

## STATISTICS 1 (A) TEST PAPER 1 : ANSWERS AND MARK SCHEME

1. (a)  $3x$  corresponds to  $24 \text{ cm}^2$ , so  $5x$  corresponds to  $40 \text{ cm}^2$  M1 A1  
 Width = 2 cm, so height = 20 cm M1 A1
- (b) Area =  $19x = 19 \times 8 = 152 \text{ cm}^2$  M1 A1 A1      7
2. (a)  $P(B) = 0.12 \div 0.4 = 0.3$       (b)  $P(A \cup B) = 0.7 - 0.12 = 0.58$  M1 A1; M1 A1  
 (c)  $P(A' \cap B) = 0.3 - 0.12 = 0.18$       (d)  $P(A | B) = P(A) = 0.4$  M1 A1; B1      7
3. (a) Mean =  $(10 + (-7)) \div 2 = 1.5$  M1 A1  
 Var( $X$ ) = Var( $X + 8$ ) =  $(18^2 - 1) / 12 = 26\frac{11}{12}$  or 26.9 M1 M1 A1
- (b)  $P(X > 7) = \frac{3}{18} = \frac{1}{6}$  M1 A1
- (c) 7 consecutive integers centred on 0 are -3 to 3, so  $x = 3$  M1 A1      9
4. (a) Median = 56.5      Mean =  $1600 \div 30 = 53\frac{1}{3}$  B1 B1  
 Var =  $102400 / 30 - (1600 / 30)^2 = 568.89$ , so s.d. = 23.9 M1 A1 A1
- (b) Median = 65.2, mean =  $62\frac{2}{3}$ , variance =  $0.8 \times 23.9 = 19.1$  B1 B1 M1 A1      9
5. (a) Scatter graph showing moderate positive correlation B5  
 (b) 7 or 8 M1 A1  
 (c)  $\sum x = 91$ ,  $\sum y = 104$  B1  
 $S_{xx} = 80.89$ ,  $S_{yy} = 62.22$ ,  $S_{xy} = 54.44$        $r = 0.767$  M1 A1 A1  
 which confirms the moderate positive correlation B1      12
6. (a) 

$z$	0	1	2	3
$P(Z = z)$	$\frac{3}{8}$	$\frac{33}{80}$	$\frac{7}{40}$	$\frac{3}{80}$

M1 A1 A1 A1 A1  
 (b)  $E(Z) = \frac{7}{8}$  M1 M1 A1
- (c) (i)  $E(Z^2) = \frac{29}{20}$       (ii)  $\text{Var}(Z) = \frac{29}{20} - \frac{49}{64} = \frac{219}{320}$  or 0.684 M1 A1 M1 A1
- (d)  $\text{Var}(3Z - 4) = \text{Var}(3Z) = 9 \text{Var}(Z) = 6\frac{51}{320}$  or 6.16 M1 A1      14
7. (a)  $P(X > 4.5) = 0.625$ , so  $P(Z > \frac{-0.7}{\sigma}) = 0.625$  M1 A1  
 $\frac{-0.7}{\sigma} = -0.32$        $\sigma = 2.1875 \approx 2.2$  M1 A1 A1
- (b)  $P(4 < X < 7) = P(-0.55 < Z < 0.82)$  M1 A1  
 $= 0.794 - (1 - 0.709) = 0.503$ , i.e. 50.3% M1 A1
- (c)  $P(X < 5) = P(Z < -0.091) = 1 - 0.536 = 0.464$  M1 A1  
 so assuming independence, probability =  $0.464^2 = 0.215$  B1 A1
- (d) (i) unchanged at 5.2 B1  
 (ii) decreases, as average deviation from mean is less B2  
 Not normal as shape of curve changes, and  $P(X = 5.2) > 0$  B1      17