EXPRESSWALA ACADEMY

Maths 1A: Trigonometric Ratios

MCQ Test, Set 08

Time: 30 minutes | Maximum marks: 25

Name: _____ Class: _____ Date: _____

1. There are 25 questions. Each has exactly one correct answer: choose A, B, C or D.
2. Each correct answer carries 1 mark. There is no negative marking.
3. The key sheet and worked solutions are at the end of this test.

1. The distance of the point $(6, 5)$ from the y-axis is

A. 5 **B.** -6 **C.** 6 **D.** $\sqrt{61}$

2. $\frac{19\pi}{20}$ radians in grades is

A. 380^g **B.** 95^g **C.** 171^g **D.** 190^g

3. 165° in radians is

A. $\frac{12\pi}{11}$ **B.** $\frac{33\pi}{40}$ **C.** $\frac{11\pi}{12}$ **D.** $\frac{11\pi}{6}$

4. An arc of length 17 cm in a circle of radius 5 cm subtends at the centre an angle of

A. 612 radians **B.** $\frac{5}{17}$ radians

C. $\frac{17}{5}$ radians **D.** $\frac{17}{10}$ radians

5. If the terminal side of θ passes through $(-24, 7)$, then $\operatorname{cosec}\theta =$

A. $\frac{25}{7}$ **B.** $\frac{7}{25}$ **C.** $-\frac{25}{24}$ **D.** $-\frac{25}{7}$

6. If $\sec\theta = \frac{29}{20}$ and θ is in the fourth quadrant, then $\cos\theta =$

A. $-\frac{20}{29}$ **B.** $\frac{29}{20}$ **C.** $\frac{20}{29}$ **D.** $-\frac{21}{29}$

7. If $\tan\theta = \frac{45}{28}$ and θ is in the third quadrant, then $\operatorname{cosec}\theta =$

A. $-\frac{45}{53}$ **B.** $\frac{53}{45}$ **C.** $-\frac{53}{28}$ **D.** $-\frac{53}{45}$

8. $6(1 - \sin^2\theta)\sec^2\theta =$

A. 12 **B.** 6 **C.** -6 **D.** 0

9. If $\operatorname{cosec}\theta + \cot\theta = \frac{9}{4}$, then $\cot\theta =$

A. $\frac{65}{72}$ **B.** $\frac{97}{72}$ **C.** $-\frac{65}{72}$ **D.** $\frac{4}{9}$

10. If $\operatorname{cosec}\theta > 0$ and $\sec\theta < 0$, then θ lies in the

A. third quadrant **B.** fourth quadrant

C. second quadrant **D.** first quadrant

11. $\sec 30^\circ \cdot \cot 60^\circ =$

A. $\frac{3}{2}$ **B.** $\sqrt{3}$ **C.** $\frac{4}{3}$ **D.** $\frac{2}{3}$

12. $\tan 45^\circ \cdot \sec 0^\circ =$

A. $\frac{1}{2}$ **B.** 1 **C.** -1 **D.** 2

13. $\sec(570^\circ) =$

A. $-\frac{\sqrt{3}}{2}$ **B.** $-\frac{2\sqrt{3}}{3}$ **C.** $\frac{2\sqrt{3}}{3}$ **D.** -2

14. $\tan(210^\circ) =$

A. $\frac{\sqrt{3}}{3}$ **B.** $-\frac{\sqrt{3}}{3}$ **C.** $\sqrt{3}$ **D.** $-\sqrt{3}$

15. $\tan(270^\circ + \theta) \cdot \tan(-\theta) =$

A. -1 **B.** $-\tan\theta$

C. $\tan\theta$ **D.** 1

16. $\cos(270^\circ - \theta) \cdot \cot(180^\circ - \theta) =$

A. $\cos\theta$ **B.** $-\cos\theta$

C. $\sec\theta$ **D.** $-\sec\theta$

17. The equation $\sec x = \frac{1}{4}$

A. has no real solution **B.** is true for every real x

C. has a real solution **D.** has exactly one real solution

18. The minimum value of $-9 - 4\cos x$ is

A. -9 **B.** -13 **C.** 4 **D.** -5

19. The vertical asymptotes of the graph of $y = \sec x$ are the lines ($n \in \mathbb{Z}$)

A. $x = 2n\pi$ **B.** $x = n\pi$

C. $x = (2n+1)\frac{\pi}{2}$ **D.** $y = n\pi$

20. $7(\sin^2 46^\circ + \sin^2 44^\circ) =$

A. 14 **B.** 49 **C.** 7 **D.** 0

21. $ABCD$ is a cyclic quadrilateral with $\sin A = \frac{2}{3}$. Then $\sin C =$

A. $\frac{3}{2}$ **B.** $\frac{2}{3}$ **C.** $\frac{1}{3}$ **D.** $-\frac{2}{3}$

22. $\sqrt{1 - \sin^2 140^\circ} =$

A. $1 - \sin 140^\circ$ **B.** $\sin 140^\circ$

C. $\cos 140^\circ$ **D.** $-\cos 140^\circ$

23. If $\sin\theta + \cos\theta = \frac{11}{8}$, then $\sin\theta\cos\theta =$

A. $\frac{57}{128}$ **B.** $-\frac{57}{128}$ **C.** $\frac{185}{128}$ **D.** $\frac{57}{64}$

24. If $10\cos\theta + 2\sin\theta = 3$ and $10\sin\theta - 2\cos\theta = k$, then $k^2 =$

A. -95 **B.** 95 **C.** 113 **D.** 105

25. The solution (x, y) of $-x - 4y + 23 = 0$ and $3x - 3y - 9 = 0$ is

A. $(4, 7)$ **B.** $(-7, 4)$ **C.** $(-7, -4)$ **D.** $(7, 4)$

Key sheet

1. C	**2.** D	**3.** C	**4.** C	**5.** A
6. C	**7.** D	**8.** B	**9.** A	**10.** C
11. D	**12.** B	**13.** B	**14.** A	**15.** D
16. A	**17.** A	**18.** B	**19.** C	**20.** C
21. B	**22.** D	**23.** A	**24.** B	**25.** D

Solutions

1. The distance of the point $(6, 5)$ from the y-axis is

The distance from the y-axis is $|x|$.

$|6| = 6$

Ans: (C) 6

---

2. $\frac{19\pi}{20}$ radians in grades is

$\pi^c = 200^g$

$\frac{19\pi}{20} = \frac{19}{20} \times 200 = 190^g$

Ans: (D) 190^g

---

3. 165° in radians is

$165^\circ = 165 \times \frac{\pi}{180}$

$= \frac{11\pi}{12}$

Ans: (C) $\frac{11\pi}{12}$

---

4. An arc of length 17 cm in a circle of radius 5 cm subtends at the centre an angle of

$\theta = \frac{l}{r} = \frac{17}{5} = \frac{17}{5}$

Ans: (C) $\frac{17}{5}$ **radians**

---

5. If the terminal side of θ passes through $(-24, 7)$, then $\operatorname{cosec}\theta =$

$r = \sqrt{(-24)^2 + (7)^2} = 25$

$\operatorname{cosec}\theta = \frac{25}{7}$

Ans: (A) $\frac{25}{7}$

---

6. If $\sec\theta = \frac{29}{20}$ and θ is in the fourth quadrant, then $\cos\theta =$

In the fourth quadrant: $x = 20$, $y = -21$, $r = 29$.

$\cos\theta = \frac{20}{29}$

Ans: (C) $\frac{20}{29}$

---

7. If $\tan\theta = \frac{45}{28}$ and θ is in the third quadrant, then $\operatorname{cosec}\theta =$

In the third quadrant: $x = -28$, $y = -45$, $r = 53$.

$\operatorname{cosec}\theta = -\frac{53}{45}$

Ans: (D) $-\frac{53}{45}$

---

8. $6(1 - \sin^2\theta)\sec^2\theta =$

$1 - \sin^2\theta = \cos^2\theta$

and $\cos^2\theta \cdot \sec^2\theta = 1$, so the value is 6.

Ans: (B) 6

---

9. If $\operatorname{cosec}\theta + \cot\theta = \frac{9}{4}$, then $\cot\theta =$

$\operatorname{cosec}\theta - \cot\theta = \frac{4}{9}$

$\cot\theta = \frac{65}{72}$

Ans: (A) $\frac{65}{72}$

---

10. If $\operatorname{cosec}\theta > 0$ and $\sec\theta < 0$, then θ lies in the

All, Silver, Tea, Cups gives the positive ratios in quadrants I to IV.

Both signs fit only the second quadrant.

Ans: (C) second quadrant

---

11. $\sec 30^\circ \cdot \cot 60^\circ =$

$\sec 30^\circ = \frac{2\sqrt{3}}{3},\ \cot 60^\circ = \frac{\sqrt{3}}{3}$

Value $= \frac{2}{3}$

Ans: (D) $\frac{2}{3}$

---

12. $\tan 45^\circ \cdot \sec 0^\circ =$

$\tan 45^\circ = 1,\ \sec 0^\circ = 1$

Value $= 1$

Ans: (B) 1

---

13. $\sec(570^\circ) =$

$570^\circ = 1 \times 360^\circ + 210^\circ$, so $\sec 570^\circ = \sec 210^\circ$.

$\sec 210^\circ = \sec(180^\circ + 30^\circ) = -\sec 30^\circ = -\frac{2\sqrt{3}}{3}$

Ans: (B) $-\frac{2\sqrt{3}}{3}$

---

14. $\tan(210^\circ) =$

$\tan 210^\circ = \tan(180^\circ + 30^\circ) = \tan 30^\circ = \frac{\sqrt{3}}{3}$

Ans: (A) $\frac{\sqrt{3}}{3}$

---

15. $\tan(270^\circ + \theta) \cdot \tan(-\theta) =$

$\tan(270^\circ + \theta) = -\cot\theta,\ \tan(-\theta) = -\tan\theta$

Product $= 1$

Ans: (D) 1

---

16. $\cos(270^\circ - \theta) \cdot \cot(180^\circ - \theta) =$

$\cos(270^\circ - \theta) = -\sin\theta,\ \cot(180^\circ - \theta) = -\cot\theta$

Product $= \cos\theta$

Ans: (A) $\cos\theta$

---

17. The equation $\sec x = \frac{1}{4}$

The range of $\sec x$ is $(-\infty, -1] \cup [1, \infty)$.

$\frac{1}{4}$ is not in this range.

Ans: (A) has no real solution

---

18. The minimum value of $-9 - 4\cos x$ is

$\cos x$ runs from -1 to 1.

So $-9 - 4\cos x$ runs from -13 to -5.

Ans: (B) -13

---

19. The vertical asymptotes of the graph of $y = \sec x$ are the lines ($n \in \mathbb{Z}$)

The graph has an asymptote wherever $\sec x$ is undefined.

That is at $x = (2n+1)\frac{\pi}{2}$.

Ans: (C) $x = (2n+1)\frac{\pi}{2}$

---

20. $7(\sin^2 46^\circ + \sin^2 44^\circ) =$

$46^\circ + 44^\circ = 90^\circ$

So $\sin^2 46^\circ + \sin^2 44^\circ = 1$ and the value is 7.

Ans: (C) 7

---

21. $ABCD$ is a cyclic quadrilateral with $\sin A = \frac{2}{3}$. Then $\sin C =$

$A + C = 180^\circ$

$\sin C = \sin(180^\circ - A) = \frac{2}{3}$

Ans: (B) $\frac{2}{3}$

---

22. $\sqrt{1 - \sin^2 140^\circ} =$

$\sqrt{1 - \sin^2 140^\circ} = \sqrt{\cos^2 140^\circ} = |\cos 140^\circ|$

$\cos 140^\circ < 0$, so this is $-\cos 140^\circ$.

Ans: (D) $-\cos 140^\circ$

---

23. If $\sin\theta + \cos\theta = \frac{11}{8}$, then $\sin\theta\cos\theta =$

$1 + 2\sin\theta\cos\theta = \frac{121}{64}$

$\sin\theta\cos\theta = \frac{57}{128}$

Ans: (A) $\frac{57}{128}$

---

24. If $10\cos\theta + 2\sin\theta = 3$ and $10\sin\theta - 2\cos\theta = k$, then $k^2 =$

Squaring and adding: $10^2 + 2^2 = 3^2 + k^2$.

$k^2 = 100 + 4 - 9 = 95$

Ans: (B) 95

---

25. The solution (x, y) of $-x - 4y + 23 = 0$ and $3x - 3y - 9 = 0$ is

$x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1} = \frac{105}{15}$, $y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1} = \frac{60}{15}$

So $(x, y) = (7, 4)$.

Ans: (D) $(7, 4)$
