national5maths.co.uk

FORMULAE LIST

The roots of $ax^2 + bx + c = 0$ are $x = \dfrac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

Sine rule: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine rule: $a^2 = b^2 + c^2 - 2bc \cos A$ or $\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$

Area of a triangle: Area = $\frac{1}{2} ab \sin C$

Volume of a sphere: Volume = $\dfrac{4}{3}\pi r^3$

Volume of a cone: Volume = $\dfrac{1}{3}\pi r^2 h$

Volume of a Pyramid: Volume = $\dfrac{1}{3}Ah$

Standard deviation: $s = \sqrt{\dfrac{\sum(x - \bar{x})^2}{n-1}} = \sqrt{\dfrac{\sum x^2 - (\sum x)^2 / n}{n-1}}$, where n is the sample size.

Standard Deviation - Exam Type Questions

1. During a recent rowing competition the times, in minutes, recorded for a 2000 metre race were

$7 \cdot 2$ $7 \cdot 3$ $7 \cdot 3$ $7 \cdot 5$ $7 \cdot 6$ $8 \cdot 4$

(a) Calculate the mean and standard deviation of these times. Give both answers correct to 2 decimal places.

(b) In the next race the mean time was $7 \cdot 76$ and the standard deviation was $0 \cdot 49$. Make two valid comments about this race compared to the one in part (a).

2. 6 friends joined "Super Slimmers", a weight loss class. Their weights were recorded and the results are shown below.

65kg 72kg 74kg 81kg 90kg 98kg

(a) Calculate the mean and standard deviation of the weights.
After 6 weeks the mean weight was 74kg and the standard deviation was $8 \cdot 6$

(b) Compare the mean and standard deviation of the friend's weights.

3. Stewart and Jenni complete a crossword puzzle every day. Here are the times (in minutes) that Stewart took to complete it each day for a week.

63 71 68 59 69 75 57

(a) Calculate the mean and standard deviation for Stewart's times.

Every day Jenni took exactly 5 minutes longer than Stewart to complete the puzzle.

(b) Write down Jenni's mean and standard deviation.

4. The number of hours spent studying by a group of 6 student nurses over a week were

20 23 14 21 27 24

(a) Calculate the mean and standard deviation of this data.

(b) A group of student teachers had a mean of $21 \cdot 5$ and a standard deviation of 6. Make two valid comments to compare the study times of the 2 groups of students.

5. Barbara is looking for a new 'A-Pod' and searches for the best deal.
The costs of the 'A-Pod' are shown below.

£175 £185 £115 £87 £150 £230

(a) Calculate the mean and standard deviation of the above data.

(b) A leading competitor, the 'E-Pod', has a mean price of £170 and a standard deviation of $26 \cdot 7$. Make **two** valid comparisons between the 2 products.