EXPRESSWALA ACADEMY

Maths 1A: Trigonometric Ratios

MCQ Test, Set 04

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 $(-11, -3)$ from the y-axis is

A. 11 **B.** -11 **C.** $\sqrt{130}$ **D.** 3

2. 750° in radians is

A. $\frac{6\pi}{25}$ **B.** $\frac{25\pi}{6}$ **C.** $\frac{25\pi}{3}$ **D.** $\frac{15\pi}{4}$

3. 35^g in degrees is

A. 35° **B.** $\frac{63}{2}^\circ$ **C.** $\frac{350}{9}^\circ$ **D.** 63°

4. An arc of length 25 cm in a circle of radius 7 cm subtends at the centre an angle of

A. $\frac{4500}{7}$ radians **B.** $\frac{7}{25}$ radians
C. $\frac{25}{7}$ radians **D.** $\frac{25}{14}$ radians

5. If the terminal side of θ passes through $(5, -12)$, then $\sin\theta =$

A. $-\frac{13}{12}$ **B.** $-\frac{12}{13}$ **C.** $\frac{5}{13}$ **D.** $\frac{12}{13}$

6. If $\tan\theta = -\frac{24}{7}$ and θ is in the fourth quadrant, then $\sec\theta =$

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

7. If $\operatorname{cosec}\theta = -\frac{65}{56}$ and θ is in the fourth quadrant, then $\cos\theta =$

A. $\frac{65}{33}$ **B.** $-\frac{33}{65}$ **C.** $-\frac{56}{65}$ **D.** $\frac{33}{65}$

8. If $\operatorname{cosec}\theta + \cot\theta = 3$, then $\operatorname{cosec}\theta =$

A. $-\frac{5}{3}$ **B.** $\frac{1}{3}$ **C.** $\frac{5}{3}$ **D.** $\frac{4}{3}$

9. If $\tan\theta = 5$, then $\sec^2\theta =$

A. -24 **B.** 26 **C.** $\frac{1}{26}$ **D.** 24

10. If $\sec\theta > 0$ and $\tan\theta > 0$, then θ lies in the

A. second quadrant **B.** fourth quadrant
C. third quadrant **D.** first quadrant

11. $\cos^2 30^\circ + \sec^2 0^\circ =$

A. $\left(\frac{\sqrt{3}}{2} + 1\right)^2$ **B.** $\frac{7}{4}$

C. $-\frac{1}{4}$ **D.** $\frac{\sqrt{3}}{2} + 1$

12. $\operatorname{cosec} 90^\circ \cdot \sec 60^\circ =$

A. 4 **B.** 3 **C.** $\frac{1}{2}$ **D.** 2

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

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

14. $\sin(150^\circ) =$

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

15. $\sin(360^\circ - \theta) \cdot \sec(-\theta) =$

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

C. $-\tan\theta$ **D.** $\cot\theta$

16. $\sec(90^\circ + \theta) \cdot \cos(270^\circ - \theta) =$

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

C. 1 **D.** -1

17. The domain of the tangent function $\tan x$ is

A. $\mathbb{R} - \{n\pi : n \in \mathbb{Z}\}$ **B.** $\mathbb{R}$

C. $\mathbb{R} - \{0\}$ **D.** $\mathbb{R} - \left\{(2n+1)\frac{\pi}{2} : n \in \mathbb{Z}\right\}$

18. The equation $\sec x = \frac{9}{2}$

A. has a real solution **B.** has no real solution

C. is true for every real x **D.** has exactly one real solution

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

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

C. $x = 2n\pi$ **D.** $x = n\pi$

20. $ABCD$ is a cyclic quadrilateral with $\tan A = \frac{1}{8}$. Then $\tan C =$

A. $\frac{7}{8}$ **B.** 8 **C.** $\frac{1}{8}$ **D.** $-\frac{1}{8}$

21. If $A + B = 90^\circ$ and $\sin A = \frac{40}{41}$, then $\tan B =$

A. $\frac{9}{40}$ **B.** $\frac{40}{41}$ **C.** $\frac{40}{9}$ **D.** $\frac{9}{41}$

22. $\sqrt{1 - \cos^2 245^\circ} =$

A. $-\sin 245^\circ$ **B.** $\cos 245^\circ$

C. $1 - \cos 245^\circ$ **D.** $\sin 245^\circ$

23. If $\sin\theta + \cos\theta = \frac{9}{7}$, then $\sin\theta\cos\theta =$

A. $\frac{65}{49}$ **B.** $\frac{32}{49}$ **C.** $\frac{16}{49}$ **D.** $-\frac{16}{49}$

24. $\sec\theta \cdot \sin\theta \cdot \operatorname{cosec}\theta =$

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

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

25. The solution (x, y) of $-x - 2y + 8 = 0$ and $-x - 5y + 26 = 0$ is

A. $(4, 6)$ **B.** $(-4, 6)$ **C.** $(6, -4)$ **D.** $(4, -6)$

Key sheet

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

Solutions

1. The distance of the point $(-11, -3)$ from the y-axis is

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

$|-11| = 11$

Ans: (A) 11

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2. 750° in radians is

$750^\circ = 750 \times \frac{\pi}{180}$

$= \frac{25\pi}{6}$

Ans: (B) $\frac{25\pi}{6}$

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3. 35^g in degrees is

$1^g = \frac{9}{10}^\circ$

$35^g = \frac{63}{2}^\circ$

Ans: (B) $\frac{63}{2}^\circ$

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4. An arc of length 25 cm in a circle of radius 7 cm subtends at the centre an angle of

$\theta = \frac{l}{r} = \frac{25}{7} = \frac{25}{7}$

Ans: (C) $\frac{25}{7}$ **radians**

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5. If the terminal side of θ passes through $(5, -12)$, then $\sin\theta =$

$r = \sqrt{(5)^2 + (-12)^2} = 13$

$\sin\theta = -\frac{12}{13}$

Ans: (B) $-\frac{12}{13}$

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6. If $\tan\theta = -\frac{24}{7}$ and θ is in the fourth quadrant, then $\sec\theta =$

In the fourth quadrant: $x = 21$, $y = -72$, $r = 75$.

$\sec\theta = \frac{25}{7}$

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

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7. If $\operatorname{cosec}\theta = -\frac{65}{56}$ and θ is in the fourth quadrant, then $\cos\theta =$

In the fourth quadrant: $x = 33$, $y = -56$, $r = 65$.

$\cos\theta = \frac{33}{65}$

Ans: (D) $\frac{33}{65}$

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8. If $\operatorname{cosec}\theta + \cot\theta = 3$, then $\operatorname{cosec}\theta =$

$\operatorname{cosec}\theta - \cot\theta = \frac{1}{3}$

$\operatorname{cosec}\theta = \frac{5}{3}$

Ans: (C) $\frac{5}{3}$

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9. If $\tan\theta = 5$, then $\sec^2\theta =$

$\sec^2\theta = 1 + \tan^2\theta = 1 + 25 = 26$

Ans: (B) 26

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10. If $\sec\theta > 0$ and $\tan\theta > 0$, then θ lies in the

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

Both signs fit only the first quadrant.

Ans: (D) first quadrant

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11. $\cos^2 30^\circ + \sec^2 0^\circ =$

$\cos 30^\circ = \frac{\sqrt{3}}{2},\ \sec 0^\circ = 1$

Value $= \frac{7}{4}$

Ans: (B) $\frac{7}{4}$

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12. $\operatorname{cosec} 90^\circ \cdot \sec 60^\circ =$

$\operatorname{cosec} 90^\circ = 1,\ \sec 60^\circ = 2$

Value $= 2$

Ans: (D) 2

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

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

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

Ans: (D) $\sqrt{3}$

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14. $\sin(150^\circ) =$

$\sin 150^\circ = \sin(180^\circ - 30^\circ) = \sin 30^\circ = \frac{1}{2}$

Ans: (A) $\frac{1}{2}$

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15. $\sin(360^\circ - \theta) \cdot \sec(-\theta) =$

$\sin(360^\circ - \theta) = -\sin\theta,\ \sec(-\theta) = \sec\theta$

Product $= -\tan\theta$

Ans: (C) $-\tan\theta$

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16. $\sec(90^\circ + \theta) \cdot \cos(270^\circ - \theta) =$

$\sec(90^\circ + \theta) = -\operatorname{cosec}\theta,\ \cos(270^\circ - \theta) = -\sin\theta$

Product $= 1$

Ans: (C) 1

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17. The domain of the tangent function $\tan x$ is

$\tan x$ is undefined where $\cos x = 0$.

So the domain is $\mathbb{R} - \left\{(2n+1)\frac{\pi}{2} : n \in \mathbb{Z}\right\}$.

Ans: (D) $\mathbb{R} - \left\{(2n+1)\frac{\pi}{2} : n \in \mathbb{Z}\right\}$

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18. The equation $\sec x = \frac{9}{2}$

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

$\frac{9}{2}$ is in this range.

Ans: (A) has a real solution

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

The graph has an asymptote wherever $\operatorname{cosec} x$ is undefined.

That is at $x = n\pi$.

Ans: (D) $x = n\pi$

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20. $ABCD$ is a cyclic quadrilateral with $\tan A = \frac{1}{8}$. Then $\tan C =$

$A + C = 180^\circ$

$\tan C = \tan(180^\circ - A) = -\frac{1}{8}$

Ans: (D) $-\frac{1}{8}$

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21. If $A + B = 90^\circ$ and $\sin A = \frac{40}{41}$, then $\tan B =$

$\cos A = \frac{9}{41},\ \tan B = \cot A$

$\cot A = \frac{9}{40}$

Ans: (A) $\frac{9}{40}$

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22. $\sqrt{1 - \cos^2 245^\circ} =$

$\sqrt{1 - \cos^2 245^\circ} = \sqrt{\sin^2 245^\circ} = |\sin 245^\circ|$

$\sin 245^\circ < 0$, so this is $-\sin 245^\circ$.

Ans: (A) $-\sin 245^\circ$

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23. If $\sin\theta + \cos\theta = \frac{9}{7}$, then $\sin\theta\cos\theta =$

$1 + 2\sin\theta\cos\theta = \frac{81}{49}$

$\sin\theta\cos\theta = \frac{16}{49}$

Ans: (C) $\frac{16}{49}$

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24. $\sec\theta \cdot \sin\theta \cdot \operatorname{cosec}\theta =$

$\sec\theta \cdot \sin\theta = \tan\theta$

Then multiply by $\operatorname{cosec}\theta$: the product is $\sec\theta$.

Ans: (A) $\sec\theta$

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25. The solution (x, y) of $-x - 2y + 8 = 0$ and $-x - 5y + 26 = 0$ is

$x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1} = \frac{-12}{3},\ y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1} = \frac{18}{3}$

So $(x, y) = (-4, 6)$.

Ans: (B) $(-4, 6)$
