UNIT 17 *Measures of Central Tendency* Answers

17.1 Mean, Median, Mode and Range

1. (a) mean = 5 median = 4.5 mode = 3 range = 8
   (b) mean = 9.9 median = 9.5 mode = 7 range = 11
   (c) mean = 16.25 median = 16 5 mode = 17 range = 10
   (d) mean = 107.6 median = 108 mode = 108 range = 13
   (e) mean = 63 median = 64 mode = 61 range = 10
   (f) mean = 21.75 median = 21.5 mode = 16 range = 14
2. (a) 6.8 (b) 6.75 (c) 6 (d) $5\frac{1}{2}$
3. (a) (i) \$13.6 (ii) \$13.5 (iii) \$13 (b) (i) mean (ii) mode
   (c) range = \$3
4. (a) Randy: mean = 20.8, range = 2 John: mean = 24.2, range = 24
   (b) Randy (c) John
5. (a) A: mean = 15.9, median = 20, mode = 20
   B: mean = 16.9, median = 17, mode = 18
   (b) Mode suggests A (c) Mean suggests B (d) Range: A = 15, B = 3
6. (a) mean = 68, median = 68.5 (b) His mean increases to 68.4.
   (c) The median. It increases from 68.5 to 70, whereas the mean only increases by 0.4.
7. (a) He objects because the mode = 0 = median (b) mean = 2.30, range = 18 (c) 15 fish
8. (a) 268.4 cars (b) The mean decreases.
9. (a) mean = 2.035, median = 2, mode = 2 (b) Either median or mode (whole numbers).
10. (i) (a) 6.65 (b) 6.6 (c) 6.7 (ii) 5.9 and 8.2
11. (a) 19°C (b) Archangel (c) 27°C
12. 225 grams
13. (a) mean = 2 goals (b) range = 4 goals
14. (a) 77 kg (b) Hereward House, because they have a much heavier team
15. (a) modal class = 24 students (b) mean class = 26 students
    (c) There is more of an even spread of students in Grade 9.
16. (a) Rory: mean = 25.3, range = 18
    (b) They both have approximately the same mean, but Kelly's scores are more consistent as shown by the smaller range; thus Kelly should be selected.
17. (a) (i) 5.6 marks (ii) 0.5 marks
    (b) Leaving out the two extreme marks probably gives a less biased measure of performance.
    (c) Mean + Range = 5.2 + 0.6 = 5.8, therefore no mark could possibly exceed 5.8.

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17.2 Finding the Mean using Tables and Tally Charts

1. mean = 1.25 cars
2. mean = 1.93 TV sets
3. mean = 4.08 calls
4. mean = 3.56 runs per over
5. (a) mean = 1.95 plants (b) 22 times
6. mean number = 1.15 planes
7. mean = 2.30 repeats
8. (a) 6 matches (b) 2.04 goals
9. Missing frequencies are 1, 5, 0. Missing frequencies of tickets are 0, 20, 21, 10, 0.
   mean = 2.8 (1 d.p.)
10. (a) 3 children (b) frequency = 21, total = 48, mean = 2.29 children
    (c) The number of children per family has decreased on average ($2.29 < 2.7$), and there is less variation from family to family (today's range is 3, whilst in 1980 it was 7).
11. (a) 12 children (b) $5 + 14 + 10 = 29$ children (c) Modal size is 5
    (d) Median size is 6 (e) (i) $p = \frac{14}{50} = 0.28$ (ii) $p = \frac{12 + 9}{50} = \frac{21}{50} = 0.42$
    (f) Mode - there will be more demand for shoes of that size.

17.3 Calculations with the Mean

1. mean = 161.55 cm
2. mean = 2 goals
3. mean = 4 students
4. mean = 60.15 kg
5. 7 solar power systems
6. 84
7. $6000
8. 9.5
9. mean ≈ 4.47
10. 320
11. 16
12. 8

17.4 Mean, Median and Mode for Grouped Data

1. (a) 32.09 shops (b) 33.42 shops (c) 30 - 39 shops
2. (a) 40.8 kg (b) 41 kg (c) $40 \le w < 45$ (kg)
3. (a) Yes (b) 20.54 s (c) 20.95 s (d) Median is greater than the mean.
4. (a) No (b) median $\approx$ 0 73 km, mean = 0.78 km. (c) The mean is the larger.

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5. 11.45 years

6. (a) 11.95 cm (b) 12.1 cm

7. (a) 9.65 nights (b) 9.92 nights (c) 11 - 15 nights

8. (a) (i) 26.78 correct answers (ii) 27.17 correct answers
   (iii) 21 - 30 correct answers
   (b) (i) 21.5 correct answers (ii) 22.25 correct answers
   (iii) 21 - 30 corrrect answers
   (c) The second class have a lower mean but similar range.

9. (a) 0 - \$10.00 (b) \$14.31

10. (a) 21, 7, 2 (people) (b) People would spend more time watching television than in summer.
    (c) 23.83 (24 hours)

11. (a) 24 cm (b) 24.32 cm

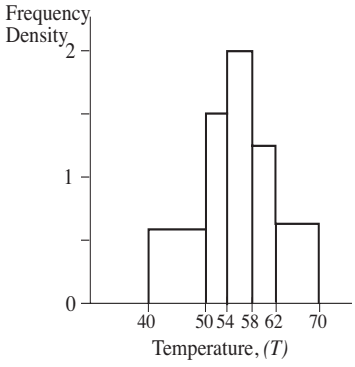
12. (a)

Temperature , T	*Mid-point*	*Frequency*
$40 < T \leq 50$	45	6
$50 < T \leq 54$	52	6
$54 < T \leq 58$	56	8
$58 < T \leq 62$	60	5
$62 < T \leq 70$	66	5

(b) $\frac{1660}{30} \approx 55.3$ °F

(c)

Interval	*Freq. Density*
40-50	$\frac{6}{10} = 0.6$
50-54	$\frac{6}{4} = 1.5$
54-58	$\frac{8}{4} = 2$
58-62	$\frac{5}{4} = 1.25$
62-70	$\frac{5}{8} = 0.625$



13. (a) (i) 51 - 60 marks (ii) 52.3 marks (iii) $p = \frac{(19 + 10 + 10)}{100} = 0.39$

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13. (b)