**Pearson Edexcel Level 3 Certificate in Mathematics in Context**

**Practice question mark schemes:**

**Statistics**

**Topic practice question mark schemes**

These materials have been gathered together to help provide opportunities for skills practice on some of the maths topics within the content of the Mathematics in Context specification. The materials comprise four sets of questions organised by topic area as follows:

**A Statistics**

B Probability and Venn Diagrams

C Linear Programming

D Sequences

These mark schemes have been taken from those for past exam papers in GCE Statistics 1. Some questions in the Sequences strand have been written afresh for this purpose to broaden the range of topics covered.

None of the questions is intentionally written in the style of Mathematics in Context exam questions. You and your students may however find them useful for classroom discussion, group work and/or individual practice on some of the mathematics skills within the specification.

|  |  |  |
| --- | --- | --- |
| **1**  (a) | *r* = awrt **0.962** | M1 A1  **(2)** |
| (b) | *r* is close to 1 or a **strong** **correlation**. [“points are close to a straight line” isB0] | B1 |
|  | [Just “positive” correlation is B0] [Use of “relationship” or “skew” not “correlation” is B0] | **(1)** |
| (c) | *b* =  =0.739947... = 0.740 (3 dp) **0.740** (only) | M1  A1cao |
|  |  | **(2)** |
| (d) | *a* = 1326.25 – (0.7399… 2423.75) [ = – 467.2 or awrt – 467] | M1 |
|  | So ***m* = – 467+ 0.74*ν*** | A1 **(2)** |
| (e) | *b* is the money (spent) per visitor. (i.e. definition of a rate in words.)[ignore values]  So each 1000 visitors generates an extra £0.74 million or each visitor spends £740 oe | B1  B1ft **(2)** |
| (f) | *m* = – 467+ 0.74  *m* = 1383 (£ million) awrt **1380** | M1  A1 |
|  |  | **(2)** |
| (g) | As 2500 is within the range of the data set or it involves interpolation.  The value of money spent is reliable | B1  B1 **(2)** |
|  |  | **Total 13** |

**Taken from GCE Statistics S1 June 2014 – question 3**

|  |  |  |
| --- | --- | --- |
| **2**  (a) |  | B1 |
|  | (**\*)** | B1cso |
|  |  | M1 A1 |
|  |  |  |
|  | **awrt** 158 | A1 |
|  |  | **(5)** |
| (b) |  | M1 |
|  | 0.7501726031…. **awrt** 0.750 | A1 |
|  |  | **(2)** |
| (c) | **(\*)** | M1 A1cso |
|  | **awrt** 28.3 | M1 A1 |
|  |  | **(4)** |
| (d) | = 36.57552…. **awrt** £3700 | M1 A1 **(2)** |
| (e) | Goes up £82.40 | B1 |
|  |  | **(1)** |
| (f) | (i) *r* = 0.750 | B1ft |
|  | (ii)*b* = 0.412 | B1 **(2)** |
|  |  |  |

**Taken from GCE Statistics S1(R) June 2014 – question 3**

|  |  |  |
| --- | --- | --- |
| **3**  (a) | …  **22 400** | M1 A1 |
|  | … **1 490 000** | A1 |
|  |  | **(3)** |
| (b) | = – 0.95200068… awrt **– 0.952** | M1A1 |
|  |  | **(2)** |
| (c) | Yes as *r* is close to **–** 1 (if **–**1 < *r* < **–** 0.5) or Yes as *r* is close to 1 (if 1> *r* > 0.5) | B1ft |
|  | [ If **–** 0.5 < *r <* 0.5 allow “no since *r* is close to 0”] [ If |*r*| > 1 award B0] | **(1)** |
|  |  |  |
| (d) | awrt **–**0.015 | M1 A1 |
|  | so ***t* = 24.2 – 0.015*h*** | M1, A1 |
|  |  | **(4)** |
| (e) | 0.015 is the drop in temp, (in 0C), for every 1(m) increase in height above sea level. | B1 |
|  |  | **(1)** |
| (f) | Change = (“24.2 – 0.015”500) – (“24.2 – 0.015”1000) or 500 ”0.015” | M1 |
|  | = 7.5 ( awrt + 7.5) (only ft a value < 100) | A1ft **(2)** |
|  |  | **[13]** |

**Taken from GCE Statistics S1 May 2013 – question 1**

|  |  |  |
| --- | --- | --- |
| **4** |  |  |
| (a) |  | M1 |
|  | awrt (2046), awrt – 90.7 | A1, A1 |
|  |  | (3) |
| (b) | awrt 0.715 | M1 A1 (2) |
|  |  |  |
| (c) | Positive | B1 |
|  | e.g. high *v* corresponds to low *t* and low *t* corresponds to high *g* so expect high *v* to corresponds to high *g*  or expect more revision to result in a better grade | B1 (2) |
|  |  | **7** |

**Taken from GCE Statistics S1 January 2013 – question 1**

|  |  |  |
| --- | --- | --- |
| **5** |  |  |
| (a) |  | B1 B1 |
|  |  | M1 |
|  |  | A1cso |
|  |  | (4) |
| (b) |  | M1 |
|  | *b* = 0.255649... (allow ) 0.25 or awrt 0.26 | A1 |
|  |  | M1 |
|  | So equation of the line is ***m* = 8.47 – 0.256*t*** (allow ) | A1 |
|  |  | (4) |
|  |  |  |
| (c) | awrt **5.9** | B1 (1) |
|  |  |  |
| (d) | Should be reliable since 10 is in the range (of the data ) | B1 (1) |
|  |  | **10** |

**Taken from GCE Statistics S1 January 2013 – question 3**

|  |  |  |
| --- | --- | --- |
| **6** (a) |  | Use overlay  B1  B1  (2) |
| (b) | Points (appear to) lie close to a (straight) line or “strong /high correlation” | B1 (1) |
|  |  |  |
| (c) | (may be seen in table) | M1 |
|  |  | M1 |
|  |  | A1; A1 (4) |
|  |  |  |
| (d) |  | B1ft |
|  | *a =* , 0.74088… | M1, A1 |
|  | ***t*  = 0.741 + 0.318*p*** (Accept  in their equation) | A1 (4) |
|  |  |  |
| (e) | = (15.5, 5.7) plotted on the graph (not wholly outside the circle) | B1 |
|  | Correct line plotted as per overlay.  For *p* = 5; 2 < *t* < 3 and for *p =*30 ; 10< *t* <11 | B1 (2) |
|  | Line must stretch roughly as far as the points and go through the circle |  |
|  |  |  |
| (f) |  | M1 |
|  | = 5.825... **awrt 5.8** | A1 (2) |
|  |  | **[15]** |

**Taken from GCE Statistics S1 May 2012 – question 3**

|  |  |  |
| --- | --- | --- |
| **7** (a) | *Stt*= = 191.6 awrt 191.6 | M1  A1 |
|  | *S*tw = = -5.03 awrt -5.03 | A1 |
|  |  | (3) |
| (b) | r =  = - 0.908469… awrt -0.908(5) | M1A1 |
|  |  | (2) |
| (c) | *b* =  awrt -0.026 | M1 A1 |
|  |  |  |
|  | *a* = 11.175 + 0.0263 | M1 |
|  | = 11.59 |  |
|  | *w* = 11.6 – 0.0263*t* | A1 |
|  |  | (4) |
| (d) | The explanatory variable is the age of each coin. This is because the age is set and the | B1 B1 |
|  | weight varies. |  |
|  |  | (2) |
|  |  |  |
| (e) (i) | awrt 11.5 | B1 |
| (ii) | Decrease(in weight of coin of 0.1052 g) = 0.1 or –0.1 or increase of –0.1 awrt (–0.1) | B1 |
|  |  | (2) |
| (f) | Decrease; removing the fake will result in a better linear fit so *r* will be closer to –1 | B1;B1 |
|  |  | (2) |
|  |  |  |

**Taken from GCE Statistics S1 January 2012 – question 5**

|  |  |  |
| --- | --- | --- |
| **8** |  |  |
| (a) |  | M1 |
|  | = 64.75 (accept 64.8) | A1 |
|  |  | (2) |
| (b) | *b* =, = 1.6392…. (awrt 1.6) | M1, A1 |
|  | *a* = , = 97.512… (awrt 97.5) | M1, A1 |
|  | *h* = 97.5 + 1.64*f* | A1ft (dep on M1M1) |
|  |  | (5) |
| (c) | *h* = 97.5+ 1.6425 , = 138~139 (final answer in [138, 139]) | M1, A1 |
|  |  | (2) |
| (d) | Should be reliable, since 25 cm(or *f* or footlength) is within the range of the data | B1, B1 |
|  |  | (2) |
| (e) | Line is for children – a different equation would apply to adults  or  Children are still growing, height will increase more than foot length | B1 |
|  |  | (1) |
|  |  | **12** |

**Taken from GCE Statistics S1 May 2011 – question 7**

|  |  |  |
| --- | --- | --- |
| **9** (a) | Correct scatter diagram | B1 B1  (2) |
| (b) | The **points** lie reasonably close to a straight **line** (o.e.) | B1  (1) |
| (c) | (both, may be implied) | B1 |
|  | = 24.208….. **awrt 24.2** | M1 A1 |
|  | = 49.06…. **awrt 49.1** | A1  (4) |
| (d) | = 2.026…. **awrt** **2.03** | M1 A1 |
|  | = 14.97….. so ***f* = 15.0 + 2.03*d*** | M1 A1  (4) |
| (e) | A flight costs **£2.03 (or about £2)** for every extra **100km** or about **2p** per **km**. | B1ft  (1) |
| (f) | 15.0 + 2.03*d* < 5*d* so  = 5.00 ~ 5.05 | M1 |
|  | So ***t* >** 500~505 | A1 (2) |

**Taken from GCE Statistics S1 May 2010 – question 6**

|  |  |  |
| --- | --- | --- |
| **10** (a) | (S*pp*=) | M1 |
|  | = 18322.5 awrt 18300 | A1 |
|  | (S*pt* =) |  |
|  | = 16150 awrt 16200 | A1 **(3)** |
| (b) | *r* =  Using their values for method | M1 |
|  | = 0.8088... awrt 0.809 | A1 **(2)** |
| (c) | As the temperature increases the pressure increases. | B1 **(1)** |
|  |  | **(6 marks)** |

**Taken from GCE Statistics S1 May 2009 – question 1**

|  |  |  |
| --- | --- | --- |
| **11** (a) | *b* = | M1 |
|  | = 1.79713….. 1.8 or awrt 1.80 | A1 |
|  | *a* = 32.7 – 1.79713… 51.83 | M1 |
|  | = – 60.44525… awrt –60 | A1 |
|  | *w* = - 60.445251…+ 1.79713…*l* *l* and *w* required and awrt 2sf | A1ft (5) |
| (b) | *w* = - 60.445251…+ 1.79713… 60 | M1 |
|  | = 47.3825… In range 47.3 – 47.6 inclusive | A1 (2) |
| (c) | It is extrapolating so (may be) unreliable. | B1 B1 (2) |
|  |  | **(9 marks)** |

**Taken from GCE Statistics S1 May 2009 – question 5**

|  |  |  |
| --- | --- | --- |
| **12**  (a)  (b)  (c)  (d)  (e) | Every (extra) hour spent using the programme produces about 9.5 marks improvement  awrt 21  Model may not be valid since [8h is] outside the range [0.5 - 4]. | M1  A1  A1 **(3)**  M1 A1  M1  A1 **(4)**  B1ft **(1)**  M1, A1 **(2)**  B1 **(1)** |

**Taken from GCE Statistics S1 January 2009 – question 1**