

Straight Lines Exam Questions MS (from OCR 4721)

Q1 (Jan 2011, Q1)

1 (i)	$\sqrt{(-2-6)^2 + (7-1)^2}$ = 10	M1 A1	2	Use of $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
(ii)	$\frac{7-1}{-2-6}$ = $-\frac{3}{4}$	M1 A1	2	uses $\frac{y_2 - y_1}{x_2 - x_1}$ o.e. ISW
(iii)	Gradient of given line = $\frac{4}{3}$ $-\frac{3}{4} \times \frac{4}{3} = -1$ So lines are perpendicular	M1 B1ft B1	 3 7	Attempt to rearrange equation to make y the subject OR attempt to find the gradient using points on the line Correct conclusion for their gradients States $-\frac{3}{4} \times \frac{4}{3} = -1$ or "negative reciprocal" relating to the correct values www

Q2 (Jan 2012, Q8)

B lies on l so has coordinates (x, 11 - 2x)	M1	Attempt to find equation of l with gradient -2
$(x-3)^2 + (11-2x-5)^2 = (6\sqrt{5})^2$	M1	$(x-3)^2 + (y-5)^2 = (6\sqrt{5})^2$ o.e. seen
$5x^2 - 30x - 135 = 0$	M1*	Attempts to solve the equations simultaneously to get a quadratic
$5(x+3)(x-9) = 0$	M1dep	Correct method to solve their quadratic
$x = -3, x = 9$	A1	Both x values
$y = 17, y = -7$	A1	Both y values
	[6]	

Q3 (Jun 2012, Q3)

(i)	$\frac{3}{5}$	B1	Allow 0.6 or any equivalent fraction
		[1]	
(ii)	P $\left(\frac{20}{3}, 0\right)$ Q (0, -4) $\left(\frac{\frac{20}{3}+0}{2}, \frac{0+(-4)}{2}\right)$ $\left(\frac{10}{3}, -2\right)$	B1 B1 M1 A1	May be implied by subsequent working May be implied Correct method to find midpoint of line Allow exact equivalent forms, decimals must be correct to at least 2dp
		[4]	

Q4, (Jan 2013, Q6)

(i)	$\frac{p-7}{-4-2} \text{ or } \frac{7-p}{-2-4}$ $\frac{p-7}{-4-2} = 4 \text{ or } \frac{7-p}{-2-4} = 4$ $p = -1$	<p>M1</p> <p>A1</p> <p>A1</p> <p>[3]</p>	<p>uses $\frac{y_2 - y_1}{x_2 - x_1}$ (at least 3 out of 4 correct)</p> <p>Correct, unsimplified equation</p>
(ii)	$\frac{-2+6}{2} = m, \quad \frac{7+q}{2} = 5$ $m = 2$ $q = 3$	<p>M1</p> <p>A1</p> <p>A1</p> <p>[3]</p>	<p>Correct method (may be implied by one correct coordinate)</p>
(iii)	$\sqrt{(-2-d)^2 + (7-3)^2}$ $d^2 + 4d + 20 = 52$ $d^2 + 4d - 32 = 0$ $(d+8)(d-4) = 0$ $d = -8 \text{ or } 4$	<p>*M1</p> <p>B1</p> <p>DM1</p> <p>A1</p> <p>[4]</p>	<p>Correct method to find line length/square of line length using Pythagoras' theorem (at least 3 out of 4 correct)</p> <p>$(2\sqrt{13})^2 = 52$ or $2\sqrt{13} = \sqrt{52}$</p> <p>Correct method to solve 3 term quadratic, must involve their "52"</p>

Q5, (Jun 2013, Q8)

<p>Midpoint of AB is $\left(\frac{-2+3}{2}, \frac{6+-8}{2}\right)$</p>	<p>M1</p>	<p>Correct method to find midpoint – can be implied by one correct value</p>
<p>$\left(\frac{1}{2}, -1\right)$</p>	<p>A1</p>	
<p>Gradient of given line = $\frac{1}{3}$</p>	<p>B1</p>	<p>Must be stated or used – just rearranging the equation is not sufficient</p>
<p>Gradient of $l = -3$</p>	<p>B1FT</p>	<p>Use of $m_1 m_2 = -1$ (may be implied), allow for any initial non-zero numerical gradient</p>
<p>$y+1 = -3\left(x - \frac{1}{2}\right)$</p>	<p>M1</p>	<p>Correct equation for line, any non-zero numerical gradient, through their $\left(\frac{1}{2}, -1\right)$</p>
<p>$6x + 2y - 1 = 0$</p>	<p>A1</p>	<p>Correct equation in any three-term form</p>
<p>$6x + 2y - 1 = 0$</p>	<p>A1</p> <p>[7]</p>	<p>$k(6x + 2y - 1) = 0$ for integer k www</p>

Q6, (Jun 2014, Q7)

i)	$\left(\frac{5+(-1)}{2}, \frac{7+(-5)}{2}\right)$ $(2, 1)$	M1 A1 [2]	Correct method to find midpoint of line
ii)	Gradient of AB = $\frac{7-(-5)}{5-(-1)} = 2$ Perpendicular gradient = $-\frac{1}{2}$ $y - 7 = -\frac{1}{2}(x - 5)$ $x + 2y - 19 = 0$	B1 B1ft M1 A1ft A1 [5]	Gradient of AB correctly found as 2 Fully processed $\frac{-1}{\text{their gradient}}$ Equation of straight line through A or B, any non-zero gradient Equation of straight line through A only , their perpendicular gradient, in any form Correct equation in given form

Q7 (Jun 2015, Q5)

(i)	$AB = \sqrt{(5-2)^2 + (-3-1)^2}$ $AB = 5$	M1 A1 [2]	Attempt to use Pythagoras' theorem – 3/4 numbers substituted correctly and attempt to square root Final answer correct, must be fully processed. ± 5 is A0.
(ii)	$\left(\frac{2+5}{2}, \frac{1+(-3)}{2}\right)$ $(3.5, -1)$ Gradient of AB = $-\frac{4}{3}$ Perpendicular gradient = $\frac{3}{4}$ $y + 1 = \frac{3}{4}\left(x - \frac{7}{2}\right)$ $6x - 8y - 29 = 0$	M1 A1 B1 B1ft M1 A1 A1 [7]	Correct method to find mid-point of line Processed $\frac{-1}{\text{their gradient}}$ processed Equation of straight line through their mid-point, any non-zero gradient in any form Equation of straight line through their mid-point, any non-zero gradient in any form Equation of straight line through their mid-point, any non-zero gradient in any form cao Must be correct equation in required form i.e. $k(6x - 8y - 29) = 0$ for integer k . Must have “=0”