# Revision answers: Statistics and probability (Topic 5)

**Coursebook chapters: 16–18**

**1.** Use the midpoint to create a frequency table:

|  |  |
| --- | --- |
| **Midpoint** | **Frequency** |
| 9 | 26 |
| 14.5 | 18 |
| 19.5 | 45 |

From GDC: mean=15.4, S.D. = 4.54 *[4 marks]*

**2.** Using Venn diagram or formula:

P(*C* ∪ *I*) =  = P(*C*) + P(*I*) – P(*C* ∩ *I*) =  – P(C ∩ I)

⇒ P(*C* ∩ *I*) = 0.2 *[5 marks]*

**3.** (a) P(walk) = 1 − P(rain or late) = 1 − (P(rain) + P(late) − P(rain and late))

As they are independent, P(rain and late) = 0.3 × 0.6 = 0.18, so P(walk) = 0.28

(b)  *[6 marks]*

**4.** Using GDC:

(a) *r* = 0.822

(b) *y* = 0.490*x* + 5.46

(c) When *y* = 28, *x* = 46

**5.** *X* ~ N(0.3, 0.042)

(a) P(*X* > 0.36) × P(*X* > 0.36) = 0.00446

(b) 2 × P(*X* < 0.4) × P(*X* > 0.4) = 0.0123 *[6marks]*

**6.** *X* ~ N(50, 4), P(double-yolked) = 0.1 × P(*X* > 60) = 0.000210

*Y* ~ B(12, 0.000210), P(*Y* = 1) = 0.00740 *[5marks]*

**7.** (a) *X* ~ B(4, *p*), P(*X* = 3 or 4) = 4*p*3(1 – *p*) + *p*4 = 4*p*3 – 3*p*4

(b) 4*p*3 – 3*p*4 = 0.05 when *p* = 0.248 (using GDC) *[5 marks]*

**8.** (a) E(*X*) = 

(b) The possible ways of scoring three points out of four hands are (CHECK THE TABLE!):

|  |  |  |
| --- | --- | --- |
| **Distribution of points** | **Combinations** | **Probability** |
| 2, 1, 0, 0 | 4 × 3 = 12 | 1/72 |
| 1, 1, 1, 0 | 4 | 1/54 |

Out of those, only the ones in the first row contain a two-point hand, so:

*p* = *[7 marks]*

**9.** *X* ~ N (252, *σ*2), P(*X* ≥ 250) = 0.99 so P(*X* < 250) = 0.01

Standardising: = −2.32 ⇒  = 0.860 g *[5 marks]*

**13.** E(*ax*) = (*ap*)*x*(1 – *p*)*n* − *x* = (*ap* + 1 – *p*)*n* *[5 marks]*