EXPRESSWALA ACADEMY

Maths 1A: Trigonometric Ratios

MCQ Test, Set 06

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 $(8, -13)$ from the y-axis is

A. 13 **B.** -8 **C.** 8 **D.** $\sqrt{233}$

2. 45^g in degrees is

A. 81° **B.** 50° **C.** 45° **D.** $\frac{81}{2}^\circ$

3. $\frac{22\pi}{15}$ radians in grades is

A. $\frac{880}{3}^g$ **B.** $\frac{1760}{3}^g$ **C.** 264^g **D.** $\frac{440}{3}^g$

4. An arc of length 11 cm in a circle of radius 6 cm subtends at the centre an angle of

A. $\frac{11}{12}$ radians **B.** $\frac{11}{6}$ radians
C. $\frac{6}{11}$ radians **D.** 330 radians

5. If the terminal side of θ passes through $(60, -63)$, then $\sin\theta =$

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

6. If $\sin\theta = -\frac{55}{73}$ and θ is in the third quadrant, then $\operatorname{cosec}\theta =$

A. $-\frac{73}{48}$ **B.** $-\frac{73}{55}$ **C.** $-\frac{55}{73}$ **D.** $\frac{73}{55}$

7. If $\cot\theta = -\frac{12}{35}$ and θ is in the fourth quadrant, then $\sec\theta =$

A. $\frac{12}{37}$ **B.** $-\frac{37}{12}$ **C.** $\frac{37}{12}$ **D.** $-\frac{37}{35}$

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

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

9. $4(1 - \cos^2\theta)\operatorname{cosec}^2\theta =$

A. -4 **B.** 4 **C.** 0 **D.** 8

10. If $\cos\theta < 0$ and $\tan\theta < 0$, then θ lies in the

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

11. $\tan^2 60^\circ + \operatorname{cosec}^2 90^\circ =$

A. $1 + \sqrt{3}$ **B.** 4

C. 2 **D.** $\left(1 + \sqrt{3}\right)^2$

12. $\cot^2 30^\circ + \sec^2 45^\circ =$

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

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

13. $\tan(1020^\circ) =$

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

14. $\operatorname{cosec}(210^\circ) =$

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

15. $\sin(90^\circ + \theta) \cdot \sin(270^\circ + \theta) =$

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

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

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

A. $-\cot^2\theta$ **B.** $\cot^2\theta$

C. $-\tan^2\theta$ **D.** $\tan^2\theta$

17. The minimum value of $2 - 8\cos x$ is

A. 10 **B.** 2 **C.** -6 **D.** 8

18. The domain of the cosecant function $\operatorname{cosec} x$ is

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

C. $\mathbb{R} - \{0\}$ **D.** $\mathbb{R}$

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

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

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

20. If $A + B = 90^\circ$ and $\sin A = \frac{21}{29}$, then $\tan B =$

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

21. $5(\cos^2 51^\circ + \cos^2 39^\circ) =$

A. 5 **B.** 0 **C.** 25 **D.** 10

22. $\sqrt{1 - \cos^2 125^\circ} =$

A. $-\sin 125^\circ$ **B.** $1 - \cos 125^\circ$

C. $\cos 125^\circ$ **D.** $\sin 125^\circ$

23. If $\sin\theta + \cos\theta = \frac{4}{3}$, then $\sin\theta\cos\theta =$

A. $\frac{25}{18}$ **B.** $\frac{7}{18}$ **C.** $-\frac{7}{18}$ **D.** $\frac{7}{9}$

24. If $\frac{a}{b} = \frac{c}{d} = \frac{1}{3}$, then $\frac{-2a - 2c}{-2b - 2d} =$

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

25. The solution (x, y) of $-2x + 4y - 18 = 0$ and $-x + 3y - 14 = 0$ is

A. $(-1, -5)$ **B.** $(5, 1)$ **C.** $(-1, 5)$ **D.** $(1, 5)$

Key sheet

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

Solutions

1. The distance of the point $(8, -13)$ from the y-axis is

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

$|8| = 8$

Ans: (C) 8

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2. 45^g in degrees is

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

$45^g = \frac{81}{2}^\circ$

Ans: (D) $\frac{81}{2}^\circ$

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3. $\frac{22\pi}{15}$ radians in grades is

$\pi^c = 200^g$

$\frac{22\pi}{15} = \frac{22}{15} \times 200 = \frac{880}{3}^g$

Ans: (A) $\frac{880}{3}^g$

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4. An arc of length 11 cm in a circle of radius 6 cm subtends at the centre an angle of

$\theta = \frac{l}{r} = \frac{11}{6} = \frac{11}{6}$

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

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5. If the terminal side of θ passes through $(60, -63)$, then $\sin\theta =$

$r = \sqrt{(60)^2 + (-63)^2} = 87$

$\sin\theta = -\frac{21}{29}$

Ans: (D) $-\frac{21}{29}$

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6. If $\sin\theta = -\frac{55}{73}$ and θ is in the third quadrant, then $\operatorname{cosec}\theta =$

In the third quadrant: $x = -144$, $y = -165$, $r = 219$.

$\operatorname{cosec}\theta = -\frac{73}{55}$

Ans: (B) $-\frac{73}{55}$

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7. If $\cot\theta = -\frac{12}{35}$ and θ is in the fourth quadrant, then $\sec\theta =$

In the fourth quadrant: $x = 12$, $y = -35$, $r = 37$.

$\sec\theta = \frac{37}{12}$

Ans: (C) $\frac{37}{12}$

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

$\sec^2\theta = 1 + \tan^2\theta = 1 + 4 = 5$

Ans: (C) 5

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9. $4(1 - \cos^2\theta)\operatorname{cosec}^2\theta =$

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

and $\sin^2\theta \cdot \operatorname{cosec}^2\theta = 1$, so the value is 4.

Ans: (B) 4

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10. If $\cos\theta < 0$ 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 second quadrant.

Ans: (A) second quadrant

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11. $\tan^2 60^\circ + \operatorname{cosec}^2 90^\circ =$

$\tan 60^\circ = \sqrt{3},\ \operatorname{cosec} 90^\circ = 1$

Value $= 4$

Ans: (B) 4

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12. $\cot^2 30^\circ + \sec^2 45^\circ =$

$\cot 30^\circ = \sqrt{3},\ \sec 45^\circ = \sqrt{2}$

Value $= 5$

Ans: (C) 5

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13. $\tan(1020^\circ) =$

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

$\tan 300^\circ = \tan(360^\circ - 60^\circ) = -\tan 60^\circ = -\sqrt{3}$

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

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14. $\operatorname{cosec}(210^\circ) =$

$\operatorname{cosec} 210^\circ = \operatorname{cosec}(180^\circ + 30^\circ) = -\operatorname{cosec} 30^\circ = -2$

Ans: (D) -2

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15. $\sin(90^\circ + \theta) \cdot \sin(270^\circ + \theta) =$

$\sin(90^\circ + \theta) = \cos\theta,\ \sin(270^\circ + \theta) = -\cos\theta$

Product $= -\cos^2\theta$

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

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

$\tan(90^\circ + \theta) = -\cot\theta,\ \tan(270^\circ - \theta) = \cot\theta$

Product $= -\cot^2\theta$

Ans: (A) $-\cot^2\theta$

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17. The minimum value of $2 - 8\cos x$ is

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

So $2 - 8\cos x$ runs from -6 to 10.

Ans: (C) -6

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18. The domain of the cosecant function $\operatorname{cosec} x$ is

$\operatorname{cosec} x$ is undefined where $\sin x = 0$.

So the domain is $\mathbb{R} - \{n\pi : n \in \mathbb{Z}\}$.

Ans: (A) $\mathbb{R} - \{n\pi : n \in \mathbb{Z}\}$

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

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

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

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

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20. If $A + B = 90^\circ$ and $\sin A = \frac{21}{29}$, then $\tan B =$

$\cos A = \frac{20}{29},\ \tan B = \cot A$

$\cot A = \frac{20}{21}$

Ans: (B) $\frac{20}{21}$

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21. $5(\cos^2 51^\circ + \cos^2 39^\circ) =$

$51^\circ + 39^\circ = 90^\circ$

So $\cos^2 51^\circ + \cos^2 39^\circ = 1$ and the value is 5.

Ans: (A) 5

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22. $\sqrt{1 - \cos^2 125^\circ} =$

$\sqrt{1 - \cos^2 125^\circ} = \sqrt{\sin^2 125^\circ} = |\sin 125^\circ|$

$\sin 125^\circ > 0$, so this is $\sin 125^\circ$.

Ans: (D) $\sin 125^\circ$

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23. If $\sin\theta + \cos\theta = \frac{4}{3}$, then $\sin\theta\cos\theta =$

$1 + 2\sin\theta\cos\theta = \frac{16}{9}$

$\sin\theta\cos\theta = \frac{7}{18}$

Ans: (B) $\frac{7}{18}$

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24. If $\frac{a}{b} = \frac{c}{d} = \frac{1}{3}$, then $\dfrac{-2a - 2c}{-2b - 2d} =$

$a = \frac{1}{3}b,\ c = \frac{1}{3}d$

So the combination has the same ratio $\frac{1}{3}$.

Ans: (A) $\frac{1}{3}$

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25. The solution (x, y) of $-2x + 4y - 18 = 0$ and $-x + 3y - 14 = 0$ is

$x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1} = \frac{-2}{-2},\ y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1} = \frac{-10}{-2}$

So $(x, y) = (1, 5)$.

Ans: (D) $(1, 5)$
