

Mark Scheme (Results)

Summer 2016

Pearson Edexcel Mathematics in  
Context [Level 3 Core Maths] Paper 1  
(7MC0/01)

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## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme.  
Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question	Working	Answer	Mark	Notes
1(a)		$T = 25x + 75w + 31y$	2	M1 for at least two correct terms or 'T=' a linear expression in $x$ , $y$ and $w$ A1 oe
(b)		(£) 1387	2	M1 ft substitution into their formula of at least two terms or two of $25 \times 47$ , $2 \times 75$ and $2 \times 31$ A1 ft from their formula of 3 terms
2		Comments	2	C2 Two comparisons eg comparison over time for either gender or comparison between genders. (C1 one correct comparison or figures for 1975/76 and 2013 for either gender )
3	Length H 20.2432... Width H 18.5497... Length VW 13.2967... Width VW 10.4100...	Honda	3	M1 A complete method to find a percentage increase A1 for at least two correct percentage increases, accept answers rounded or truncated to two or more significant figures. C1 for the correct conclusion supported by correct figures  NB Allow use of area

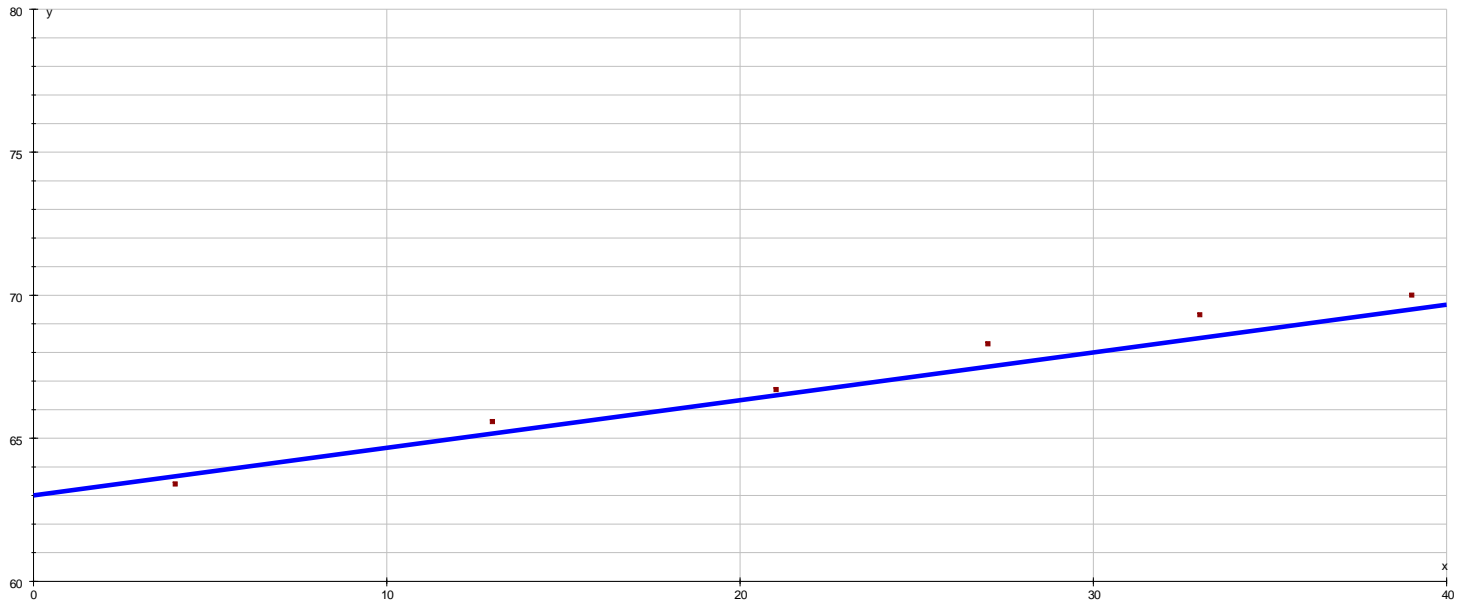
Question	Working	Answer	Mark	Notes
4	Let $x = \text{year} - 1970$	Draws straight line from equation and plots points from table with comment OR Plot points and find a line of best fit with comment	7	B1 for correct linear scales B3 for correct line between $x = 4$ and 35 (B2 For at least 2 correct points plotted <b>OR</b> for a line drawn with a positive gradient through (0,63 ) <b>and</b> clear intention to use of a gradient of $\frac{1}{6}$ ) (B1 For at least 2 correct points <b>OR</b> for a line drawn with a positive gradient through (0,63 ) <b>OR</b> a line of a gradient of $\frac{1}{6}$ ) M1 for plotting at least 4 of the points for the VW Golf A1 for a fully correct scatter graph drawn C1 for a clear statement describing how close the actual points are to the line draw or comparison of line of best fit and equation given
5(a)(i)  (ii)	Min 16.2      IQR 10.4 LQ 21.5      UB 47.5 Med 29.5      LB 5.9 UQ 31.9 Max 37.3  Allow LQ 21.2      IQR 10.6(25) Med 28.5      UB 47.7(625) UQ 31.8(25)      LB 5.2(625)	Box plot drawn	6	M1 for method to find either the LQ (21.5) or UQ (31.9) ( may be seen on diagram) M1 ft for a full method to calculate a boundary C1 ft for identification there are no outliers with correct figures M1 for method to find the median for non US cars (may be seen in part (i) or part (ii) or on diagram only) B2 ft for a fully correct box plot drawn and labelled (B1 for a partially correct box plot, allow up to 2 plotting errors)
(b)			2	C1 ft for comparison of central tendency C1 ft for comparison of spread (At least one must be in context)

Question	Working	Answer	Mark	Notes
6	$S_{xx} = 653(.5\dots)$ $S_{xy} = 7481(.3\dots)$ $S_{yy} = -2048(.46\dots)$	-0.82(67857..)	6	<p>M1 method to rank miles per gallon and horsepower either way round but consistent  M1 ft finds d for their rankings  M1 ft for finding <math>\Sigma d^2</math> for their ranking  A1 for <math>\Sigma d^2 = 1023</math>  M1 for using the spearman rank formula correctly for their figures  C1 for SR = -0.82(67857..) and statement supporting article statement</p> <p><b>OR</b></p> <p>M1 for method to find any required total  M1 for method to find any 3 required totals or 1 of <math>S_{xx}</math>, <math>S_{xy}</math> or <math>S_{yy}</math>  M1 for method to find all totals or 2 of <math>S_{xx}</math>, <math>S_{xy}</math> or <math>S_{yy}</math>  A1 for at least 4 of 5 correct totals or 2 of <math>S_{xx}</math>, <math>S_{xy}</math> or <math>S_{yy}</math> correct values  M1 for a complete method to find <math>r</math>  C1 for <math>r = -0.92(6383\dots)</math> and statement supporting article statement</p>
7		0.41 and 0.51 and statement	4	<p>M1 for finding the total world population or Sub-Saharan for either year  M1 complete method to find either proportion  A1 awrt 0.41 and awrt 0.51oe  C1 (dep on at least one correct proportion) for interpretation <b>in context</b> eg of the pupils not at school, the proportion come from the Sub-Saharan has increased</p>

Question	Working	Answer	Mark	Notes						
8(a)		One advantage and one disadvantage	2	C1 Comment eg smaller data set, easier to analyse C1 Comment eg Loss of accuracy or do not know how the sample was taken or could be bias						
(b)		14.95 Incorrect and assumption	2	B1 14.95 C1 Assumed can take average or equal population/weighting						
(c)		16.7 and assumption	3	M1 for method to correctly use the formula A1 awrt 16.7 C1 Statement eg Assumed ratios are proportional, using population figures oe						
9(a)	<table border="1"> <thead> <tr> <th>Mean</th> <th>SD</th> </tr> </thead> <tbody> <tr> <td>Portugal 7.28</td> <td>0.93- 0.965</td> </tr> <tr> <td>Mexico 14.88</td> <td>0.62</td> </tr> </tbody> </table>	Mean	SD	Portugal 7.28	0.93- 0.965	Mexico 14.88	0.62	7.275(83..) and 0.93-0.965	3	B1 awrt 7.3 M1 $\frac{646.4205}{12} - (7.28)^2$ or better A1 ft for "7.28" (SCB2 for awrt 6.2 and awrt 2.7)
Mean	SD									
Portugal 7.28	0.93- 0.965									
Mexico 14.88	0.62									
(b)		Comments	3	C1 for comparing any two figures (may be given as part of either C1 below) C1 for a comment about the means in context C1 for a comment about the standard deviation in context						

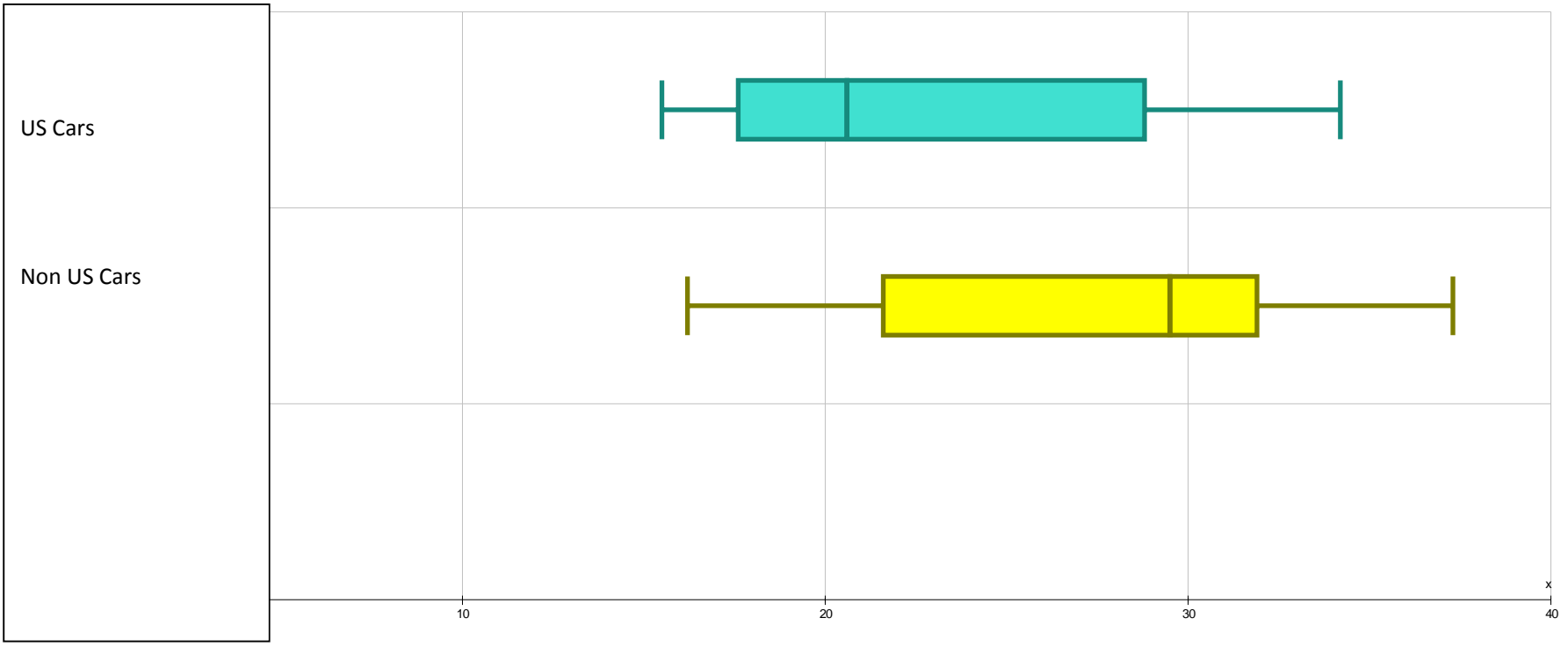
Question	Working	Answer	Mark	Notes
10(a)		Diagram drawn	2	M1 Intention to draw a scatter diagram A1
(b)		Explanation	1	C1 for explanation eg number of years in education could determine personal earnings
(c)(i)		-(£) 1400, (£) 31200 and comment	4	M1 for substitution into the line of regression A1 -1400 A1 31200 C1 for comment about reliability eg not reliable as some answers are negative OR only valid for certain values of $x$
(ii)		Statement	1	C1 Interpretation eg increase in earnings per extra year of education (within a sensible range of $x$ )
(d)	$S_{xx}= 29.67333$ $S_{xy}= 120905.666$ $S_{yy}= 2366913745$	0.456	3	M1 for a method to find $S_{xx}$ , $S_{xy}$ and $S_{yy}$ or for finding $(\sum x^2 - \frac{(\sum x)^2}{n})(\sum y^2 - \frac{(\sum y)^2}{n})$ M1 for a complete method to find $r$ A1 awrt
(e)		Statement	2	C1 statement about type or strength of correlation C1 a relevant statement in context eg slight relationship between years in education and earnings Note one sentence could include all.





Qu 4

Q1 5



US Cars

Non US Cars

10

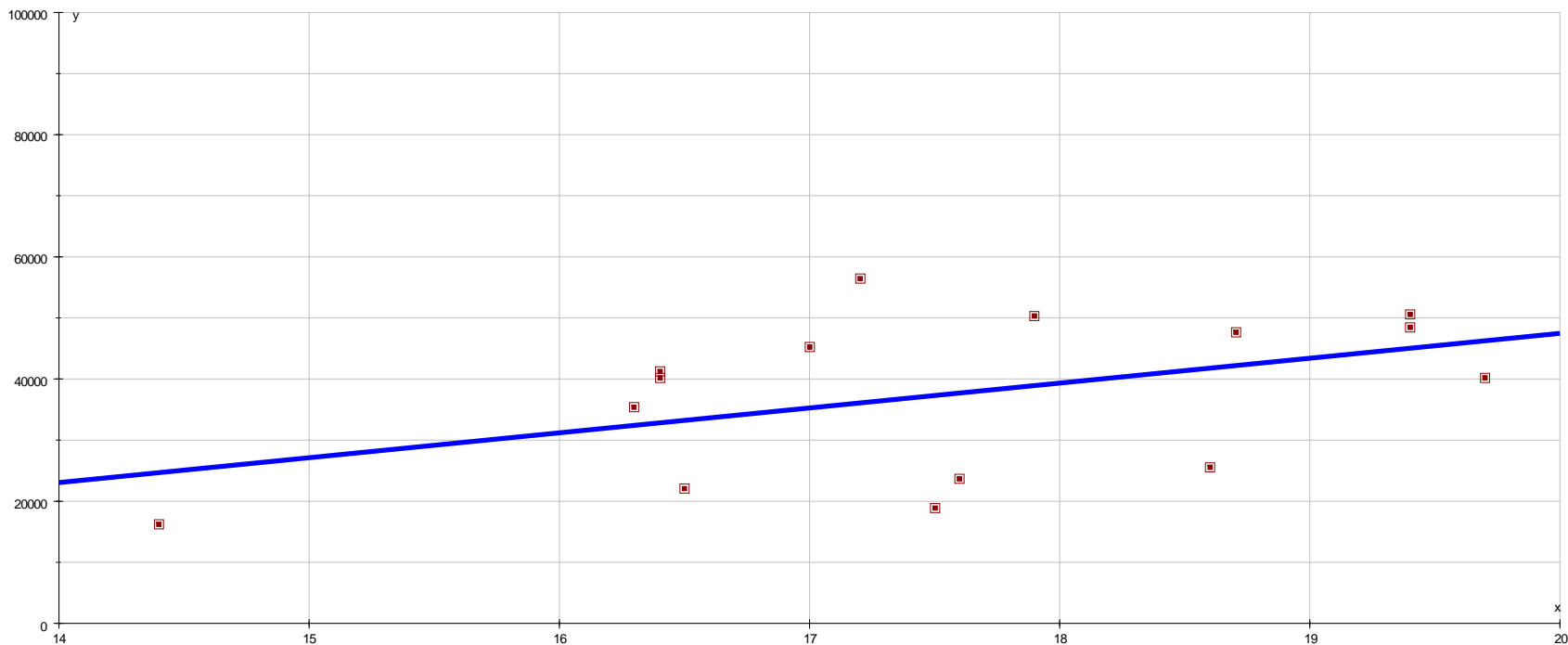
20

30

x  
40

Working for qu 6

Miles per gallon	Horsepower	miles rank		difference	d squared
16.2	133	1	15	14	196
17	125	2	14	12	144
20.3	103	3	11	8	64
21.5	110	4	12	8	64
21.6	115	5	13	8	64
22	97	6	10	4	16
27.5	95	7	9	2	4
29.5	68	8	3	5	25
30.5	78	9	7	2	4
31.5	71	10	5.5	4.5	20.25
31.8	65	11	1.5	9.5	90.25
31.9	71	12	5.5	6.5	42.25
34.1	65	13	1.5	11.5	132.25
35.1	80	14	8	6	36
37.3	69	15	4	11	121
					1023



Qu 10

years	Earnings
19.4	50449
17	45199
16.5	22101
19.4	48347
17.5	18944
19.7	40060
16.4	40242
18.6	25503
16.3	35405
14.4	16193
18.7	47590
17.9	50282
17.6	23688
16.4	41192
17.2	56340

263 561535

xy	xx	yy
978710.6	376.36	2545101601
768383	289	2042949601
364666.5	272.25	488454201
937931.8	376.36	2337432409
331520	306.25	358875136
789182	388.09	1604803600
659968.8	268.96	1619418564
474355.8	345.96	650403009
577101.5	265.69	1253514025
233179.2	207.36	262213249
889933	349.69	2264808100
900047.8	320.41	2528279524
416908.8	309.76	561121344
675548.8	268.96	1696780864
969048	295.84	3174195600
9966486	4640.94	23388350827



