cos^2\alpha - 1$
3) $sin^2\alpha \cdot sin^2\beta + sin^2\alpha \cdot cos^2\beta + cos^2\alpha = 1$
4) $cos^4\alpha - sin^4\alpha = cos^2\alpha - sin^2\alpha$
5) $(1 + tg^2\alpha)(1 - sin^2\alpha) - sin^2\alpha = cos^2\alpha$
6) $tg^2\alpha \cdot ctg^2\alpha - cos^2\alpha = sin^2\alpha$
7) $sin^4\alpha + cos^4\alpha = 1 - 2sin^2\alpha \cdot cos^2\alpha$
8) $sin^6\alpha + cos^6\alpha + 3sin^2\alpha \cdot cos^2\alpha = 1$
9) $2(sin^6\alpha + cos^6\alpha) - 3(sin^4\alpha + cos^4\alpha) + 1 = 0$
10) $\frac{tgx}{sinx} - \frac{sinx}{ctgx} = cosx$
11) $sin\left(\frac{\pi}{2} - x\right) = cosx$
12) $cos\left(\frac{\pi}{2} - x\right) = sinx$
13) $tg\left(\frac{\pi}{2} - x\right) = ctgx$
14) $ctg\left(\frac{\pi}{2} - x\right) = tgx$
15) $\frac{cos\alpha + sin\alpha}{cos\alpha - sin\alpha} = tg(45^0 + \alpha)$
16) $\frac{cos\alpha + 1}{sin\alpha} = ctg\frac{\alpha}{2}$
17) $\frac{sin\alpha}{1 - cos\alpha} = ctg\frac{\alpha}{2}$

4. Тригонометр функцийн утгыг ол.

1) $\sin\alpha = 0.6$ ба $\frac{\pi}{2} < \alpha < \pi$ бол $\cos\alpha, tg\alpha, ctg\alpha -$ ийг ол.

2) $tg\alpha = \sqrt{3}$ ба $\pi < \alpha < \frac{3\pi}{2}$ бол $\cos\alpha, \sin\alpha, ctg\alpha -$ ийг ол.

3) $\sin\alpha = -\frac{20}{29}$ ба $\pi < \alpha < \frac{3\pi}{2}$ бол $\cos\alpha, tg\alpha, ctg\alpha -$ ийг ол.

4) $ctg\alpha = -3$ ба $\frac{3\pi}{2} < \alpha < 2\pi$ бол $\cos\alpha, tg\alpha, \sin\alpha -$ ийг ол.

5) $tg\alpha = 4\sqrt{3}$ ба $0 < \alpha < \frac{\pi}{2}$ бол $\cos\alpha, \sin\alpha, ctg\alpha -$ ийг ол.

6) $tg\alpha = -\frac{40}{9}$ ба $\frac{3\pi}{2} < \alpha < 2\pi$ бол $\cos\alpha, \sin\alpha, ctg\alpha -$ ийг ол.

7) $\cos\alpha = -\frac{60}{61}$ ба $\pi < \alpha < \frac{3\pi}{2}$ бол $\sin\alpha, tg\alpha, ctg\alpha -$ ийг ол.

8) $tg\alpha = -1$ ба $\frac{3\pi}{2} < \alpha < 2\pi$ бол $\cos\alpha, \sin\alpha, ctg\alpha -$ ийг ол.

9) $\sin\alpha = -\frac{84}{85}$ ба $\frac{3\pi}{2} < \alpha < 2\pi$ бол $\cos\alpha, tg\alpha, ctg\alpha -$ ийг ол.

10) $ctg\alpha = -5$ ба $\frac{\pi}{2} < \alpha < \pi$ бол $\sin\alpha, tg\alpha, \sin\alpha -$ ийг ол.

5. Утгийг ол.

1) $\sin 43^0 \cdot \cos 17^0 + \cos 43^0 \cdot \sin 17^0 =$

2) $\sin 56^0 \cdot \cos 34^0 + \cos 56^0 \cdot \sin 34^0 =$

3) $\cos 83^0 \cdot \cos 7^0 - \sin 83^0 \cdot \sin 7^0 =$

4) $\cos 37^0 \cdot \cos 7^0 + \sin 37^0 \cdot \sin 7^0 =$

5) $\frac{tg 12^0 + tg 48^0}{1 - tg 12^0 \cdot tg 48^0} =$

6) $\frac{ctg 21^0 \cdot ctg 24^0 - 1}{ctg 21^0 + ctg 24^0} =$

7) $\frac{\sin 42^0 \cdot \cos 18^0 + \cos 42^0 \cdot \sin 18^0}{\sin 14^0 \cdot \cos 74^0 - \cos 14^0 \cdot \sin 74^0} =$

8) $\frac{ctg 46^0 \cdot ctg 1^0 + 1}{ctg 46^0 - ctg 1^0} =$

9) $\sin 15^0 =$ 12) $\cos 15^0 =$ 15) $tg 75^0 =$

10) $\sin 75^0 =$ 13) $\cos 75^0 =$ 16) $ctg 15^0 =$

11) $\sin 105^0 =$ 14) $tg 15^0 =$ 17) $ctg 75^0 =$

6. Тригонометр илэрхийлэлийг хялбарчил.

1) $\sin^2\alpha + \sin^2\alpha \cdot \cos^2\alpha + \cos^4\alpha =$

2) $\cos^2\alpha + \cos^2\alpha \cdot \sin^2\alpha + \sin^4\alpha - 1 =$

3) $\frac{1}{\sin\alpha\cdot\cos\alpha} - ctg\alpha =$

4) $\frac{1}{\sin\alpha\cdot\cos\alpha} - tg\alpha =$

5) $(1 - \sin^2\alpha) \cdot (1 + tg^2\alpha) =$

6) $(1 - \cos^2\alpha) \cdot (1 + ctg^2\alpha) =$

7) $(\sin\alpha + \cos\alpha)^2 - 2\sin\alpha \cdot \cos\alpha =$

8) $(\sin\alpha - \cos\alpha)^2 + 2\sin\alpha \cdot \cos\alpha =$

9) $\sin^4\beta + \cos^4\beta + 2\sin^2\beta\cos^2\beta =$

10) $1 - \frac{\sin\alpha\cdot\cos\alpha}{ctg\alpha} =$

11) $1 - \frac{\sin\alpha\cdot\cos\alpha}{tg\alpha} =$

12) $\frac{tg\alpha\cdot ctg\alpha - \cos^2\alpha}{2\sin\alpha} =$

13) $1 - \frac{\sin^2\alpha}{1-\cos\alpha} =$

14) $1 - \frac{\sin^2\alpha}{1+\cos\alpha} =$

15) $\frac{1-tg^2\alpha}{1+tg^2\alpha} =$

16) $tg^2\beta \cdot (2\cos^2\beta + \sin^2\beta - 1) =$

17) $ctg^2\beta \cdot (2\sin^2\beta + \cos^2\beta - 1) =$

18) $\frac{\sin^3\alpha + \cos^3\alpha}{\sin\alpha + \cos\alpha} + \sin\alpha \cdot \cos\alpha =$

19) $\frac{\sin^3\alpha - \cos^3\alpha}{\sin\alpha - \cos\alpha} - \sin\alpha \cdot \cos\alpha =$

20) $\dfrac{\sin^3\alpha+\cos^3\alpha}{\sin\alpha+\cos\alpha} + \sin\alpha \cdot \cos\alpha =$

21) $\dfrac{\sin^3\alpha-\cos^3\alpha}{\sin\alpha-\cos\alpha} - \sin\alpha \cdot \cos\alpha =$

22) $\dfrac{1}{\cos\alpha} - \dfrac{\cos\alpha}{1+\sin\alpha} =$

23) $\dfrac{1}{\sin\alpha} - \dfrac{\sin\alpha}{1+\cos\alpha} =$

24) $3\sin^4\alpha - 2\sin^6\alpha + 3\cos^4\alpha - 2\cos^6\alpha =$

25) $\cos^2\alpha + tg^2\alpha \cdot \cos^2\alpha =$

26) $\sin^2\alpha + ctg^2\alpha \cdot \sin^2\alpha =$

27) $\dfrac{\sin^2 x-1}{\cos^2 x-1} =$

28) $\cos^2 x \cdot (1 + tg^2 x) - \sin^2 x =$

29) $\dfrac{\sin\alpha}{1-\cos\alpha} + \dfrac{\sin\alpha}{1+\cos\alpha} =$

30) $\dfrac{1}{1+\sin\alpha} + \dfrac{1}{1-\sin\alpha} =$

31) $\dfrac{1+tg x+tg^2\alpha}{1+ctg\alpha+ctg^2\alpha} =$

32) $\dfrac{1}{1+tg^2\alpha} + \dfrac{1}{1+ctg^2\alpha} =$

33) $\dfrac{\sin^2\alpha-\cos^2\alpha+\cos^4\alpha}{\cos^2\alpha-\sin^2\alpha+\sin^4\alpha} =$

34) $(\cos\alpha-\sin\alpha)^2 + (\cos\alpha+\sin\alpha)^2 =$

35) $ctg\alpha + \dfrac{\sin\alpha}{1+\cos\alpha} =$

36) $tg\alpha + \dfrac{\cos\alpha}{1+\sin\alpha} =$

Хариу:

4. Тригонометр функцийн утгыг ол.

1. $cos\alpha = -\frac{4}{5}$, $tg\alpha = -\frac{3}{4}$, $ctg\alpha = -\frac{4}{3}$ 2. $cos\alpha = -\frac{1}{2}$, $sin\alpha = -\frac{\sqrt{3}}{2}$, $ctg\alpha = \frac{1}{\sqrt{3}}$

3. $cos\alpha = -\frac{21}{29}$, $tg\alpha = \frac{20}{21}$, $ctg\alpha = \frac{21}{20}$ 4. $cos\alpha = \frac{3}{\sqrt{10}}$, $tg\alpha = -\frac{1}{3}$, $sin\alpha = -\frac{1}{\sqrt{10}}$

5. $cos\alpha = \frac{12}{7\sqrt{3}}$, $sin\alpha = \frac{1}{7}$, $tg\alpha = \frac{\sqrt{3}}{12}$ 6. $cos\alpha = \frac{9}{41}$, $ctg\alpha = -\frac{9}{40}$, $sin\alpha = -\frac{40}{41}$

7. $sin\alpha = -\frac{11}{61}$, $ctg\alpha = \frac{60}{11}$, $tg\alpha = \frac{11}{60}$ 8. $cos\alpha = \frac{\sqrt{2}}{2}$, $ctg\alpha = -1$, $sin\alpha = -\frac{\sqrt{2}}{2}$

9. $cos\alpha = \frac{13}{85}$, $ctg\alpha = -\frac{13}{84}$, $tg\alpha = -\frac{84}{13}$ 10. $cos\alpha = -\frac{5\sqrt{26}}{26}$, $tg\alpha = -5$, $sin\alpha = \frac{\sqrt{26}}{26}$

5. Утгийг ол.

1. $\frac{\sqrt{2}}{2}$ 2. 1 3. 0 4. $\frac{\sqrt{3}}{2}$ 5. $\sqrt{3}$ 6. 1 7. -1 8. 1

9. $\frac{\sqrt{6}-\sqrt{2}}{4}$ 10. $\frac{\sqrt{6}+\sqrt{2}}{4}$ 11. $\frac{\sqrt{6}+\sqrt{2}}{4}$ 12. $\frac{\sqrt{6}+\sqrt{2}}{4}$ 13. $\frac{\sqrt{6}-\sqrt{2}}{4}$ 14. $2-\sqrt{3}$

15. $2+\sqrt{3}$ 16. $2+\sqrt{3}$ 17. $2-\sqrt{3}$

6. Тригонометр илэрхийлэлийг хялбарчил.

1. 1 2. 0 3. $tg\alpha$ 4. $ctg\alpha$ 5. 1 6. 1

7. 1 8. 1 9. 1 10. $cos^2\alpha$ 11. $sin^2\alpha$ 12. $\frac{sin\alpha}{2}$

13. $-cos\alpha$ 14. $cos\alpha$ 15. $cos2\alpha$ 16. $sin^2\alpha$ 17. $cos^2\alpha$

18. $1-\frac{1}{2}sin2\alpha$ 19. $1+\frac{1}{2}sin2\alpha$ 20. 1 21. 1 22. $tg\alpha$

23. $ctg\alpha$ 24. 1 25. 1 26. 1 27. $ctg^2\alpha$ 28. $1+sin^2\alpha$

29. $\frac{2}{sin^2\alpha}$ 30. $\frac{2}{cos^2\alpha}$ 31. $tg^2\alpha$ 32. 1 33. $tg^4\alpha$ 34. 2

35. $\frac{1}{sin\alpha}$ 36. $\frac{1}{cos\alpha}$