

NS LS Non-Calc Revision

1. $\frac{29}{100}$

2. $V_{\text{cylinder}} = \pi r^2 h$
 $= 3.14 \times 5^2 \times 4$
 $= 3.14 \times 25 \times 4$
 $= 3.14 \times 100$
 $\approx 314 \text{ cm}^3$

3. a) $\bar{x} = 10 \div 5 = 2$

x	$x - \bar{x}$	$(x - \bar{x})^2$
1	-1	1
1	-1	1
1	-1	1
2	0	0
5	3	9
		$\Sigma 12$

$$s.d. = \sqrt{\frac{(x - \bar{x})^2}{n-1}} = \sqrt{\frac{12}{4}} = \sqrt{3}$$

b) All numbers have had 100 added on so still same spread.

$$s.d. = \sqrt{3}$$

4 ~~4.5~~ a) 12th

b) $\frac{5}{20} = \frac{1}{4}$

~~4.5~~ ~~Q3~~ ~~Q1~~

85. 37, 41, 43 | 47, 56, 58 | 59, 61, 66 | 68, 70, 75

$Q_1 = 45$ $Q_2 = 58.5$ $Q_3 = 67$

i) median = 58.5

ii) $SIGR = \frac{67 - 45}{2} = \frac{22}{2} = 11$

b) Median has increased by 8.5 so pupils performed better
 SIGR has reduced by 4 so pupils scores are more consistent

6. X

$$\begin{aligned}
 7. V &= \frac{4}{3} \pi r^3 \\
 &= \frac{4}{3} \times \pi \times 3^3 \\
 &= \frac{4}{3} \times 3.14 \times 27 \\
 &= 36 \times 3.14 \\
 &= 113.04 \text{ cm}^3
 \end{aligned}$$

$$\begin{array}{r}
 36 \overset{,6}{\times} 3.14 \\
 \hline
 113.04
 \end{array}$$

$$\begin{array}{r}
 3.14 \\
 \times 6 \\
 \hline
 18.84 \\
 \hline
 \frac{18.84}{2}
 \end{array}
 \qquad
 \begin{array}{r}
 18.84 \\
 \times 6 \\
 \hline
 113.04 \\
 \hline
 \frac{113.04}{2}
 \end{array}$$

8. £244 per month

$$\begin{aligned}
 &244 \times 28 \\
 &= \text{£}6832 \text{ paid}
 \end{aligned}$$

$$244 \times 28 \overset{,4}{\underset{,7}{} }$$

$$\begin{array}{r}
 244 \\
 \times 4 \\
 \hline
 976 \\
 \hline
 \frac{976}{1}
 \end{array}
 \qquad
 \begin{array}{r}
 976 \\
 \times 7 \\
 \hline
 6832 \\
 \hline
 \frac{6832}{54}
 \end{array}$$

$$\begin{array}{r}
 244 \\
 \times 8 \\
 \hline
 \text{£}1952 \\
 \hline
 \frac{1952}{33}
 \end{array}
 \text{ left to pay}$$

a. 0, 2, 5, 6, 6, 7, 8, 9, 11, 15

\uparrow Q_1 \uparrow $Q_2 = 6.5$ \uparrow Q_3

i) median = 6.5

ii) lower quartile = 5

iii) upper quartile = 9

b)

c) Train has a lower median ($4 < 6.5$) so is more on time
 SIQR for train (1.5) is lower than bus (2) so train is more consistent

$$\begin{array}{r}
 10. \quad 240.00 \\
 - \quad 7.20 \\
 \hline
 232.80
 \end{array}$$

New balance = £232.80

$$\begin{aligned}
 \text{Interest} &= 1\% \text{ of } 232.80 \\
 &= £2.328 \\
 &= £2.33
 \end{aligned}$$

$$\begin{array}{r}
 \text{Balance owed} = 232.80 \\
 + \quad 2.33 \\
 \hline
 \underline{£235.13}
 \end{array}$$

$$\begin{array}{r}
 11a) \text{ mean} = 8900 \\
 12700 \\
 59200 \\
 10300 \\
 + 9700 \\
 \hline
 100800 \\
 \hline
 32
 \end{array}$$

$$\begin{array}{r}
 20160 \\
 5 \overline{) 100800}
 \end{array}$$

mean = 20160

b) The mean as the median does not take the largest attendance into consideration

$$12. \quad 1 \quad 157 \quad 818 \quad 887 \quad 139$$

↑
4sigfig

$$\text{£}1158000000000$$

$$13. \text{ Basic hourly rate : } 296 \div 40 \begin{matrix} ^4 \\ \text{10} \end{matrix}$$

$$\text{£}7.40$$

$$\text{Time and a half} = 7.40$$

$$\begin{array}{r}
 + 3.70 \\
 \hline
 \underline{\text{£}11.10}
 \end{array}$$

$$4 \overline{) 29.6} \begin{matrix} 7.4 \\ \end{matrix}$$

$$\text{£}55.50 = 11.10 \times (5) \rightarrow 5 \text{ hours overtime}$$

14. i) median = 35
 ii) lower quartile = 22
 iii) upper quartile = 39

b)

- c) 4th median is higher ($42 > 35$) so they spend longer on HW
 4th year SIQR is smaller ($6 < 8.5$) so they are more consistent

15. -6, -5, -4, -3, -2, -1, 0, 1, 2, 2, 4, 4, 8
- \uparrow Q_1 $Q_2 = 0.5$ \uparrow Q_3

- i) median = 0.5
 ii) lower quartile = -3
 iii) upper quartile = 2

b)

- c) Median is higher in Feb 14 ($2 > 0.5$) so on average hotter
 SIQR is higher in Feb 13 ~~2.5~~ ($2.5 > 2$) so temp is more spread out

16. Payment is 5% of 854.60 or £20 whichever is bigger

$$10\% \text{ of } 854.60 = £85.46$$

$$5\% \text{ of } " = £42.73$$

$$\begin{array}{r} 42.73 \\ 2 \overline{) 85.46} \end{array}$$

$$\text{minimum payment} = £42.73$$

N5 LS Calc Revision

1. $100 + 2.3 = 102.3$ ($\div 100$)
 $= 1.023$

$$28400 \times 1.023^3 = 30405.01634$$
$$= \pounds 30405 \text{ (nearest pound)}$$

2. a) Boys because lowest result is 47.

b) i) median = 58

ii) lower quartile = 52

iii) upper quartile = 76

c)

d) SIQR of boys is lower than girls ($5 < 12$) so results were more consistent

3. $V_{\text{ornament}} = \frac{1}{3} \pi r^2 h$
 $= \frac{1}{3} \times \pi \times 15^2 \times 24$
 $= 5654.86 \dots$

$$V_{\text{air}} = \frac{1}{3} \pi r^2 h$$
$$= \frac{1}{3} \times \pi \times 5^2 \times 8$$
$$= 209.439 \dots$$

$$V_{\text{water}} = 5654.86 - 209.439$$
$$= 5445.42$$
$$= 5400 \text{ cm}^3 \text{ (2 sig fig)}$$

4. D 1

5. $22000 - 15000 = \pounds 7000$ commission

$$2.5\% \rightarrow 7000$$

$$1\% \rightarrow 7000 \div 2.5 = 2800$$

$$100\% \rightarrow 2800 \times 100 = \pounds 280000$$

6. a) £292.33 per month

$$292.33 \times 48 = \text{£}14031.84$$

b) £425.63 per month

$$425.63 \times 36 = \text{£}15322.68$$

No. It would be £1290.84 more expensive

7. $100 + 4.5 = 104.5\%$ ($\div 100$)

$$= 1.045$$

$$50000 \times 1.045^4 = \text{£}59625.93003$$

$$\begin{aligned} \text{Interest} &= 59625.93 - 50000 = \text{£}9625.93003 \\ &= \text{£}9625.93 \end{aligned}$$

8. a) Prism = Ah

$$\begin{aligned} &= 1172.389 \times 50 \\ &= 58619.467... \\ &= 58600 \text{ cm}^3 \end{aligned}$$

(Area = $24 \times 30 + \pi \times 12^2$)

$$\begin{aligned} &= 720 + 452.389... \\ &= 1172.389... \end{aligned}$$

b) $V_{\text{box}} = 58600 \div 2$

$$= 29300 \text{ cm}^3$$

$$V_{\text{cuboid}} = Lbh$$

$$29300 = 35 \times 28 \times h$$

$$\begin{aligned} h &= \frac{29300}{35 \times 28} \\ &= 29.9 \text{ cm} \end{aligned}$$

$$9. a) \bar{x} = \frac{10+18+26+32+49}{5} = 27$$

x	$x - \bar{x}$	$(x - \bar{x})^2$
10	-17	289
18	-9	81
26	-1	1
32	5	25
49	22	484
		$\Sigma 880$

$$\begin{aligned}
 \text{sd} &= \sqrt{\frac{(x - \bar{x})^2}{n-1}} \\
 &= \sqrt{\frac{880}{4}} \\
 &= \sqrt{220} \\
 &= 14.83
 \end{aligned}$$

b) The sd for Physics students was less ($6.8 < 14.83$) so these scores were less spread out/more consistent

c) x

d) x

$$10. a) A = \pounds 75.00$$

$$B = 1.6\% \text{ of } 75.00 = \pounds 1.20$$

$$C = 75.00 + 1.20 + 62.99 + 15.88 = \pounds 155.07$$

b) Minimum payment : 3% of 155.07 or $\pounds 5$ whichever is largest
 $= \pounds 4.65$

$\pounds 5$ minimum payment

$$11. \text{ Taxable income} = 15425 - 5225 = \pounds 10200$$

$$10\% \text{ of } 2230 = \pounds 223$$

$$22\% \text{ of } (10200 - 2230) = \pounds 1753.40$$

$$\text{Total} = \pounds 1976.40$$

$$\begin{array}{r}
 12. \quad 40 \text{ hours} \\
 + 6 \text{ hours} \\
 \hline
 46 \text{ hours}
 \end{array}$$

3 hours double time = 6 hours

$$239.20 \div 46 = \underline{\underline{5.20}}$$

$$\begin{array}{r}
 13. \quad ~~3000~~ \quad 11\% \text{ of } 3000 = 330 + \\
 10\% \text{ of } 3300 = 330 -
 \end{array}$$

$$2006 : 3300 - 330 = 2970$$

Less by 30

$$14. \quad \bar{x} \text{ mean} = \frac{1204}{7} = 172$$

x	$x - \bar{x}$	$(x - \bar{x})^2$
173	1	1
176	4	16
168	-4	16
166	-6	36
170	-2	4
180	8	64
171	-1	1

$$\Sigma 138$$

$$\begin{aligned}
 \text{sd} &= \sqrt{\frac{\Sigma (x - \bar{x})^2}{n-1}} \\
 &= \sqrt{\frac{138}{6}} \\
 &= \sqrt{23} \\
 &= 4.8
 \end{aligned}$$

$$\begin{aligned}
 15. \quad V_{\text{outside}} &= \pi r^2 h \\
 &= \pi \times 41^2 \times 900 \\
 &= 4752915.526
 \end{aligned}$$

$$\begin{aligned}
 V_{\text{inside}} &= \pi r^2 h \\
 &= \pi \times 31^2 \times 900 \\
 &= 3870756.308
 \end{aligned}$$

$$\begin{aligned}
 V_{\text{aluminium}} &= \text{outside} - \text{inside} \\
 &= 882159.2175 \\
 &= 882000 \text{ mm}^3
 \end{aligned}$$

$$16. \quad \pounds 413.57 \text{ per month}$$

$$\begin{aligned}
 &413.57 \times 48 \\
 &= \pounds 19851.36
 \end{aligned}$$

$$\begin{array}{r}
 17. \quad 218 \\
 + 32 \\
 \hline
 \pounds 250
 \end{array}
 \qquad
 \begin{aligned}
 80 \times 40 &= 3200p \\
 &= \pounds 32
 \end{aligned}$$

$$\frac{2}{5} \text{ of } 250 = \pounds 100 \text{ saved}$$

$$\begin{aligned}
 18. \quad \text{Taxable} &= 42000 - 5425 \\
 &= \pounds 36575
 \end{aligned}$$

$$20\% \text{ of } 34600 = \pounds 6920$$

$$40\% \text{ of } (36575 - 34600) = \pounds 790$$

$$\text{Yearly } \underline{\underline{\pounds 7710}}$$

$$\begin{aligned}
 \text{Monthly tax} &= 7710 \div 12 \\
 &= \pounds 642.50
 \end{aligned}$$

$$19. \quad 100 - 4.25 = 95.75\%$$

$$= 0.9575$$

$$176500 \times 0.9575^3$$

$$= \text{£}154939.1102$$

$$\uparrow$$

$$= \text{£}155000$$

$$20. \quad \text{Total pupils} = 72$$

$$\text{Pasta} : \frac{30}{72} \times 360 = 150^\circ$$

$$\text{B Pot} : \frac{40}{72} \times 360 = 200^\circ$$

$$\text{Salad} : \frac{2}{72} \times 360 = 10^\circ$$

$$21. a) \quad \cancel{0}, \cancel{8}, \cancel{7}, \cancel{7}, \cancel{8}, \cancel{9}, \cancel{4}, \cancel{3}$$

\uparrow
 Median

$$\text{mean} = \frac{49}{7} = 7$$

x	$x - \bar{x}$	$(x - \bar{x})^2$
13	5	25
7	0	0
0	-7	49
9	2	4
7	0	0
8	1	1
5	-2	4
		$\Sigma 83$

$$\text{sd} = \sqrt{\frac{(x - \bar{x})^2}{n-1}}$$

$$= \sqrt{\frac{83}{6}}$$

$$= \sqrt{13.83}$$

$$= 3.72$$

b) Mean has increased by 20 so scoring more points
 sd has dropped by 0.47 so more consistent

$$22. V = \pi r^2 h$$

$$3260 = \pi \times 6.4^2 \times h$$

$$h = 3260 \div \pi \div 6.4^2$$

$$= 25.3 \text{ cm}$$

$$23. \text{ Basic : } 35 \times 6.40 = \text{£}224$$

$$\text{Evening : } \del{35} 6 \times 6.40 \times 1.5 = \text{£}57.60$$

$$\underline{\text{£}281.60}$$

$$\text{Weekend} = 320 - 281.60 = \text{£}38.40$$

$$\text{Double time} = 6.40 \times 2 = \text{£}12.80$$

$$\text{Hours} = 38.40 \div 12.80 = \underline{\underline{3}}$$

$$24. 100 + 3.15 = 103.15$$

$$= 1.0315$$

$$134750 \times 1.0315^3 = 172696.14$$

$$\uparrow$$

$$= \text{£}172700$$

$$25 \text{ a) } V = \pi r^2 h$$

$$= \pi \times 1.5^2 \times 15$$

$$= 106.03 \text{ m}^3$$

$$\text{b) } V_{\text{cone}} = \frac{1}{3} \pi r^2 h$$

$$5.7 = \frac{1}{3} \times \pi \times 1.5^2 \times h$$

$$h = 5.7 \div \frac{1}{3} \div \pi \div 1.5^2 = 2.4 \text{ m}$$

Total height =

$$15 + 2.4 = 17.4 \text{ m}$$

$$26a) \text{ mean} = \frac{246}{6} = 41$$

x	$x - \bar{x}$	$(x - \bar{x})^2$
43	2	4
39	-2	4
41	0	0
40	-1	1
39	-2	4
44	3	9
		$\Sigma 22$

$$\begin{aligned} \text{sd} &= \sqrt{\frac{22}{5}} \\ &= \sqrt{4.4} \\ &= 2.1 \end{aligned}$$

b) Mean is within limits of 38 and 42
S.d. is 0.9 less than 3 so ok.

$$27. \text{ Total loan} = 10000 + 2339 = 12339$$

$$\text{Yearly repayment} : 12339 \div 5 = 2467.8$$

$$\text{Monthly} \quad " \quad : 2467.8 \div 12 = \text{£}205.65$$

Finesave without protection

28. 39 hours is 4 hours overtime

4 hours overtime = 6 hours basic pay (time and $\frac{1}{2}$)

$$\text{Basic} : 255.84 \div 41 = \text{£}6.24 \text{ per hour}$$

$$\text{Overtime} : 6.24 \times 1.5 = \text{£}9.36$$

29. Cylinder + Sphere

radius = 8mm

$$\begin{aligned}
 &= \pi r^2 h + \frac{4}{3} \pi r^3 \\
 &= \pi \times 8^2 \times 15 + \frac{4}{3} \times \pi \times 8^3 \\
 &= 3015.9 + 2144.7 \\
 &= 5160.6 \text{ mm}^3
 \end{aligned}$$

$$30a) \text{ mean} = \frac{696}{6} = 116$$

x	$x - \bar{x}$	$(x - \bar{x})^2$
134	18	324
102	-14	196
127	11	121
98	-18	324
104	-12	144
131	15	225
	Σ	1334

$$\begin{aligned}
 \text{sd} &= \sqrt{\frac{1334}{5}} \\
 &= \sqrt{266.8} \\
 &= 16.3
 \end{aligned}$$

b) 1 Total is the same

4 First match scores more spread out

31. £667.35 per month

$$\Rightarrow 667.35 \times 24 = \text{£}16016.40$$

$$32. \quad 100 - 15 = 85\% \\ = 0.85$$

$$0.85^4 = 0.522 = 52.2\%$$

No 2.2% short

$$33. \quad 100 - 20 = 80\% \quad \text{Half value} = \text{£}375,000 \\ = 0.8$$

$$\text{Year 1: } 750000 \times 0.8 = 600000$$

$$2: 480000$$

$$3: 384000$$

$$4: 307200$$

Replaced after 4 years

$$34. \quad \text{Bonus: } 7.25 \times 88 = \text{£}638$$

$$\text{Gross: } 1350 + 638 = \text{£}1988$$

$$\text{Pension: } 6\% \text{ of } 1988 = \text{£}119.28$$

$$\text{Net: } 1988 - 187.42 - 297.59 - 119.28 = \text{£}1383.71$$

$$35. \quad \text{£}228.41 \text{ per month}$$

$$228.41 \times 5 \times 12 = \text{£}13704.60$$

$$\text{Cost of loan} = 13704.60 - 10000 = \text{£}3704.60$$

36. A: £141.89

2.5% of 141.89 = £3.55

B: £5

37. a) mean = $\frac{410}{5} = 82$

x	$x - \bar{x}$	$(x - \bar{x})^2$
84	-2	4
78	-4	16
87	5	25
80	-2	4
81	-1	1
$\Sigma 50$		

$$\begin{aligned} \text{sd} &= \sqrt{\frac{50}{4}} \\ &= \sqrt{12.5} \\ &\approx 3.5 \end{aligned}$$

b) All scores have 20 added on

mean = $82 + 20 = 102$

sd = 3.5 (same spread)

38. $V_{\text{cube}} = 10 \times 10 \times 10 = 1000 \text{ cm}^3$

8% of 1000 = 80 cm^3

$V_{\text{cone}} = 920 \text{ cm}^3 = \frac{1}{3} \pi r^2 h$

$h = 920 \div \frac{1}{3} \div \pi \div 8^2$

= 13.7 cm

= 14 cm (2 sigfig)

$$39. \quad 100 - 15 = 85\% \\ = 0.85$$

$$964 \times 0.85^3 = 592.016 \dots \\ = 592 \\ = 590 \text{ pupils}$$

$$40 \text{ a) } V = \pi r^2 h \\ = \pi \times 5^2 \times 15 \\ = 1178.1 \\ = 1180 \text{ cm}^3$$

$$\text{b) } V_{\text{cone}} = \frac{1}{3} \pi r^2 h \\ 1180 = \frac{1}{3} \times \pi \times 7^2 \times h \\ h = 1180 \div \frac{1}{3} \div \pi \div 7^2 \\ = 22.996 \dots \\ = 23 \text{ cm}$$

$$41 \text{ a) } \text{mean} = \frac{339}{6} = 56.5$$

x	$x - \bar{x}$	$(x - \bar{x})^2$
53	-3.5	12.25
57	0.5	0.25
58	1.5	2.25
60	3.5	12.25
55	-1.5	2.25
56	-0.5	0.25
		57.5

$$\text{sd} = \sqrt{\frac{57.5}{5}} \\ = \sqrt{11.5} \\ = 3.39$$

41 b) No. Her mean time has reduced by 1.5s but her s.d has increased. Less consistent.

42. $\frac{25}{20}$ is bigger than 1. This isn't possible

43. Total cost = $5000 + 1702.60 = £6702.60$

Yearly : $6702.60 \div 5 = 1340.52$

Monthly : $1340.52 \div 12 = £111.71$

Central Bank

44. Deductions : £119.98

Gross Pay : $352.02 + 119.98 = £472$

Commission : $472 - 191.50 = £280.50$

3% $\rightarrow 280.50$

1% $\rightarrow 280.50 \div 3 = £93.50$

100% $\rightarrow 93.50 \times 100 = \underline{\underline{£9350}}$

