

Math Relays 2018

Trigonometry

Shade the letter of the correct answer on the answer sheet.

In 1-9 use one of the following as an answer in identifying a triangle with given sides:

(a) right , (b) isosceles, (c) obtuse (d) equilateral, (e) none of these

1. $6 - 6 - 10$

2. $20 - 21 - 29$

3. $3 - 4 - 6$

4. $\pi - \pi - \pi$

5. $8 - 15 - 17$

6. $100 - 101 - 102$

7. $3 - 5 - 7$

8. $7 - 24 - 25$

9. $2 - 3 - 1$

In 10-18, in the triangle with sides $8 - 15 - 17$ and the angle α opposite the smallest side, find the value of:

(a) $\frac{17}{15}$, (b) $\frac{8}{15}$, (c) $\frac{15}{17}$ (d) $\frac{8}{17}$, (e) none of these

10. $\sin \alpha$

11. $\cos(90^\circ - \alpha)$

12. $\cos \alpha$

13. $\cot(90^\circ - \alpha)$

14. $\tan \alpha$

15. $\csc(90^\circ - \alpha)$

16. $\sec \alpha$

17. $(\tan \alpha)(\csc \alpha)$

18. $((\cot \alpha)(\sec \alpha))^{-1}$

In 19-24, choose your answer from the following that simplifies the expression:

(a) $\tan^2 x - \cot^2 x$, (b) $\cos x$, (c) $\sec(x - \frac{\pi}{2})$, (d) $\tan^2 x + \cot^2 x$, (e) none of these

19. $\csc x =$

20. $\cos^4 \frac{x}{2} - \sin^4 \frac{x}{2} =$

21. $\frac{1}{4}[\csc^2 \frac{x}{2} - \sec^2 \frac{x}{2}] =$

22. $\frac{1}{(\csc x - 1)(\csc x + 1)} - \frac{1}{(\sec x - 1)(\sec x + 1)} =$

23. $\frac{1}{(\csc x - 1)(\csc x + 1)} + \frac{1}{(\sec x - 1)(\sec x + 1)} =$

24. $\frac{(\sec x - 1)(\sec x + 1)}{(\csc x - 1)(\csc x + 1)} =$

In 25-30, determine the period of:

(a) π , (b) $\pi/2$, (c) 2π , (d) 1, (e) none of these

25. $y = 1 - 2 \sin^2(x - \frac{\pi}{2})$

26. $y = \pi \cos(2\pi x - \frac{\pi}{2})$

27. $y = \cos(\sin x)$

28. $y = \sec(2\pi x - 4^{10}\pi)$

29. $\cos^4 \frac{x}{2} - \sin^4 \frac{x}{2}$

30. $\frac{\sin x + \cos x}{\cos x}$