EXPRESSWALA ACADEMY

Maths 1B: Straight Lines

MCQ Test, Set 01

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 slope of a line perpendicular to the line through $(2, 7)$ and $(4, -1)$ is

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

2. The inclination of a line with slope $\sqrt{3}$ is

A. 30° **B.** 60° **C.** 150° **D.** 120°

3. The point on the x-axis equidistant from $(5, -1)$ and $(-1, 1)$ is

A. $(-2, 0)$ **B.** $(0, 2)$ **C.** $(2, 1)$ **D.** $(2, 0)$

4. The x-axis divides the join of $(5, -6)$ and $(5, -5)$ in the ratio

A. $5 : 6$ externally **B.** $5 : 6$ internally

C. $6 : 5$ externally **D.** $6 : 5$ internally

5. The point dividing the join of $(0, 0)$ and $(7, -2)$ internally in the ratio $4 : 1$ is

A. $(-\frac{7}{3}, \frac{2}{3})$ **B.** $(\frac{28}{3}, -\frac{8}{3})$

C. $(\frac{7}{5}, -\frac{2}{5})$ **D.** $(\frac{28}{5}, -\frac{8}{5})$

6. The points of trisection of the join of $(2, -5)$ and $(11, -5)$ are

A. $(5, -5),\ (8, -5)$ **B.** $(\frac{13}{2}, -5),\ (11, -5)$

C. $(\frac{13}{2}, -5),\ (8, -5)$ **D.** $(-1, -5),\ (14, -5)$

7. $A(4, 5)$, $B(-6, 3)$, $C(-2, -5)$ are three vertices of the parallelogram $ABCD$. The fourth vertex D is

A. $(0, 13)$ **B.** $(1, 0)$ **C.** $(8, -3)$ **D.** $(-12, -7)$

8. The area of the triangle with vertices $(1, -3)$, $(-4, -4)$, $(-2, 4)$ is

A. 20 **B.** 38 **C.** $\frac{19}{2}$ **D.** 19

9. The locus of a point P at which the segment joining $A(1, -4)$ and $B(-4, 2)$ subtends a right angle is

A. $x^2 + y^2 + 3x + 2y - 12 = 0$ **B.** $x^2 + y^2 - 3x - 2y - 12 = 0$

C. $x^2 + y^2 + 3x - 2y - 12 = 0$ **D.** $x^2 + y^2 - 3x + 2y - 12 = 0$

10. The line through $(-4, 0)$ perpendicular to $5x + y - 2 = 0$ is

A. $5x - y + 20 = 0$ **B.** $x - 5y - 4 = 0$ **C.** $5x + y + 20 = 0$ **D.** $x - 5y + 4 = 0$

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11. The area of the triangle formed by $6x - 5y - 6 = 0$ with the coordinate axes is

A. 3 **B.** $\frac{3}{10}$ **C.** $\frac{3}{5}$ **D.** $\frac{6}{5}$

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12. When $x - \sqrt{3}\,y - 4 = 0$ is written as $x\cos\alpha + y\sin\alpha = p$, the value of α is

A. 300° **B.** 240° **C.** 120° **D.** 60°

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13. The distance of $(-3, 5)$ from the line $3x - 5y + 6 = 0$ measured along a line of inclination 45° is

A. 28 **B.** $\frac{14\sqrt{34}}{17}$ **C.** $28\sqrt{2}$ **D.** $14\sqrt{2}$

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14. The perpendicular distance from $(5, 3)$ to $3x + 4y + 5 = 0$ is

A. $\frac{32}{25}$ **B.** $\frac{32}{5}$ **C.** 32 **D.** 1

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15. The distance between the parallel lines $3x + 4y + 11 = 0$ and $6x + 8y + 12 = 0$ is

A. $\frac{17}{5}$ **B.** 5.0 **C.** $\frac{1}{5}$ **D.** 1

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16. $(3, 1)$ and $(5, 2)$ are two vertices of an equilateral triangle. The third vertex is

A. $(4 - \frac{\sqrt{3}}{2}, \frac{3}{2} + \sqrt{3})$ or $(\frac{\sqrt{3}}{2} + 4, \frac{3}{2} - \sqrt{3})$

B. $(5 - \frac{\sqrt{3}}{2}, \frac{3}{2} + \sqrt{3})$ or $(\frac{\sqrt{3}}{2} + 3, \frac{3}{2} - \sqrt{3})$

C. $(4 - \frac{\sqrt{3}}{2}, \frac{3}{2} - \sqrt{3})$ or $(\frac{\sqrt{3}}{2} + 4, \frac{3}{2} + \sqrt{3})$

D. $(4 - \sqrt{3}, \frac{3}{2} + 2\sqrt{3})$ or $(\sqrt{3} + 4, \frac{3}{2} - 2\sqrt{3})$

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17. The line $4x + y - 10 = 0$ divides the join of $(-2, -2)$ and $(-3, 0)$ in the ratio

A. $10 : 11$ internally **B.** $10 : 11$ externally

C. $11 : 10$ internally **D.** $11 : 10$ externally

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18. The point of intersection of $y - 4 = 0$ and $3x - y - 2 = 0$ is

A. $(2, 4)$ **B.** $(-2, -4)$ **C.** $(4, 2)$ **D.** $(2, -4)$

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19. The centroid of the triangle with vertices $(2, 4)$, $(3, -1)$, $(4, 3)$ is

A. $(\frac{9}{2}, 3)$ **B.** $(9, 6)$ **C.** $(3, 2)$ **D.** $(2, 3)$

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20. The slopes of the lines making an angle of 45° with a line of slope $\frac{5}{2}$ are

A. $-\frac{3}{7},\ \frac{7}{3}$ **B.** $\frac{3}{7},\ \frac{7}{3}$

C. $\frac{3}{7},\ -\frac{7}{3}$ **D.** $\frac{7}{3},\ -\frac{3}{7}$

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21. For the lines $5x + 12y + 1 = 0$ and $4x - 3y + 9 = 0$, the bisector of the angle containing the origin is

A. $27x - 99y + 112 = 0$ **B.** $9x + 9y + 10 = 0$ **C.** $77x + 21y + 122 = 0$ **D.** $x + 15y - 8 = 0$

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22. The area of the rhombus $6|x| + 6|y| = 6$ is

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

23. The image of $(-2, -1)$ in the line $2x - y + 1 = 0$ is

A. $(-\frac{9}{5}, -\frac{2}{5})$ **B.** $(-\frac{2}{5}, -\frac{9}{5})$

C. $(-\frac{6}{5}, -\frac{7}{5})$ **D.** $(-\frac{18}{5}, -\frac{1}{5})$

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24. A line through $(25, 4)$ meets the positive x- and y-axes at A and B. The least value of $OA + OB$ is

A. 40 **B.** 29 **C.** 49 **D.** 58

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25. The equation $2x^2 + 5xy + y^2 + 8y + 4 = 0$ represents

A. a pair of straight lines **B.** a hyperbola

C. a parabola **D.** a circle

Key sheet

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

Solutions

1. The slope of a line perpendicular to the line through $(2, 7)$ and $(4, -1)$ is

$m = \frac{-1-7}{4-2} = -4$

A perpendicular line has slope $-\frac{1}{m} = \frac{1}{4}$

Ans: (B) $\frac{1}{4}$

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2. The inclination of a line with slope $\sqrt{3}$ is

$\tan\theta = \sqrt{3},\ 0 \le \theta < 180^\circ$

$\theta = 60^\circ$

Ans: (B) 60°

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3. The point on the x-axis equidistant from $(5, -1)$ and $(-1, 1)$ is

Let it be $(h, 0)$: $(h-5)^2 + 1 = (h-(-1))^2 + 1$

$h = 2$

Ans: (D) $(2, 0)$

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4. The x-axis divides the join of $(5, -6)$ and $(5, -5)$ in the ratio

The x-axis divides it in the ratio $-y_1 : y_2 = 6 : -5$

$= 6 : 5$, externally

Ans: (C) $6 : 5$ **externally**

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5. The point dividing the join of $(0, 0)$ and $(7, -2)$ internally in the ratio $4 : 1$ is

$\frac{mB+nA}{m+n} = (\frac{28}{5}, -\frac{8}{5})$

Ans: (D) $(\frac{28}{5}, -\frac{8}{5})$

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6. The points of trisection of the join of $(2, -5)$ and $(11, -5)$ are

They divide AB in the ratios $1 : 2$ and $2 : 1$.

$(5, -5),\ (8, -5)$

Ans: (A) $(5, -5),\ (8, -5)$

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7. $A(4, 5)$, $B(-6, 3)$, $C(-2, -5)$ are three vertices of the parallelogram $ABCD$. The fourth vertex D is

$D = A + C - B = (8, -3)$

Ans: (C) $(8, -3)$

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8. The area of the triangle with vertices $(1, -3)$, $(-4, -4)$, $(-2, 4)$ is

$\frac{1}{2}\,|1(-8) + (-4)(7) + (-2)(1)| = 19$

Ans: (D) 19

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9. The locus of a point P at which the segment joining $A(1, -4)$ and $B(-4, 2)$ subtends a right angle is

Let $P(x, y)$ be on the locus: $PA \perp PB:\ (x-x_1)(x-x_2) + (y-y_1)(y-y_2) = 0$

$x^2 + y^2 + 3x + 2y - 12 = 0$

This is a circle.

Ans: (A) $x^2 + y^2 + 3x + 2y - 12 = 0$

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10. The line through $(-4, 0)$ perpendicular to $5x + y - 2 = 0$ is

A perpendicular line is $x - 5y = k$

$k = -4$

$x - 5y + 4 = 0$

Ans: (D) $x - 5y + 4 = 0$

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11. The area of the triangle formed by $6x - 5y - 6 = 0$ with the coordinate axes is

Intercepts 1 and $-\frac{6}{5}$.

$\text{Area} = \frac{c^2}{2|ab|} = \frac{36}{60} = \frac{3}{5}$

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

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12. When $x - \sqrt{3}\,y - 4 = 0$ is written as $x\cos\alpha + y\sin\alpha = p$, the value of α is

Move the constant to the right so that it is positive, then divide by $\sqrt{a^2 + b^2} = 2$

$x\cos 300^\circ + y\sin 300^\circ = 2$

Ans: (A) 300°

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13. The distance of $(-3, 5)$ from the line $3x - 5y + 6 = 0$ measured along a line of inclination 45° is

$\left|\frac{ax_1 + by_1 + c}{a\cos\theta + b\sin\theta}\right| = \left|\frac{-28}{-\sqrt{2}}\right| = 14\sqrt{2}$

Ans: (D) $14\sqrt{2}$

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14. The perpendicular distance from $(5, 3)$ to $3x + 4y + 5 = 0$ is

$\frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}} = \frac{|32|}{\sqrt{25}} = \frac{32}{5}$

Ans: (B) $\frac{32}{5}$

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15. The distance between the parallel lines $3x + 4y + 11 = 0$ and $6x + 8y + 12 = 0$ is

Write the second line with the same x, y coefficients: $3x + 4y + 6.0 = 0$

$\frac{|c_1 - c_2|}{\sqrt{a^2 + b^2}} = \frac{|5.0|}{\sqrt{25}} = 1$

Ans: (D) 1

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16. $(3, 1)$ and $(5, 2)$ are two vertices of an equilateral triangle. The third vertex is

$\left(\frac{(x_1 + x_2) \pm \sqrt{3}(y_1 - y_2)}{2}, \frac{(y_1 + y_2) \mp \sqrt{3}(x_1 - x_2)}{2}\right)$

$(4 - \frac{\sqrt{3}}{2}, \frac{3}{2} + \sqrt{3})$ or $(\frac{\sqrt{3}}{2} + 4, \frac{3}{2} - \sqrt{3})$

Ans: (A) $(4 - \frac{\sqrt{3}}{2}, \frac{3}{2} + \sqrt{3})$ or $(\frac{\sqrt{3}}{2} + 4, \frac{3}{2} - \sqrt{3})$

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17. The line $4x + y - 10 = 0$ divides the join of $(-2, -2)$ and $(-3, 0)$ in the ratio

$L_{11} = -20,\ L_{22} = -22$

$-L_{11} : L_{22} = 10 : 11$ externally

Ans: (B) $10 : 11$ **externally**

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18. The point of intersection of $y - 4 = 0$ and $3x - y - 2 = 0$ is

Solve the two equations together (cross-multiplication).

$(2, 4)$

Ans: (A) $(2, 4)$

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19. The centroid of the triangle with vertices $(2,4)$, $(3,-1)$, $(4,3)$ is

$G = \frac{A+B+C}{3} = (3,2)$

Ans: (C) $(3,2)$

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20. The slopes of the lines making an angle of 45° with a line of slope $\frac{5}{2}$ are

$\frac{m-\tan\alpha}{1+m\tan\alpha},\ \frac{m+\tan\alpha}{1-m\tan\alpha}$

$\frac{3}{7},\ -\frac{7}{3}$

Ans: (C) $\frac{3}{7},\ -\frac{7}{3}$

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21. For the lines $5x+12y+1=0$ and $4x-3y+9=0$, the bisector of the angle containing the origin is

$\frac{5x+12y+1}{13} = \pm\frac{4x-3y+9}{5}$

The required bisector is $27x-99y+112=0$

Ans: (A) $27x-99y+112=0$

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22. The area of the rhombus $6|x|+6|y|=6$ is

Vertices $(\pm1,0)\,,\ (0,\pm1)$

$\frac{2c^2}{|ab|} = 2$

Ans: (C) 2

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23. The image of $(-2,-1)$ in the line $2x-y+1=0$ is

$\frac{h-x_1}{a} = \frac{k-y_1}{b} = \frac{-2(ax_1+by_1+c)}{a^2+b^2} = \frac{4}{5}$

$(-\frac{2}{5},-\frac{9}{5})$

Ans: (B) $(-\frac{2}{5},-\frac{9}{5})$

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24. A line through $(25,4)$ meets the positive x- and y-axes at A and B. The least value of $OA+OB$ is

$(\sqrt{x_1}+\sqrt{y_1})^2 = (\sqrt{25}+\sqrt{4})^2 = 49$

Ans: (C) 49

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25. The equation $2x^2+5xy+y^2+8y+4=0$ represents

$a=2,\ h=\frac{5}{2},\ b=1,\ g=0,\ f=4,\ c=4$

$\Delta = abc+2fgh-af^2-bg^2-ch^2 = -49,\ h^2-ab = \frac{17}{4}$

So it is a hyperbola.

Ans: (B) a hyperbola
