

Final Revision (2) Mathematics Form "10" Second Term

1. Choose the correct answer:

1) If $A = \begin{pmatrix} 1 & 1 & x-1 \\ 1 & 3 & 5 \\ -1 & 5 & 6 \end{pmatrix}$ is a symmetric matrix, then $x = \underline{\hspace{2cm}}$

a) -1

b) zero

c) 4

d) 6

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2) If $A = (3, 5)$, $B = (2, 0)$, $C = (-3, 3)$, then the area of a triangle ABC equals _____ square unit

a) 2

b) 7

c) 14

d) 28

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3) If the two straight lines:

$$4x + ay + 7 = 0, \vec{r} = (1, 5) + k(3, 9), \text{ then } a = \underline{\hspace{2cm}}$$

a) $\frac{3}{4}$

b) $\frac{4}{3}$

c) $\frac{-3}{4}$

d) $\frac{-4}{3}$

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4) $\frac{\sin \theta \tan \theta}{(1 + \cos \theta)(1 - \cos \theta)}$ in the simplest form = _____

a) $\sec \theta$

b) $\csc \theta$

c) $\sin^2 \theta$

d) $\sin \theta$

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5) The point belongs to the solution set of the inequality:

$x \geq 2, y < 2, x + 7 > 3$ from the following is _____

- a) (3, 1) b) (3, 2) c) (2, 2) d) (2, 1)

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6) The polar form of the vector $\vec{B} = -3\sqrt{2} \vec{i} + 3\sqrt{2} \vec{j}$ is ____

a) $(6, \frac{5\pi}{4})$

b) $(6, \frac{\pi}{4})$

c) $(6, \frac{3\pi}{4})$

d) $(6, \frac{7\pi}{4})$

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7) If $A(7, 8)$, $B(-2, -4)$, then the point C which divide \overline{AB} with ratio $1:2$ internally is _____

a) $(-4, 4)$

b) $(4, -4)$

c) $(4, 4)$

d) $(-4, -4)$

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8) ABC is a triangle; D is the midpoint of \overline{BC}

H is the midpoint of \overline{AD} , then

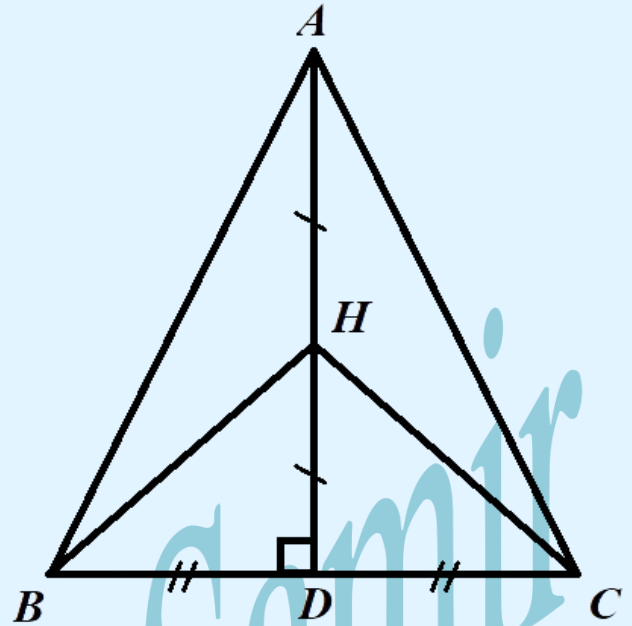
$$\overrightarrow{AB} + \overrightarrow{AC} = \underline{\hspace{2cm}} \overrightarrow{AH}$$

a) -4

b) 4

c) 2

d) 1



9) The equation of the straight line passing through the two points $(-2, 4)$, $(3, 1)$ is _____

a) $3x - 5y = 0$

b) $3x + 5y + 14 = 0$

c) $3x + 5y = 0$

d) $3x + 5y - 14 = 0$

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10) A light pole of height 8 meters gives a shade on the ground of length 5 meters, then the measure of the elevation angle of the sun at that moment to the nearest degree equals _____ °

a) 32

b) 51

c) 39

d) 58

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11) In the opposite figure:

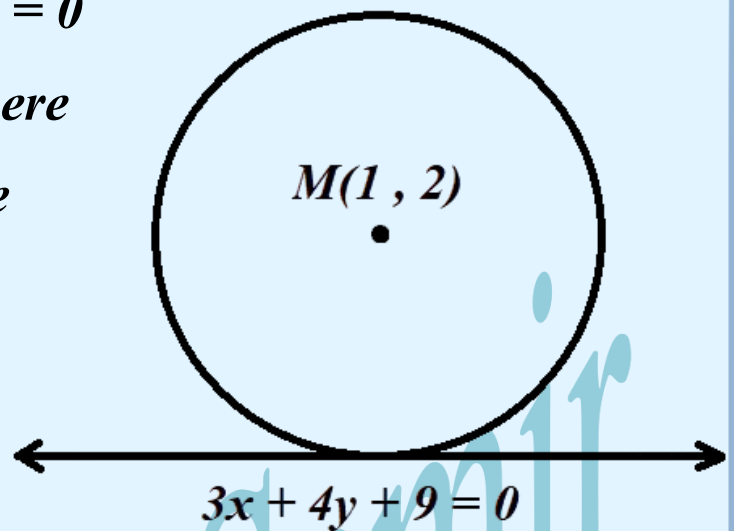
The straight line $3x + 4y + 9 = 0$ is a tangent to a circle M where $M(1, 2)$, then the area of the circle equals _____ cm^2

a) 5π

b) 9π

c) 16π

d) 25π



12) If $A = \begin{pmatrix} 1 & 7 \\ 2 & 4 \end{pmatrix}$, $B = \begin{pmatrix} 0 & -3 \\ 5 & 6 \end{pmatrix}$, then $A + B^t =$ _____

a) $\begin{pmatrix} 0 & 7 \\ 2 & -2 \end{pmatrix}$

b) $\begin{pmatrix} 1 & 12 \\ -1 & 10 \end{pmatrix}$

c) $\begin{pmatrix} 1 & 7 \\ 2 & 4 \end{pmatrix}$

d) $\begin{pmatrix} 1 & 12 \\ 2 & 6 \end{pmatrix}$

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13) The area of the circular sector which its perimeter equals 24 cm and the length of its arc = 12 cm equals _____ cm^2

a) 36

b) 72

c) 96

d) 144

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14) The measure of the acute angle between the two straight lines whose slopes $\frac{3}{4}$, $\frac{-1}{7}$ = _____°

a) 30

b) 60

c) 45

d) 90

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15) If $B = \begin{pmatrix} 2 & 4 \\ 3 & 1 \end{pmatrix}$, and $AB = I$, then $A =$ _____

a) $\begin{pmatrix} 0.2 & 0.4 \\ 0.6 & 0.1 \end{pmatrix}$

b) $\begin{pmatrix} -0.1 & 0.4 \\ 0.3 & -0.2 \end{pmatrix}$

c) $\begin{pmatrix} 0.1 & -0.4 \\ -0.3 & 0.2 \end{pmatrix}$

d) $\begin{pmatrix} 0.5 & 0.25 \\ 0.4 & -0.1 \end{pmatrix}$

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16) Regular hexagon of side length 8 cm, then its area equals _____ cm^2

- a) $12\sqrt{3}$ b) $24\sqrt{3}$ c) $96\sqrt{3}$ d) $144\sqrt{3}$

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17) In the opposite figure:

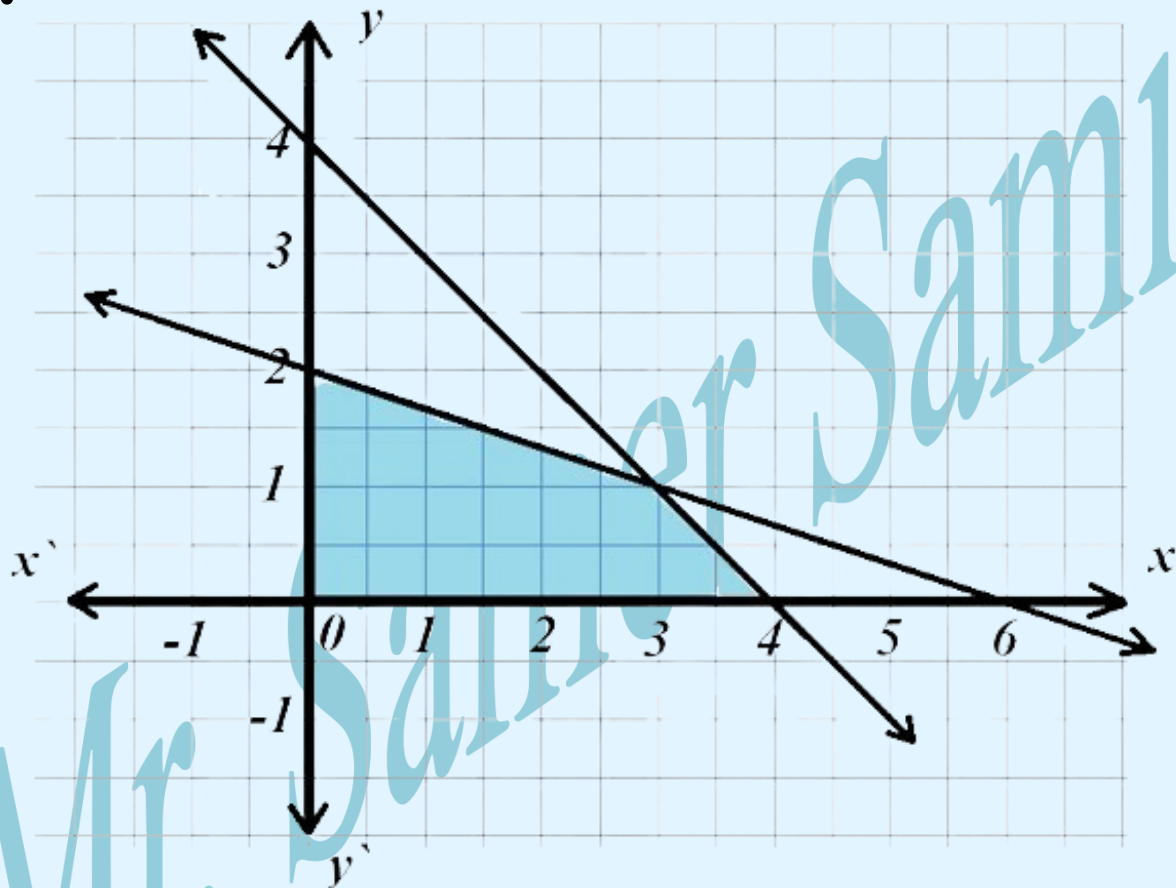
The shaded part represents the solution set of the inequalities: $x \geq 0$, $y \geq 0$, $x + 3y \leq 6$, $x + y \leq 4$, then the maximum value of the function $P = 2x + y$ equals ____

a) 8

b) 2

c) 4

d) 7



18) If A, B are two matrices where $AB = \begin{pmatrix} 2 & -1 \\ 3 & 5 \end{pmatrix}$, then

$B^t A^t = \underline{\hspace{2cm}}$

a) $\begin{pmatrix} 2 & 3 \\ -1 & 5 \end{pmatrix}$

b) $\begin{pmatrix} 2 & -1 \\ 3 & 5 \end{pmatrix}$

c) $\begin{pmatrix} 5 & -1 \\ 3 & 2 \end{pmatrix}$

d) $\begin{pmatrix} 5 & 3 \\ -1 & 2 \end{pmatrix}$

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19) In the opposite figure:

$ABCDFH$ is a regular hexagon

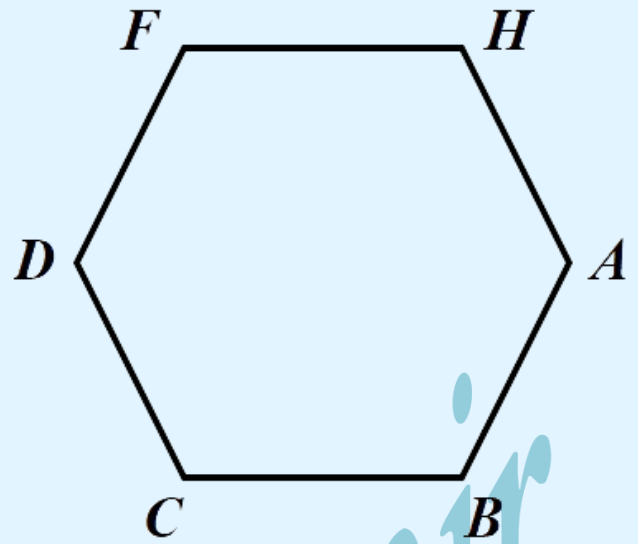
$$(\overrightarrow{AB} - \overrightarrow{CB}) + \overrightarrow{AH} + \overrightarrow{DH} = \underline{\hspace{2cm}}$$

a) \overrightarrow{EH}

b) \overrightarrow{AH}

c) \overrightarrow{AD}

d) \overrightarrow{AC}



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20) If $\overrightarrow{OC} = (12, \frac{5\pi}{6})$ is the position vector of point C with respect to the origin point, then point C = _____

a) $(6, -6)$

b) $(6, 6\sqrt{3})$

c) $(-6\sqrt{3}, 6)$

d) $(6\sqrt{3}, -6)$

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21) If $\vec{A} = (-1, 5)$, $\vec{B} = (2, 1)$, then $\|\vec{AB}\| = \underline{\hspace{2cm}}$

a) 4

b) 3

c) 5

d) 2

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22) The slope of the straight line perpendicular to the straight line $\vec{r} = (3, 1) + k(-5, 1)$ equals _____

a) 5

b) -5

c) 3

d) $-\frac{1}{5}$

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23) If $\theta \in]0, 2\pi[$, then the solution set of the equation:

$$2\sin \theta - \sqrt{3} = 0 \text{ is } \underline{\hspace{2cm}}$$

a) $\{30^\circ, 150^\circ\}$

b) $\{60^\circ, 120^\circ\}$

c) $\{210^\circ, 150^\circ\}$

d) $\{120^\circ, 240^\circ\}$

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24) If $\begin{pmatrix} x & 0 \\ -1 & y \end{pmatrix} + \begin{pmatrix} 1 & 5 \\ -1 & -2 \end{pmatrix} = \begin{pmatrix} 4 & 5 \\ -2 & 3 \end{pmatrix}$, then $x + y =$ _____

a) 5

b) 6

c) 7

d) 8

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25) The vector equation of the straight line passing through the point $(2, 3)$ and parallel to x-axis is _____

a) $\vec{r} = k(2, 3)$

b) $\vec{r} = k(2, 3) + k(0, 1)$

c) $\vec{r} = k(2, 3) + k(1, 0)$

d) $\vec{r} = k(0, 1)$

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26) $\sin \theta \cos \theta \tan \theta$ in the simplest form = _____

- a) $\sin^2 \theta$ b) $\cos^2 \theta$ c) $\tan^2 \theta$ d) $1 - \sin^2 \theta$

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27) If $\|3k\vec{A}\| = \|-15\vec{A}\| = \underline{\hspace{2cm}}$

a) 5

b) -5

c) ± 5

d) 6

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28) The measure of the included angle between the two straight lines: $2x = 3$, $y = 4$ equals _____ °

a) 90
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b) 45

c) 60

d) 30

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29) The solution set of $\begin{vmatrix} x-2 & 0 & 0 \\ 1 & 1 & 0 \\ 2 & 3 & x+2 \end{vmatrix} = 5$ is _____

- a) $\{2, -2\}$ b) $\{3, -3\}$ c) $\{3, 2\}$ d) $\{1, -1\}$

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30) The cartesian equation of the straight line passes through the point $(-2, 7)$ and parallel to the y-axis is _____

a) $y = 2$

b) $y = -2$

c) $x = -2$

d) $x = 7$

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31) The point which belongs to the S.S of the inequalities $x > 3$, $y < 1$, $x + y \leq 5$ is _____

- a) (3, -2) b) (1, -2) c) (4, 4) d) (6, -2)

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32) If $\begin{pmatrix} 1 & 2x - 4 \\ -2 & 3 \end{pmatrix}$ is symmetric matrix, then $x = \underline{\hspace{2cm}}$

a) 1

b) 3

c) 2

d) -2

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33) If $0^\circ \leq \theta \leq 360^\circ$ and $\sin \theta + 1 = 0$, then $\theta =$ _____ $^\circ$

a) 0

b) 90

c) 180

d) 270

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34) If the straight line which passes through the two points:
 $(3, 0)$, $(0, -2)$ is parallel to the straight-line $y = ax - 3$,
 then $a =$ _____

a) $\frac{3}{2}$

b) $\frac{2}{3}$

c) $\frac{-2}{3}$

d) $\frac{-3}{2}$

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35) If $\vec{A} = (4, 2)$, $\vec{B} = (1, -2)$, then $\|\vec{A} - \vec{B}\| = \underline{\hspace{2cm}}$

a) 7

b) 5

c) 4

d) 3

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36) Which of the following matrices doesn't have a multiplicative inverse?

a) $\begin{pmatrix} 1 & 3 \\ 2 & 5 \end{pmatrix}$

b) $\begin{pmatrix} -1 & 4 \\ 2 & 8 \end{pmatrix}$

c) $\begin{pmatrix} 2 & 6 \\ 3 & 9 \end{pmatrix}$

d) $\begin{pmatrix} 4 & 0 \\ -2 & 1 \end{pmatrix}$

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37) The perimeter of the circular sector whose arc length is 4 cm and the diameter of its circle is 10 cm = _____ cm

a) 14

b) 20

c) 30

d) 10

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- 38) The length of the drawn perpendicular from the point $(1, 1)$ to the straight-line $x + y = 0$ equals ____ length unit
- a) 2 b) $\sqrt{2}$ c) 1 d) zero

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39) If $A = \begin{pmatrix} 4l & -1 \\ 2m & 2 \end{pmatrix}$, $B = \begin{pmatrix} n & m+1 \\ l & 2 \end{pmatrix}$ and $A = B^t$, then

$$l + m + n = \underline{\hspace{2cm}}$$

a) -5

b) 6

c) -4

d) 2

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40) The solution set of:

$$\sin \theta + \cos \theta = 0 \text{ where } 180^\circ \leq \theta \leq 360^\circ = \underline{\hspace{2cm}}$$

- a) $\{210^\circ\}$ b) $\{225^\circ\}$ c) $\{240^\circ\}$ d) $\{315^\circ\}$

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41) In the opposite figure:

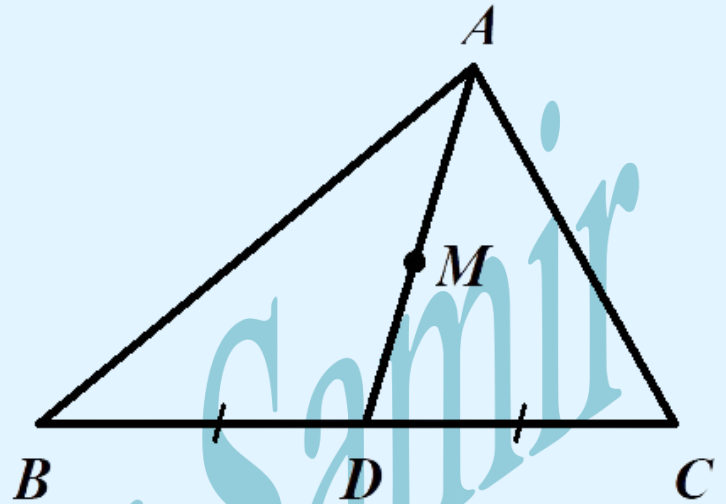
\overline{AD} is a median in $\triangle ABC$, M is the point of intersection of its medians. If $\overrightarrow{AB} + \overrightarrow{AC} = k\overrightarrow{AM}$, then $k = \underline{\hspace{2cm}}$

a) $\frac{1}{3}$

b) $\frac{1}{2}$

c) 3

d) 2



42) The point at which the function: $P = 40x + 20y$ has a maximum value from the following is _____

a) (0 , 0)

b) (0 , -4)

c) (15 , 10)

d) (25 , 0)

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43) Equation of the straight line which makes a positive angle of measure 45° with x-axis an intercepts 5 units from the positive part of y-axis is ____

a) $y = x - 5$

b) $y = \frac{1}{2}x + 5$

c) $y = \frac{1}{\sqrt{2}}x + 5$

d) $y = x + 5$

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44) If $\overrightarrow{AB} = 3\overrightarrow{i} + 3\overrightarrow{j}$, $\overrightarrow{BC} = \overrightarrow{j}$, then $\|\overrightarrow{AC}\| = \underline{\hspace{2cm}}$

a) 6

b) $3\sqrt{2}$

c) 1

d) 5

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45) The polar form of the vector $(6, 6\sqrt{3})$ is _____

a) $(12, \frac{\pi}{3})$

b) $(12, \frac{\pi}{6})$

c) $(6, \frac{\pi}{3})$

d) $(6, \frac{\pi}{6})$

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46) A kite with string its length is 42 m, if the angle which the string makes with the horizontal ground 63° , then the height of the kite above the ground is approximately = _ m

a) 37

b) 19

c) 82

d) 80

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47) If C divides \overline{AB} externally by the ratio $5 : 7$, then $\frac{AC}{AB} = \text{---}$

a) $\frac{2}{7}$

b) $\frac{7}{2}$

c) $\frac{2}{5}$

d) $\frac{5}{2}$

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48) A quadrilateral whose diagonal lengths are 10 cm and 12 cm and its area 30 cm^2 the measure of the acute angle between the diagonals is ____ °

a) 30

b) 60

c) 150

d) 45

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49) If $A(3, 5)$, $B(2, 0)$, $C(-3, 3)$, then the area of ABC equals _____ cm^2

a) 28

b) 14

c) 7

d) 3

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2. Essay Questions:

1) XYZ is a triangle, $L \in \overline{YZ}$ such that $YL : LZ = 5 : 3$

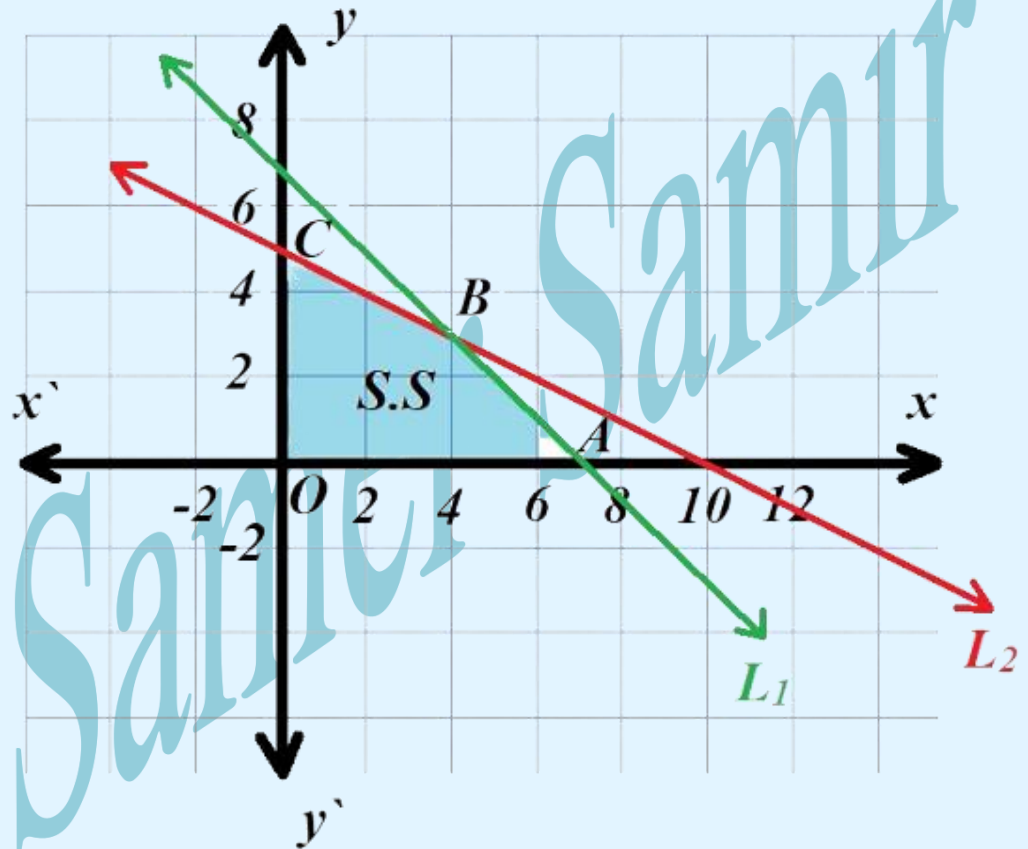
prove that: $5\overrightarrow{XZ} + 3\overrightarrow{XY} = 8\overrightarrow{XL}$

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2) Determine the solution set in $R \times R$ of the following linear inequalities graphically:

$x \geq 0, y \geq 0, x + y \leq 7, x + 2y \leq 10$, then find from the solution set the values of x and y which make the value of the objective function: $P = 5x + 2y$ is greatest as possible

in Solution:



3) ABC is a triangle in which: $D \in \overline{BC}$ and $\overrightarrow{BD} = 4\overrightarrow{DC}$

prove that: $\overrightarrow{AB} = 4\overrightarrow{AC} = 5\overrightarrow{AD}$

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4) If $2\overrightarrow{M} + 3\overrightarrow{AB} = 2\overrightarrow{CB} - \overrightarrow{BA}$, prove that: $\overrightarrow{M} = \overrightarrow{CA}$

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