

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge Ordinary Level

MARK SCHEME for the October/November 2014 series

4040 STATISTICS

4040/12

Paper 1, maximum raw mark 100

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2014 series for most Cambridge IGCSE[®], Cambridge International A and AS Level components and some Cambridge O Level components.

® IGCSE is the registered trademark of Cambridge International Examinations.

Page 2	Mark Scheme	Syllabus	Paper
	Cambridge O Level – October/November 2014	4040	12

- 1 (i) correct method for mean M1
46.5 A1
correct method for SD or variance M1
4.46 or better A1
- (ii) mean smaller B1
SD larger B1
- 2 (i) SD/variance = 6, 36 or 36, 6 M1
SD = 6 and variance = 36 A1
med = 48 B1
LQ = 43 B1
UQ = 53 B1
- if zero scored allow SC1 for *their* LQ, *their* med, *their* UQ in ascending order
- (ii) *their* UQ B1✓
- 3 (i) (a) citizens not in the telephone directory excluded B1
(b) better response rate/questions can be clarified by interviewer B1
(c) can reach a wide range of people/efficient distribution/
responses obtained very quickly B1
excludes those without internet access/
responses may be from non citizens B1
- (ii) (a) limited number of answers to questions possible/
respondent may feel none of allowed answers appropriate B1
(b) any relevant open question B1
- 4 (i) (a) 19 in correct place B1
(b) 20 in correct place B1
(c) 17 in correct place B1
(d) 34 in correct place B1
- (ii) attempt to find frequencies for variable values 1, 2 (63, 81) M1
2 A1✓

Page 3	Mark Scheme	Syllabus	Paper
	Cambridge O Level – October/November 2014	4040	12

- 5** (i) 15/40 or 3/8 or 0.375 B1
- (ii) 5/40 or 1/8 or 0.125 B1
- (iii) 6/15 or 2/5 or 0.4 B1
- (iv) $(17/40) \times$ M1
 $(\text{their } 17 - 1)/(\text{their } 40 - 1)$ M1
 272/1560 or 136/780 or 68/390 or 34/195 or 0.174 or 0.17 A1
- 6** (i) addition of scale readings of 10 km/h wide columns (26 + 43 + 47) M1
 116 A1
- (ii) appreciation of area being proportional to frequency M1
 (may be earned here or in (iii) or (iv)) A1
 62
- (iii) 40 A1✓
- (iv) 6 A1✓

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge O Level – October/November 2014	4040	12

- 7 (i) $1 + 8 + 3 + 37$ (=49) M1
 $25 + 167 + 40 + 228$ (=460) M1
(their 49/their 460) × 1000 M1
106.5 A1
- (ii) correct method for any job group M1
40 47.9 75 162.3 A1
- (iii) any one job group rate multiplied by standard population figure M1
sum of four such products M1
 $(40 \times 0.08) + (47.9 \times 0.35) + (75 \times 0.12) + (162.3 \times 0.45)$ A1^h
102 or 102.0 A1
- (iv) because its standardised accident rate is lower M1
Fastbuild A1^h
- (v) Kwikbuild 30.7 (or Fastbuild 32.5) B1
Fastbuild 32.5 (or Kwikbuild 30.7) and Kwikbuild B1
- (vi) crude B1*
standardised rate is to eliminate differences in population structures
so is meaningless for one category B1dep
- 8 (i) 280 B1
- (ii) $(35/100) \times 120$ **AG** B1
- (iii) $(45/100) \times 160$ M1
72 A1
- (iv) number completing = $65 + 39 + 10 + 71 + 46 + 37$ (=268) M1
their (i) – their 268 M1
12 A1
- (v) attempted use of class mid points (75, 105, 135, 165) M1*
correct method for mean ($\Sigma fx = 5205$) M1dep
141 A1
- (vi) finds $18 + 2 + 15 + 8 + 3 + 6$ (=52) M1*
 $((3 + 6)/\text{their } 52) \times 100$ M1dep
17.3% or better or 17% A1
- (vii) finds 30% of 160 (=48) M1*
 $((3 + 15)/\text{their } 48) \times 100$ M1dep
37.5% or 38% A1

Page 5	Mark Scheme	Syllabus	Paper
	Cambridge O Level – October/November 2014	4040	12

- 9 (i) (a) 23.5–23.8 B1
- (b) 26.2–26.5 B1
- (c) 21.2–21.5 B1
- (d) 29.5–29.8 B1
- (ii) (a) attempt to read cf% values for BMI = 18.5 and 25 and subtract
on either graph (65 – 7) (40 – 4) M1
57(%)–59(%) A1
- (b) 36(%) A1
- (iii) 60% overweight B1
attempt to read BMI for cf% = 40% + $\frac{1}{2} \times 60\%$ (=70%) on 2010 graph M1
28.8–29.1 A1
- (iv) attempt to read BMI for cf% = 93% on 1980 graph M1
30 A1
- Attempt to read cf% for BMI = 30 on 2010 graph M1
22(%) A1
- (v) population has become more unhealthy, with specific support
median BMI increased
or percentage healthy decreased
or percentage obese increased B1
- support strengthened by
reference to more than one of these changes
or citation of specific values for any change B1

Page 6	Mark Scheme	Syllabus	Paper
	Cambridge O Level – October/November 2014	4040	12

- 10** (i) correctly plotted points B2
allow B1 for 6 or 7 correctly plotted
- (ii) not in the set of four lowest *x* values B1
or any indication of need to order data by *x* values first
- (iii) method for calculating either semi-average M1
plot of (2, 41) A1
plot of (4.5, 69) A1
method for calculating overall mean M1
plot of (3.25, 55) A1
- (iv) straight line through at least two of *their* plotted points in (iii) B1
correct method for gradient, *m*, of *their* line M1
correct method for *c* M1
 $m = 11.0 - 11.4$ and $c = 18 - 19$ A1
- (v) 52 B1✓
- (vi) because its line has the greatest gradient **oe** M1
Science (or Statistics if *their* $m > 13.8$) A1✓
- (vii) difficult to know if pupils perform well because they like a subject, B1
or they like a subject because they perform well in it
- 11** (i) (a) $(0.9)^2$ M1
0.81 or equiv fraction A1
- (b) $1 - \text{their } 0.81$ or $(0.1 \times 0.9 \times 2) + (0.1)^2$ M1
0.19 or equiv fraction A1✓
- (ii) 0.1×0.4 M1
 $\times (0.9)^3$ M1
 $\times 4$ M1
0.11664 or 0.1166 or 0.117 or 0.12 or equiv fraction (729/6250) A1
- (iii) (a) $(0.1 \times 0.6)^2$ M1
 $\times 0.9 \times 3$ M1
0.00972 or 0.0097 or equiv fraction (243/25000) A1
- (b) $(0.1 \times 0.4) \times (0.9)^2 \times 3$ (L, not O, not O) (0.0972) M1
 $(0.1 \times 0.6) \times (0.9)^2 \times 3$ (S, not O, not O) (0.1458) M1
 $(0.9)^3$ (not O, not O, not O) (0.729) M1
addition of *their* 0.00972, *their* 0.0972, *their* 0.1458, *their* 0.729 M1
0.98172 or 0.9817 or 0.982 or 0.98 or equiv fraction (24543/25000) A1