EXPRESSWALA ACADEMY

Maths 1A: Trigonometric Ratios

MCQ Test, Set 10

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 $(1, 14)$ from the y-axis is

A. 1 **B.** -1 **C.** 14 **D.** $\sqrt{197}$

2. 150° in radians is

A. $\frac{5\pi}{3}$ **B.** $\frac{6\pi}{5}$ **C.** $\frac{3\pi}{4}$ **D.** $\frac{5\pi}{6}$

3. 75^g in degrees is

A. $\frac{135}{2}^\circ$ **B.** 75° **C.** $\frac{250}{3}^\circ$ **D.** 135°

4. An arc of length 16 cm in a circle of radius 6 cm subtends at the centre an angle of

A. $\frac{3}{8}$ radians **B.** $\frac{4}{3}$ radians
C. $\frac{8}{3}$ radians **D.** 480 radians

5. If the terminal side of θ passes through $(33, 56)$, then $\sin\theta =$

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

6. If $\tan\theta = \frac{16}{63}$ and θ is in the third quadrant, then $\sec\theta =$

A. $-\frac{63}{65}$ **B.** $-\frac{65}{16}$ **C.** $-\frac{65}{63}$ **D.** $\frac{65}{63}$

7. If $\cot\theta = -\frac{45}{28}$ and θ is in the second quadrant, then $\sec\theta =$

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

8. If $\operatorname{cosec}\theta + \cot\theta = 11$, then $\operatorname{cosec}\theta =$

A. $\frac{1}{11}$ **B.** $\frac{61}{11}$ **C.** $-\frac{61}{11}$ **D.** $\frac{60}{11}$

9. If $\tan\theta = \frac{3}{4}$, then $\sec^2\theta =$

A. $\frac{16}{25}$ **B.** $-\frac{7}{16}$ **C.** $\frac{25}{16}$ **D.** $\frac{7}{16}$

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

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

11. $\sin^2 30^\circ + \operatorname{cosec}^2 60^\circ =$

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

C. $-\frac{13}{12}$ **D.** $\frac{19}{12}$

12. $\cos^2 45^\circ + \operatorname{cosec}^2 60^\circ =$

A. $\left(\frac{\sqrt{2}}{2} + \frac{2\sqrt{3}}{3}\right)^2$ **B.** $\frac{11}{6}$

C. $-\frac{5}{6}$ **D.** $\frac{\sqrt{2}}{2} + \frac{2\sqrt{3}}{3}$

13. $\tan(150^\circ) =$

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

14. $\sec(1020^\circ) =$

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

15. $\operatorname{cosec}(180^\circ + \theta) \cdot \cot(90^\circ + \theta) =$

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

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

16. $\sec(180^\circ - \theta) \cdot \operatorname{cosec}(90^\circ + \theta) =$

A. $\sec^2\theta$ **B.** $-\cos^2\theta$

C. $-\sec^2\theta$ **D.** $\cos^2\theta$

17. The minimum value of $-5 - 6\sin x$ is

A. 1 **B.** -11 **C.** -5 **D.** 6

18. The equation $\cos x = \frac{4}{3}$

A. has exactly one real solution **B.** has a real solution

C. has no real solution **D.** is true for every real x

19. In the interval $\left(\frac{\pi}{2}, \pi\right)$, which of these functions is decreasing?

A. $\cos x$ **B.** $\sec x$ **C.** $\tan x$ **D.** $\operatorname{cosec} x$

20. $ABCD$ is a cyclic quadrilateral with $\cos A = \frac{1}{3}$. Then $\cos C =$

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

21. If $A + B = 90^\circ$ and $\sin A = \frac{15}{17}$, then $\tan B =$

A. $\frac{8}{17}$ **B.** $\frac{15}{8}$ **C.** $\frac{15}{17}$ **D.** $\frac{8}{15}$

22. $\sqrt{1 - \cos^2 280^\circ} =$

A. $\cos 280^\circ$ **B.** $-\sin 280^\circ$

C. $\sin 280^\circ$ **D.** $1 - \cos 280^\circ$

23. If $\sin\theta + \cos\theta = \frac{8}{7}$, then $\sin\theta\cos\theta =$

A. $-\frac{15}{98}$ **B.** $\frac{113}{98}$ **C.** $\frac{15}{49}$ **D.** $\frac{15}{98}$

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

A. $-\operatorname{cosec}^2\theta$ **B.** $-\sin^2\theta$

C. $\operatorname{cosec}^2\theta$ **D.** $\sin^2\theta$

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25. The solution (x, y) of $5x + 4y - 31 = 0$ and $-2x + y + 15 = 0$ is

A. $(7, -1)$ **B.** $(-7, -1)$ **C.** $(-1, 7)$ **D.** $(-7, 1)$

Key sheet

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

Solutions

1. The distance of the point $(1, 14)$ from the y-axis is

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

$|1| = 1$

Ans: (A) 1

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2. $150°$ in radians is

$150° = 150 \times \frac{\pi}{180}$

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

Ans: (D) $\frac{5\pi}{6}$

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3. 75^g in degrees is

$1^g = \frac{9}{10}°$

$75^g = \frac{135}{2}°$

Ans: (A) $\frac{135}{2}°$

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4. An arc of length 16 cm in a circle of radius 6 cm subtends at the centre an angle of

$\theta = \frac{l}{r} = \frac{16}{6} = \frac{8}{3}$

Ans: (C) $\frac{8}{3}$ **radians**

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5. If the terminal side of θ passes through $(33, 56)$, then $\sin\theta =$

$r = \sqrt{(33)^2 + (56)^2} = 65$

$\sin\theta = \frac{56}{65}$

Ans: (A) $\frac{56}{65}$

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6. If $\tan\theta = \frac{16}{63}$ and θ is in the third quadrant, then $\sec\theta =$

In the third quadrant: $x = -63$, $y = -16$, $r = 65$.

$\sec\theta = -\frac{65}{63}$

Ans: (C) $-\frac{65}{63}$

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7. If $\cot\theta = -\frac{45}{28}$ and θ is in the second quadrant, then $\sec\theta =$

In the second quadrant: $x = -135$, $y = 84$, $r = 159$.

$\sec\theta = -\frac{53}{45}$

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

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8. If $\operatorname{cosec}\theta + \cot\theta = 11$, then $\operatorname{cosec}\theta =$

$\operatorname{cosec}\theta - \cot\theta = \frac{1}{11}$

$\operatorname{cosec}\theta = \frac{61}{11}$

Ans: (B) $\frac{61}{11}$

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9. If $\tan\theta = \frac{3}{4}$, then $\sec^2\theta =$

$\sec^2\theta = 1 + \tan^2\theta = 1 + \frac{9}{16} = \frac{25}{16}$

Ans: (C) $\frac{25}{16}$

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10. If $\operatorname{cosec}\theta > 0$ and $\cot\theta < 0$, 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: (B) second quadrant

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11. $\sin^2 30^\circ + \operatorname{cosec}^2 60^\circ =$

$\sin 30^\circ = \frac{1}{2},\ \operatorname{cosec} 60^\circ = \frac{2\sqrt{3}}{3}$

Value $= \frac{19}{12}$

Ans: (D) $\frac{19}{12}$

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12. $\cos^2 45^\circ + \operatorname{cosec}^2 60^\circ =$

$\cos 45^\circ = \frac{\sqrt{2}}{2},\ \operatorname{cosec} 60^\circ = \frac{2\sqrt{3}}{3}$

Value $= \frac{11}{6}$

Ans: (B) $\frac{11}{6}$

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13. $\tan(150^\circ) =$

$\tan 150^\circ = \tan(180^\circ - 30^\circ) = -\tan 30^\circ = -\frac{\sqrt{3}}{3}$

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

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14. $\sec(1020^\circ) =$

$1020^\circ = 2 \times 360^\circ + 300^\circ$, so $\sec 1020^\circ = \sec 300^\circ$.

$\sec 300^\circ = \sec(360^\circ - 60^\circ) = \sec 60^\circ = 2$

Ans: (D) 2

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15. $\operatorname{cosec}(180^\circ + \theta) \cdot \cot(90^\circ + \theta) =$

$\operatorname{cosec}(180^\circ + \theta) = -\operatorname{cosec}\theta,\ \cot(90^\circ + \theta) = -\tan\theta$

Product $= \sec\theta$

Ans: (A) $\sec\theta$

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16. $\sec(180^\circ - \theta) \cdot \operatorname{cosec}(90^\circ + \theta) =$

$\sec(180^\circ - \theta) = -\sec\theta,\ \operatorname{cosec}(90^\circ + \theta) = \sec\theta$

Product $= -\sec^2\theta$

Ans: (C) $-\sec^2\theta$

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17. The minimum value of $-5 - 6\sin x$ is

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

So $-5 - 6\sin x$ runs from -11 to 1.

Ans: (B) -11

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18. The equation $\cos x = \frac{4}{3}$

The range of $\cos x$ is $[-1, 1]$.

$\frac{4}{3}$ is not in this range.

Ans: (C) has no real solution

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19. In the interval $\left(\frac{\pi}{2}, \pi\right)$, which of these functions is decreasing?

$\left(\frac{\pi}{2}, \pi\right)$ is quadrant II.

There the decreasing functions are $\sin$, $\cos$, $\cot$.

Ans: (A) $\cos x$

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20. $ABCD$ is a cyclic quadrilateral with $\cos A = \frac{1}{3}$. Then $\cos C =$

$A + C = 180^\circ$

$\cos C = \cos(180^\circ - A) = -\frac{1}{3}$

Ans: (B) $-\frac{1}{3}$

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21. If $A + B = 90^\circ$ and $\sin A = \frac{15}{17}$, then $\tan B =$

$\cos A = \frac{8}{17},\ \tan B = \cot A$

$\cot A = \frac{8}{15}$

Ans: (D) $\frac{8}{15}$

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22. $\sqrt{1 - \cos^2 280^\circ} =$

$\sqrt{1 - \cos^2 280^\circ} = \sqrt{\sin^2 280^\circ} = |\sin 280^\circ|$

$\sin 280^\circ < 0$, so this is $-\sin 280^\circ$.

Ans: (B) $-\sin 280^\circ$

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23. If $\sin\theta + \cos\theta = \frac{8}{7}$, then $\sin\theta\cos\theta =$

$1 + 2\sin\theta\cos\theta = \frac{64}{49}$

$\sin\theta\cos\theta = \frac{15}{98}$

Ans: (D) $\frac{15}{98}$

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

$\cot\theta \cdot \sec\theta = \operatorname{cosec}\theta$

Then multiply by $\operatorname{cosec}\theta$: the product is $\operatorname{cosec}^2\theta$.

Ans: (C) $\operatorname{cosec}^2\theta$

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25. The solution (x, y) of $5x + 4y - 31 = 0$ and $-2x + y + 15 = 0$ is

$x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1} = \frac{91}{13},\ y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1} = \frac{-13}{13}$

So $(x, y) = (7, -1)$.

Ans: (A) $(7, -1)$
