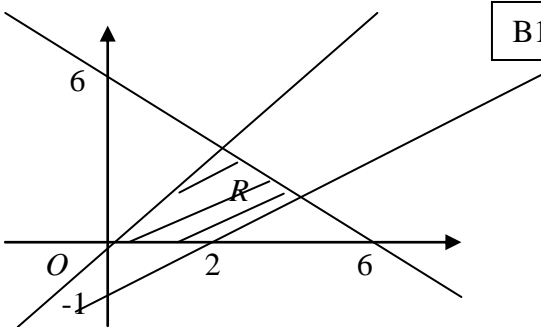


Question Number	Scheme	Marks
<b>1(a)</b>		B1B1B1 (3)
<b>(b)</b>	Shade in or out for B1 (R not needed)	B1ft (1)
<b>(c)</b>	$(y + 2x)_{\max} = 10\frac{2}{3}$	B1 (1)
		[5]

**(a)****B1** B1 for each line which is correct ie crosses both axes at the correct points.**B1** x- axis intercepts are: origin, 6 and 2**B1** Enter B1B1B1, B1B1B0, B1B0B0**(b)****B1ft** Correct area shaded. Follow through their 3 lines **provided** area shown is the internal area above the x-axis**(c)****B1** Correct answer only (or one correct answer clearly indicated). Allow  $10.5 \leq x \leq 10.8$  (as it can be obtained by calculation or by reading values from the grid)

<b>2</b>	$x^2 - 6x + 5 = 11 - x$ $x^2 - 5x - 6 (=0)$ OR $y^2 - 17y + 60 (=0)$ $(x-6)(x+1) (=0)$ $(y-12)(y-5) (=0)$ $x = 6, y = 5$ $x = -1, y = 12$	M1 A1 dM1 A1 A1 [5]
----------	---	---------------------------------

**M1** Obtain an equation in one variable. Must be quadratic but no simplification needed**A1** Correct simplified 3 term quadratic equation, terms in any order**dM1** Solve their quadratic by any valid means (see "General Principles")**A1** Either (x, y) pair correct **or** both x values **or** both y values correct**A1** Second pair correct. It must be clear how the values are paired. (Horizontally as shown or vertically is sufficient.)

<b>3 (a)</b>	$b^2 - 4ac = p^2 - 36 < 0$ oe $-6 < p < 6$ or $ p  < 6$	M1A1 A1 (3)
<b>(b)</b>	$49 - 4q^2 \geq 0$ $-\frac{7}{2} \leq q \leq \frac{7}{2}$ (or 3.5, $\sqrt{12.25}$ ) Allow with $<$ or $=$	M1

Question Number	Scheme	Marks
	$q = \pm 3, \pm 2, \pm 1, 0$	A1A1cso (3) [6]

(a)

**M1** Use the discriminant to form an inequality or equation. Can have ( $\leq, <, =, >, \geq$ )**A1** Correct inequality Allow with  $< 0$  or  $\leq 0$ . May be implied by the correct answer.**A1**  $-6 < p < 6$ ,  $p > -6$  and  $p < 6$ ,  $|p| < 6$  score A1 but  $p > -6$  or  $p < 6$  scores A0

(b)

**M1** Use the discriminant to form an **inequality** or equation for  $q$  **and** attempt to **solve** it. (Inequality/equation for  $q^2$  and no further work scores M0) $(x \pm q)(x \pm q) = 0$  so  $q = \pm 3.5$  oe scores M0**A1** Any 4 correct values - can come from an equation.**A1cso** All 7 correct - must have used an inequality.

<b>4(a)</b>	$a = 6t + 2$ $t = 2$ $a = 14$ (m/s <sup>2</sup> )	M1A1 A1ft (3)
<b>(b)</b>	$s = t^3 + t^2 + 5t$ (+c) $s = 51$ (m)	M1,A1( <b>M1 on e-PEN</b> ) A1cso (3)[6]

(a)

**M1** Differentiate the expression for  $v$ . Min one term differentiated (see "General Principles") and none integrated.**A1** Correct differentiation**A1ft** Substitute  $t = 2$  to obtain the acceleration. Follow through their expression for the accel, provided attempt at differentiation has been made (ie M mark earned).

(b)

**M1** Attempt to integrate the expression for  $v$ , constant of integration not needed. Min 2 of 3 terms to be integrated and none differentiated.**A1** Correct integration with or without  $c$ **(M1 on e-PEN)****A1cso** For  $s = 51$  (m) A constant of integration must have been included and made  $= 0$ **ALT** (b) **By definite integration:**

M1: Integrate min of 2 of 3 terms (ignore limits); A1: Correct integration

A1cso: For  $s = 51$  (m) by substitution of limits 0 and 3.**NB** Parts not labelled: Int and sub  $t = 3$ , assume (b); Diff and sub  $t = 2$ , assume (a)**5(a)**

$$(2x+3)^2 = x^2 + (4x-5)^2 - 2x(4x-5)\cos 60^\circ$$

$$4x^2 + 12x + 9 = x^2 + 16x^2 - 40x + 25 - 4x^2 + 5x$$

M1A1