**Quantifying correlation**

**In-class investigation**

**Solutions and marking key**

**Question 1 (7 Marks)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Solution | Mathematical behaviours | Marks |
| (a) | 10 | * reads number of points on scatter graph | 1 |
| (b) | 6 | * reads position of horizontal median line | 1 |
| (c) | 8 | * reads position of vertical median line | 1 |
| (d) | 3 in quadrant A | * interprets values on scatter graph * identifies location of points | 1  1 |
| (e) | *q*-correlation coefficient  = (3 + 3 - 2) ÷8  =  = 0.5 | * reads number of points on scatter graph * calculates *q*-correlation coefficient   (for fraction, for decimal) | 1  1 |

**Question 2 (7 Marks)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Solution | Mathematical behaviours | Marks |
| (a) | As the temperature rises the number of pies sold decreases | * interprets scatter graph | 1 |
| (b) | 70 | * reads position of horizontal median line | 1 |
| (c) | There are no days where the temperature was 24 nor where the number of pies sold was 70 | * identifies median not a score for temperature * identifies median not a score for pies sold | 1  1 |
| (d) | *q*-correlation coefficient  = )(0 + 0) – (5 + 5)) ÷ 10  = -1 | * reads number of points on scatter graph * calculates *q*-correlation coefficient | 1  1 |
| (e) | 1 | * interprets calculation of *q*-correlation coefficient | 1 |

**Question 3 (8 Marks)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Solution | Mathematical behaviours | Marks |
| (a) | 10% | * reads scatter graph | 1 |
| (b) | 90% | * reads scatter graph | 1 |
| (c) | The class in which 50% liked soccer and 50% liked football. | * interprets scatter graph * describes both variables | 1  1 |
| (d) | *q*-correlation coefficient  = ((2 + 2 – (2+2)) ÷8 = 0 | * reads number of points on graph * calculates *q*-correlation coefficient | 1  1 |
| (e) | No relationship. The points are scattered randomly. | * Describes lack of relationship * interprets scatter graph | 1  1 |

**Question 4(a)(d)(e)(f) Q4=7 Marks**

|  |  |
| --- | --- |
| Solution | |
|  | |
| Mathematical behaviours | Marks |
| * plots most points accurately * plots all points accurately * draws vertical line at median for Test 1 * draws horizontal line for median at Test 2 * labels quadrants as previously instructed | 1  1  1  1  1 |

**Question 4(b)**

|  |  |
| --- | --- |
| Solution | |
| Median = 6 | |
| Mathematical behaviours | Marks |
| * calculates median | 1 |

**Question 4(c)**

|  |  |
| --- | --- |
| Solution | |
| Median = 5 | |
| Mathematical behaviours | Marks |
| * calculates median | 1 |

**Question 5(a) Q5=12 Marks**

|  |  |
| --- | --- |
| Solution | |
|  | |
| Mathematical behaviours | Marks |
| * plots coordinates for each point in correct order * plots most points accurately * plots all points accurately | 1  1  1 |

**Question 5(b)**

|  |  |
| --- | --- |
| Solution | |
| As wind speed increases so does the temperature; the points are generally rising to the right | |
| Mathematical behaviours | Marks |
| * notes increasing wind speed is associated with increasing temperature * describes location of points | 2  1 |

**Question 5(c)**

|  |  |
| --- | --- |
| Solution | |
|  | |
| Mathematical behaviours | Marks |
| * determines median maximum wind speed * determines median maximum temperature * draws median lines and labels quadrants | 1  1  2 |

**Question 5(d)**

|  |  |
| --- | --- |
| Solution | |
| *q*-correlation coefficient = (8 - 4) ÷ 12 = = | |
| Mathematical behaviours | Marks |
| * determines number of points in each quadrant * calculates the *q*-correlation coefficient (for fraction, for decimal) | 1  1 |

**Question 6 (9 Marks)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Solution | Mathematical behaviours | Marks |
| (a) | (i) 0.9  (ii) 0.1  (iii) -0.6  (iv) 0.1  (v) 0.9  (vi) -1 | * identifies positive correlation from graph * identifies lack of relationship from graph * identifies negative correlation from graph * identifies lack of correlation from description * identifies positive correlation from description * identifies negative correlation from description | 1  1  1  1  1  1 |
| (b) | Easy to follow/calculate  More precise than guessing | * suggests one advantage | 1 |
| (c) | Inaccurate  Time-consuming | * suggests disadvantage of the process * suggests disadvantage of the process | 1  1 |