

Section A: Multiple Choice (Select the correct or best alternative)

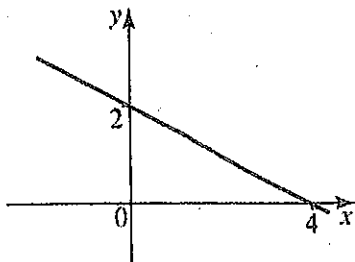
1 To sketch the graph of $y = 1 - \frac{2}{5}x$ using the gradient-intercept method, we need to move, beginning from the y -intercept:

- A 2 units up and 5 units right
- B 2 units down and 5 units left
- C 5 units down and 2 units right
- D 5 units down and 2 units left
- E 2 units down and 5 units right.

2 Find the equation of the line parallel to $y = 5x - 1$ and passing through $(3, 4)$:

- A $y = 5x + 11$
- B $y = -5x + 11$
- C $y = -5x - 11$
- D $y = 5x - 11$
- E $y = 3x + 4$

3 The gradient of the line drawn is:



- A -2
- B -4
- C $\frac{1}{2}$
- D $-\frac{1}{2}$
- E 2

4 The line with the equation $3x + 4y = -12$ intersects the axes at which of the following points?

- A $(0, -4)$ and $(-3, 0)$
- B $(-4, 0)$ and $(0, -3)$
- C $(0, 4)$ and $(3, 0)$
- D $(-3, 0)$ and $(0, -4)$
- E $(4, 0)$ and $(0, 3)$

5 To plot $4x - y = 7$, the following table of values is constructed:

x	1	3		6
y	-3	5	9	

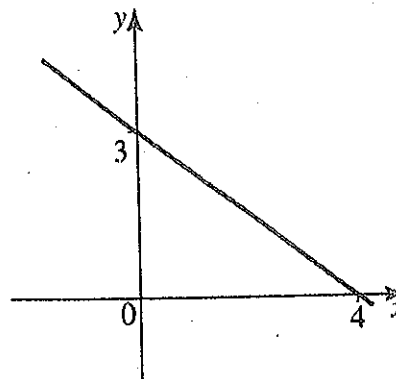
The missing values are:

- A $x = -4, y = -17$
- B $x = -4, y = 17$
- C $x = 4, y = 17$
- D $x = 4, y = -17$
- E $x = 4, y = 10$

6 Which of these points lie on the line $y = 2x - 1$?

- A $(3, -5)$
- B $(3, 5)$
- C $(-5, 3)$
- D $(5, 3)$
- E $(0, 1)$

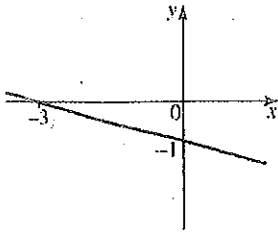
7 Which is the equation of the graph?



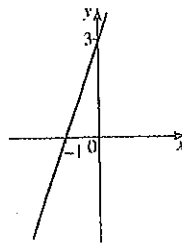
- A $y = -\frac{3}{4}x - 3$
- B $y = -\frac{3}{4}x + 3$
- C $y = \frac{3}{4}x + 3$
- D $y = -\frac{3}{4}x - 4$
- E $y = -\frac{3}{4} + 4$

8 Which is the graph of $3x - y - 3 = 0$?

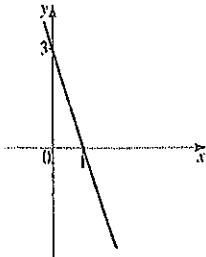
A



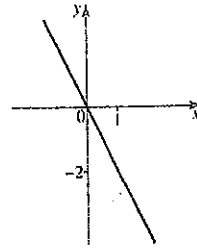
B



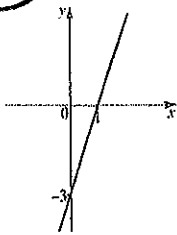
C



D



E



Section B Short answer Questions

Complete working must be shown to gain full marks for these problems

1. Find the equation of the line which has a gradient of -2 and passes through the point (4, -1).

$y = -2x + 7$

2. Find the equation of a line which passes through the points (4, 6) and (6, 10).

$m = \frac{10-6}{6-4} = \frac{4}{2} = 2$ $b = 2 \times 4 + c = 6 - 8 = c = -2$

$y = 2x - 2$

3. Sketch the graph of the line $3x - y = 6$ using the x-y intercept method.

$x \text{ int} = 2$ $y \text{ int} = -6$

4. Sketch the graph of the line $y = -5x + 2$ using the gradient - intercept method. Now sketch this graph on your calculator, show your teacher when complete.

$m = -5$
 $c = 2$

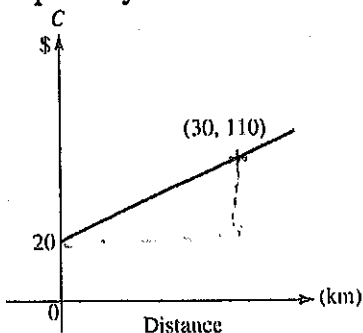
5. A local basketball club decided to hire a bus to the Grand Final. The cost (\$B) equation for people is $B = 5n + 200$. If the final cost was \$400, how many people went by the bus?

$400 = 5n + 200$ $200 = 5n$ $n = 40$

6. To hire a steam-cleaner from Coles, the initial cost is \$8 plus an additional charge of \$2.50 per hour. Construct an equation for the cost (\$W) if you hire the steam-cleaner for t hours.

$W = 8 + 2.50t$

7. The graph shows the cost (\$C) of a towing service. Find the equation of the graph, using appropriate symbols.



$c = 20$
 $m = \frac{90}{30} = 3$

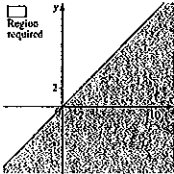
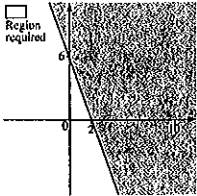
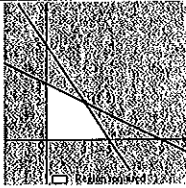
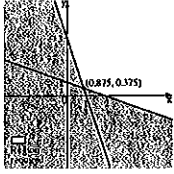
$C = 3D + 20$

Linear Programming Revision Answers

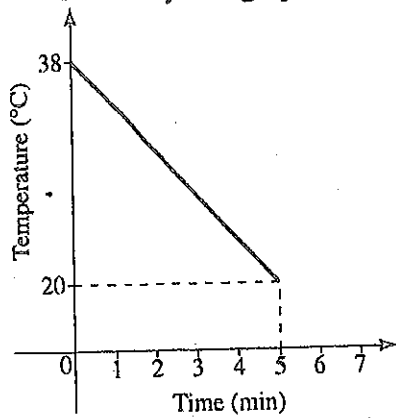
Multiple Choice

1. C	2. D	3. B	4. A	5. B	6. E
7. B	8. C	9. D	10. B		

Short Answer:

<p>1. $y = x$ (0, 0), (2, 2)</p>  <p>Region required</p>	<p>2. Boundary coordinates</p> <table> <tr> <td>(0, 0)</td> <td>0</td> </tr> <tr> <td>(0, 3)</td> <td>3</td> </tr> <tr> <td>(2, 2)</td> <td>8</td> </tr> <tr> <td>(4, 0)</td> <td>12</td> </tr> </table> <p>Hence, maximum value is 12.</p>	(0, 0)	0	(0, 3)	3	(2, 2)	8	(4, 0)	12
(0, 0)	0								
(0, 3)	3								
(2, 2)	8								
(4, 0)	12								
<p>3. $3x + y = 6$ (0, 6), (2, 0)</p>  <p>Region required</p>	<p>4. </p> <p>Boundary coordinates are: $(0, 0), (0, 3), (3, 2), (5, 0)$ $3x + y = 6$ (0, 6), (2, 0)</p>								
<p>5. $x + 3y = 2$ $(0, \frac{2}{3}), (2, 0)$ $3x + y = 3$ (0, 3), (1, 0) Point of intersection is (0.875, 0.375).</p> 	<p>6. $x \geq 15, y \geq 10, x + 2y \leq 60$</p>								

shown by this graph:



The rule connecting temperature T and time t minutes within the given domain is:

- A $T = -3.6t$
- B $T = -3.6t - 38$
- C $T = 3.6t - 38$
- D $T = 3.6t + 38$
- E** $T = -3.6t + 38$

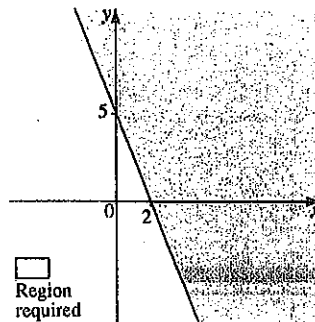
2. If the gradient of the line passing through $(-3, 5)$ and $(2, y)$ is -1 , then y equals:

- A 5
- B 3
- C -1
- D -3
- E 0**

3. A pest and insect control company charges \$30 to spray 1 room and \$50 to spray 3 rooms of a house. The linear model expressing the charge, C dollars, for spraying n rooms is:

- A** $C = 10n + 20$
- B $C = 10n - 20$
- C $C = 10n + 40$
- D $C = 10n - 40$
- E $C = 20n + 10$

4. The region required for the graph below is defined by the inequation:



- A $2y - 5x < 10$
- B** $2y + 5x \leq 10$
- C $2y + 5x \geq 10$
- D $2y < 5x$
- E $2y - 5x \geq 10$

5. Which of these is equivalent to

$$4(x - 1) = 20?$$

A $4x = 19$

B $4x = 21$

C $x - 4 = 20$

D $4x - 1 = 20$

E $x - 1 = 5$

6. The solution to the equation $\frac{x}{3} - 1 = -3$ is:

A -10

B -6

C -3

D 6

E 12

7. If $2x - 3y = 5$ and $3x + 4y = -1$, then the values of x and y are:

A $1, 1$

B $1, -1$

C $-1, 1$

D $-1, -1$

E $0, -1$

8. The coordinates of the intersections of the axes of the line with the equation

$$3x - 5y = 15$$
 are:

A $(-5, 0), (0, -3)$

B $(5, 0), (0, 3)$

C $(5, 0), (0, -3)$

D $(-5, 0), (0, 3)$

E $(3, 0), (0, 5)$

9. Which equation has the line that is parallel to the line of $y = \frac{1}{2}x - 3$?

A $x + 2y - 10 = 0$

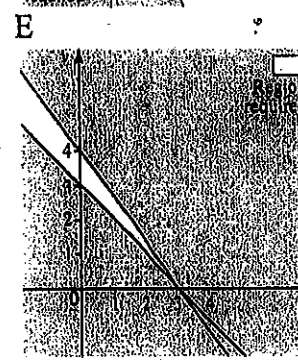
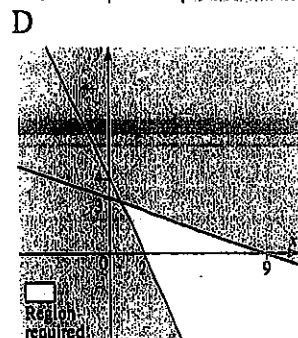
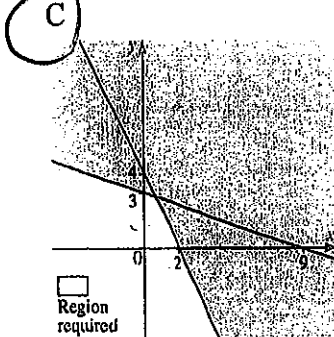
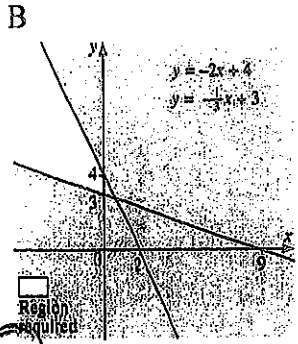
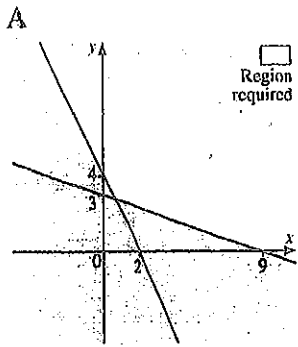
B $x - 2y - 10 = 0$

C $x + 2y + 10 = 0$

D $-x - 2y - 10 = 0$

E $-x - 2y + 10 = 0$

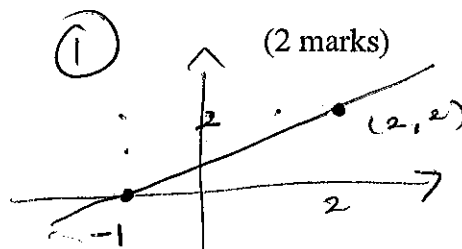
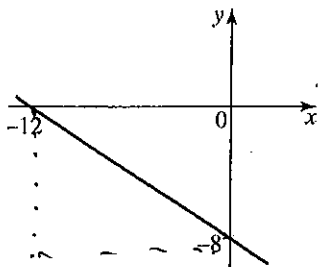
$2x + y - 4 \geq 0$ and $2x + 6y \leq 18$ is:



Section B: Short Answer Questions

(Show all working on lined paper)

- Sketch the graph of $y = \frac{2}{3}x - 1$
- Find the equation of the graph shown.



(2) $y = mx + c$
 $y = -\frac{2}{3}x - 8$ (3 marks)

- Solve the pair of simultaneous equations-

$$\begin{aligned} y &= 2x - 3 \\ y - 2x &= 10 \end{aligned}$$

(3 marks)

$y = 2x - 3$ sub.
 $2x - 3 - 2x = 10$
 $-3 = 10 + 3$
 $0 = 13$

- Solve this pair of simultaneous equations-

$$\begin{aligned} x - y &= 4 \\ 2x + y &= 11 \\ \hline 3x &= 15 \\ x &= 5 \end{aligned}$$

$5 - y = 4$
 $\therefore y = 1$
 $(5, 1)$

(4 marks)

5. Solve the following equations:
 a) $\frac{x+1}{3} = \frac{8-x}{2}$
 $2(x+1) = 3(8-x)$
 $2x+2 = 24-3x$
 $2x+3x = 24-2$
 $5x = 22$
 $x = \frac{22}{5}$

b) $\frac{x+1}{3} = 4 - \frac{x}{2}$
 $2(x+1) = 3(8-x)$
 $2x+2 = 24-3x$
 $2x+3x = 24-2$
 $5x = 22$
 $x = \frac{22}{5}$

(3+2=5 marks)

- Sketch these system of inequations and leave the required region unshaded:

$$3x + 2y \leq 12, x \leq 2, x \geq 0, y \geq 0$$

$2x + 3y = 24 - 2$
 $2x = 22$
 $x = 11$

$3x + 2y = 12$
 $3(0) + 2y = 12$
 $2y = 6$
 $y = 3$

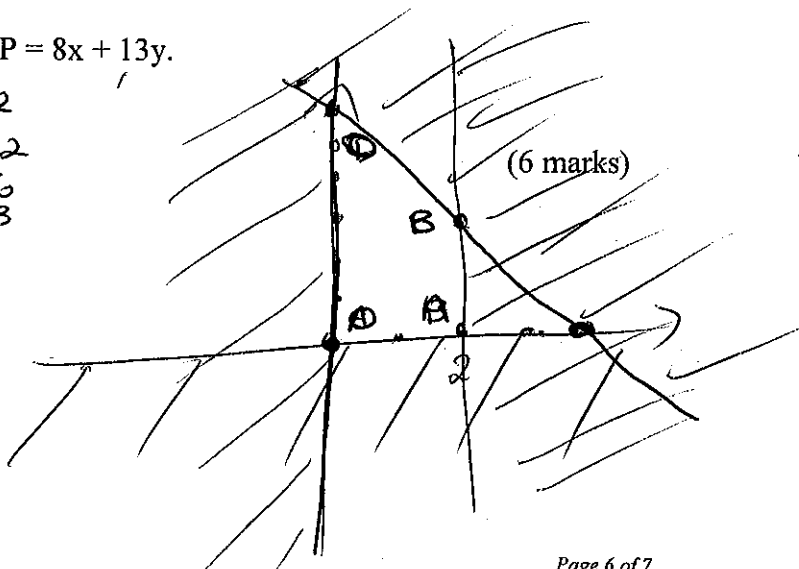
$3x + 2y = 12$
 $3(2) + 2y = 12$
 $6 + 2y = 12$
 $2y = 6$
 $y = 3$

$(0, 6), (4, 0)$

- Find the corner points.

- Maximize the objective function $P = 8x + 13y$.

$(0, 0) P = 0 + 0 = 0$
 $A(2, 0) P = 16 + 0 = 16$
 $B(2, 3) P = 16 + 39 = 55$
 $C(0, 6) P = 0 + 78 = 78$ ✓

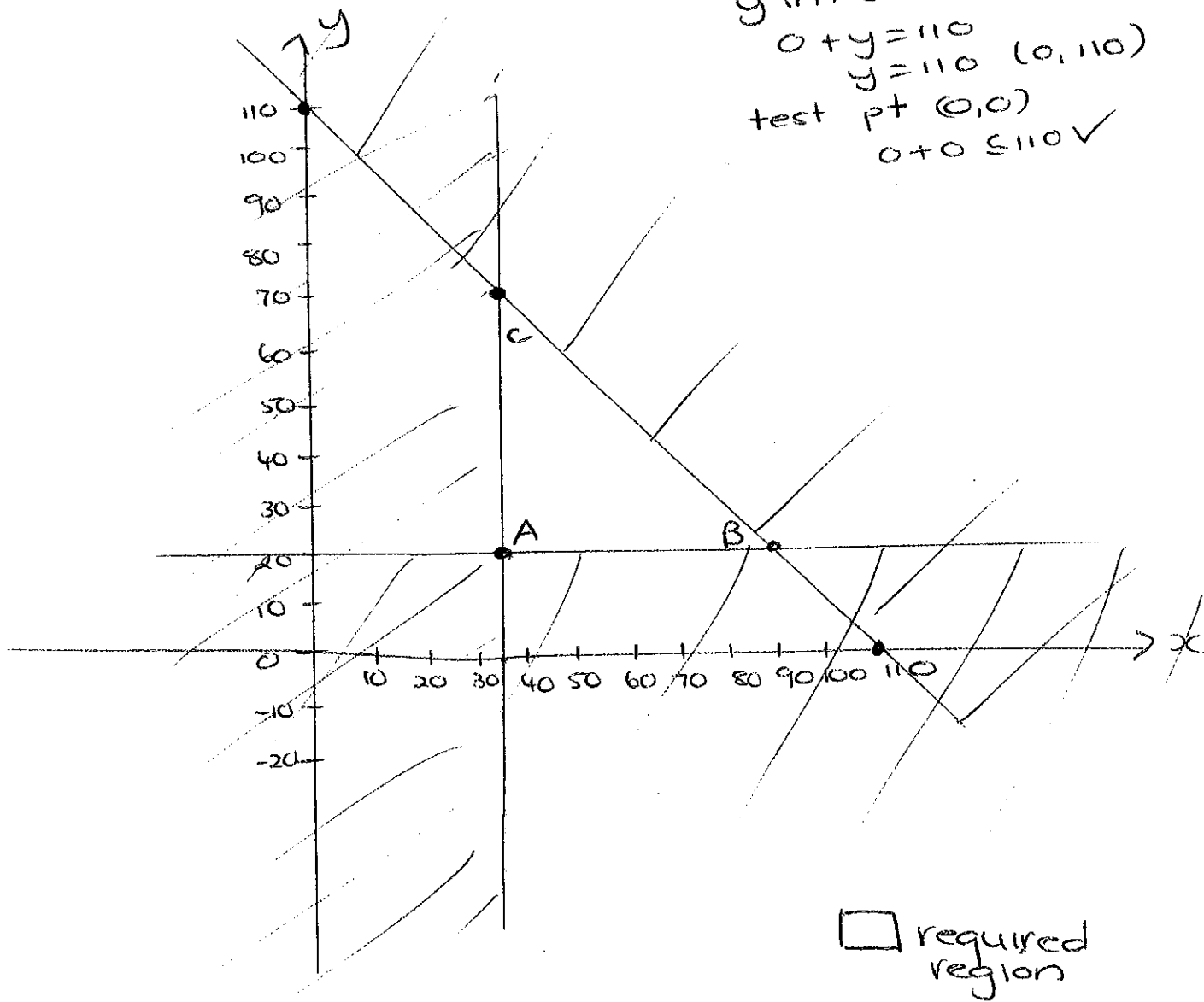


Section C: Analysis

Question 1:

a) $x \geq 35$
 $y \geq 20$

$x + y \leq 110 \rightarrow x \text{ int } y = 0$
 $x + 0 = 110$
 $\therefore x = 110 \quad (110, 0)$
 $y \text{ int } x = 0$
 $0 + y = 110$
 $y = 110 \quad (0, 110)$
 test pt $(0, 0)$
 $0 + 0 \leq 110 \checkmark$



* b) If had to max profit

$\$P = 9x + 15y$
 $A(35, 20) \quad P = 9 \times 35 + 15 \times 20 = \615
 $B(90, 20) \quad P = 9 \times 90 + 15 \times 20 = \1110
 $C(35, 75) \quad P = 9 \times 35 + 15 \times 75 = \1440
 To Max profit need 35 budget + 75 deluxe

$A(35, 20)$
 $B(90, 20) \rightarrow y = 20$
 $x + y = 110$
 $x + 20 = 110$
 $\therefore x = 110 - 20$
 $x = 90$
 $C(35, 75)$
 $x = 35$
 $x + y = 110$
 $35 + y = 110$
 $y = 110 - 35$
 $y = 75$