3. **"I don't have bad days because I'm a man"**

Vladimir Putin, might be willing to joke about things like climate change and meddling with US elections, but when it comes to his masculinity, he is dead serious. The 66 year old Russian President, who likes being photographed shirtless and holding big guns, recently told director Oliver Stone in The Putin Interviews, that he doesn't have any "bad days as President" because "he's not a woman"[45]. And while gliding through the Kremlin's throne room, he offered this pseudoscientific explanation on why that was the case: "I am not trying to insult anyone. That's just the nature of things. There are certain natural cycles"[46]

Several Russian men and women were asked how many bad days they had on the job in the last year. Their responses are listed below.

Men

13	15	15	15	17	18	19	19	19	20	21	22
22	24	24	26	27	28	28	32	33	33	34	55

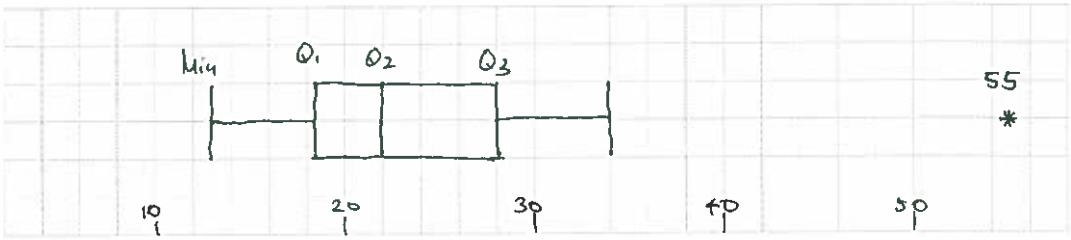
Women

2	6	7	10	12	12	12	13	14	17	17	18	19	20
20	21	23	23	26	28	29	29	30	31	34	39	54	59

(a) Create a box-plot for the men's data and identify all outliers if any.

Q_1: $L = \frac{(24+1)}{100}.25 = 6.25$: $Q_1 = 18 + (19-18)(0.25) = 18.25$: Q_2: $L = \frac{(24+1)}{100}.50 = 12.5$ $Q_2 = 22$

Q_3: $L = \frac{(24+1)}{100}.75 = 18.75$: $Q_3 = 28$; $IQR = Q_3 - Q_1 = 28 - 18.25 = 9.75$

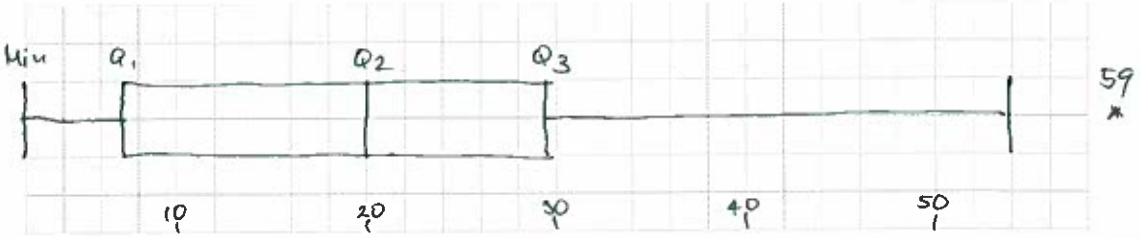


Inner Fence $= Q_1 - 1.5(IQR) = 18.25 - 1.5(9.75) = 3.625$; Outer Fence $= Q_3 + 1.5(IQR) = 28 + 1.5(9.75) = 42.625$

(b) Create a box-plot for the women's data and identify all outliers if any.

Q_1: $L = \frac{(28+1)}{100}.25 = 7.25$; $Q_1 = 12 + 0.25(13-12) = 12.25$; Q_2: $L = \frac{(28+1)}{100}.50 = 14.5$ $Q_2 = 20$

Q_3: $L = \frac{(28+1)}{100}.75 = 21.75$; $Q_3 = 29 + 0.75(29-29) = 29$: $IQR = Q_3 - Q_1 = 29 - 12.25 = 16.75$



Inner Fence $= Q_1 - 1.5(IQR) = 7.25 - 1.5(16.75) = -17.875$; Outer Fence $= Q_3 + 1.5IQR = 29 + 1.5(16.75) = 54.125$

(c) Comment on the similarities and differences found between both sets data.

The two datasets are similarly located but the women's data has a lot more variability.

[45] https://foreignpolicy.com/2017/06/07/oliver-stones-putin-interviews-will-teach-you-little-about-putin-and-even-less-about-russia/

4. **Clueless and in the Dark**

Three in four husbands claim to know everything about their wives but the results from a OnePoll survey would beg to differ. Of the 2000 men who were surveyed (all of whom were in a relationship), 12% didn't know what their significant other's eye color was; 27% were stumped on questions about their partners clothing size, and 12% had trouble remembering what their better half's favourite flowers were[47].

(a) The survey had 20 questions and for 35 men who answered the survey, the number of questions they answered correctly are shown below.

0	2	2	2	2	3	3	3	5	8	8	9	9	10	11
11	13	13	14	14	15	15	16	16	16	17	17	17	18	18
18	19	19	20	20										

Calculate the following

i. P_{10} $L = \frac{(35+1)}{100} \cdot 10 = 3.6$ $P_{10} = 2 + 0.6(2-2) = 2$

ii. P_{40} $L = \frac{(35+1)}{100} \cdot 40 = 14.4$ $P_{40} = 10 + 0.4(11-10) = 10.4$

iii. P_{53} $L = \frac{(35+1)}{100} \cdot 53 = 19.08$ $P_{53} = 14 + 0.08(14-14) = 14$

iv. IQR Q_1: $L = \frac{(35+1)}{100} \cdot 25 = 9$, $Q_1 = 5$; Q_3: $L = \frac{(35+1)}{100} 75 = 27$, $Q_3 = 17$

$IQR = Q_3 - Q_1 = 17 - 9 = 8$

(b) The survey also revealed that while most men knew what perfume their girlfriends or wives wore, 22% have purchased the wrong one as a gift[48]. Below is a table the number of men who accidentally purchased the incorrect perfume for their significant other and how much they spent.

Amount Spent ($)	Number of Men	LTCF
$0 \le x < 25$	2	2
$25 \le x < 50$	8	10
$50 \le x < 75$	17	27
$75 \le x < 100$	14	41
$100 \le x < 125$	15	56
$125 \le x < 150$	3	59
$150 \le x < 175$	1	60

Using the table, estimate into which class the following percentiles fall into

i. P_{10} : 25 $\le x <$ 50

ii. Q_1 : 50 $\le x <$ 75

iii. Q_3 : 100 $\le x <$ 125

iv. P_{80} : 100 $\le x <$ 125

v. P_{99} : ____ $\le x <$ ____

P_{10}: $L = \frac{(60+1)}{100} 10 = 6.1$ (Second class)

Q_1: $L = \frac{(60+1)}{100} 25 = 15.25$ (Third class)

Q_3: $L = \frac{(60+1)}{100} 75 = 45.75$ (Fifth class)

P_{80}: $L = \frac{(60+1)}{100} 80 = 48.8$ (Fifth class)

P_{99}: $L = \frac{(60+1)}{100} 99 = 60.39$ Outside the dataset