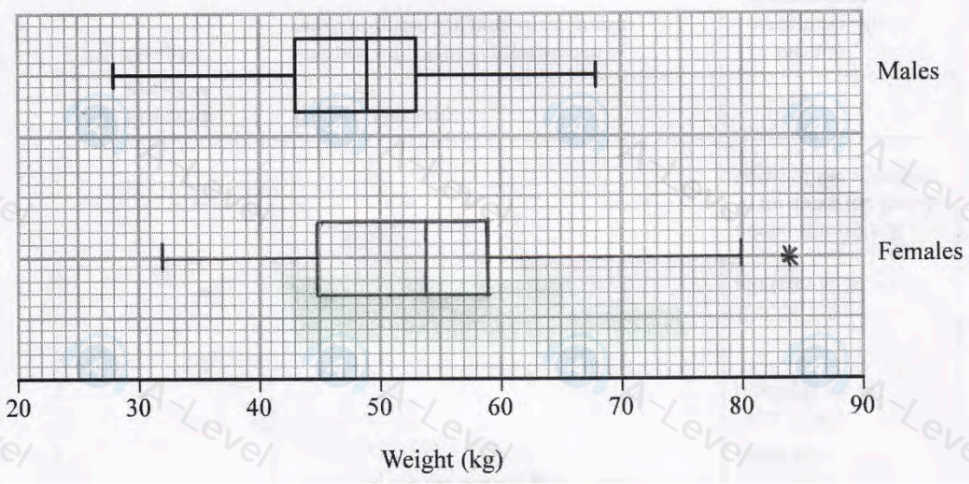
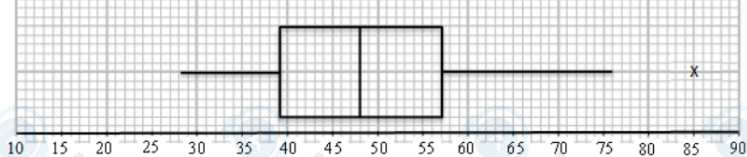
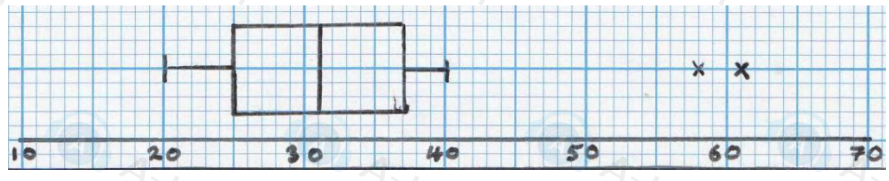


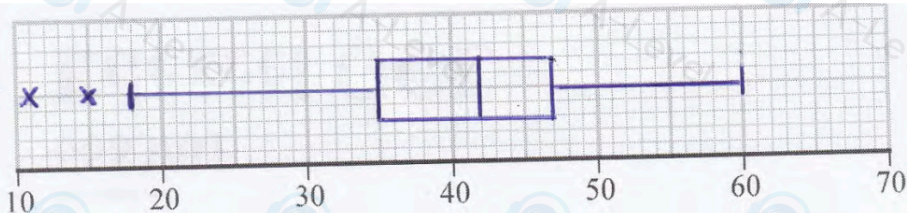
Question Number	Scheme	Marks
2.	$1.5 \times 12 = 18$ 20 people represented by 18 (cm ²) or 1 person is represented by 0.9 (cm ²) $x = \frac{20 \times 94.5}{18}$ oe = 105 (people)	M1 M1 A1cao (3) Total 3

Question Number	Scheme	Marks
2. (a)	$a = \frac{77 \times 1 + 82 \times 2 + \dots}{15} = \frac{1385}{15} = \frac{277}{3} = 92.\dot{3}$ awrt 92.3 $b = \left[89.5 + \right] \frac{7.5 - 5}{9 - 5} (94.5 - 89.5) = 92.625$ awrt 92.6 $c = \frac{1 \times 77^2 + 2 \times 82^2 + \dots}{15} - 92.\dot{3}^2 = 64.88\dots$ awrt 64.9	M1 A1 M1 A1 M1 A1 (6)
(b)	Median in 2010 (92.6 kg) > Median in 1990 (82.0 kg) Mean in 2010 (92.3 kg) > Mean in 1990 (83.0 kg) Rugby coach's claim supported.	either dep B1 dB1 (2) Total 8

Question Number	Scheme	Marks
2.(a)	$Q_2 = 54$ $Q_1 = 45$ $Q_3 = 59$	B1 B1 B1 (3)
(b)	Upper limit = $59 + 1.5 \times 14 = 80$ Lower limit = $45 - 1.5 \times 14 = 24$ Outlier 84	M1 A1 A1ft (3)
(c)		B1 B1 B1 (3)
(d)	Any two from: The females are heavier than the males (on average). The males have lower median than females. The males have a smaller IQR than the females. The females have a greater range than males. [Comments just about skewness are B0]	B1 B1 (2)
Notes		Total 11

Question	Scheme	Marks
1 (a)	$k = 3$	B1 (1)
(b)	$Q_1 = 39$ $Q_3 = 57$	B1 B1 (2)
(c)	"57" + $1.5 \times ("57" - "39")$ or " $39 - 1.5 \times ("57" - "39")$ " 84 and 12 therefore only 1 outlier [85]	M1 A1 (2)
(d)		M1 M1 M1 A1 (4)
(e)	A correct difference of the medians with supporting figures e.g. On average Birch [trees grow slightly] taller as the median is larger 48 > 45 oe or A correct difference of the spread with supporting figures e.g. Maple has a greater spread/variation of heights as the range is larger 55 > 48 (excluding outlier) oe e.g. Birch has a greater spread/variation of heights as the range is larger 57 > 55 (with outlier) oe	B1ft (1)
(f)	36 ,, $a < x$ where 43 ,, x ,, 45 or 54 ,, $2a$,, 80 36 ,, a ,, "43" and 54 ,, $2a$,, 80 36 ,, a ,, 40	M1 A1ft A1 (3)
Notes		Total 13

Question	Scheme	Marks
2. (a)	[Range = $61 - 20 =$] 41	B1 (1)
(b)	[IQR = $37 - 25 =$] 12	B1 (1)
(c)	$Q_3 - Q_2 = Q_2 - Q_1$ [= 6] or $37 - 31 = 31 - 25$ So symmetric <u>or</u> no skew	M1 A1 (2)
(d)	$r = \frac{10}{\sqrt{5514 \times 1145.6}}$ $= 0.0039787\dots$ 0.004 or awrt 0.0040	M1 A1 (2)
(e)	Value of r is close to zero <u>or</u> no correlation <u>or</u> (very) weak correlation So Chetna's belief is not supported	B1 dB1 (2)
(f)	Check upper outlier limit: $37 + 1.5 \times "12" (= 55)$ Adam's change won't affect median or upper quartile Betty's change now becomes a 2 nd outlier Upper whisker stays the same	M1 (2)
		M1 A1 (3)
		(11 marks)

Question Number	Scheme	Marks
2. (a)(i)	[IQR = 47 - 33 =] 14	B1
(ii)	[Range = 54 - 11 =] 43	B1
		(2)
(b)	e.g. $Q_2 - Q_1 (=9) > (5=) Q_3 - Q_2$ Therefore <u>negative</u> (skew)	M1
		A1
		(2)
(c)	25 → 37 ⇒ new $Q_1 = 35$ (may be on box plot) [54 → 60 (implies upper whisker now at 60) but no change to Q_3] New IQR = 12 so need to re-calculate for outliers Outliers now [> 47 + 18 = 65 or] < 35 - 18 = 17 Box Plot	B1
		M1
	Box and two whiskers with median still at 42 Lower quartile at their 35 ($\neq 33$) and upper quartile unchanged at 47 Two outliers at 11 and 15 Lower whisker at 18 (or 17) <u>and</u> upper whisker at 60	A1ft
		A1
		A1
		(7)
(d)	The value of pmcc is small <u>or</u> weak correlation (o.e.) Therefore the complaint is <u>not</u> supported	M1
		A1
		(2)
		[13]