

Maths A Level

Year 2

Honest Self-assessment
followed by Remedial Action

Starting the Second Year course

- Friday September 7th : Mini lesson (today!)
- Friday 14th September: First lesson
 - Implicit Differentiation
 - Please watch the video
 - Please bring in your completed “Continuing With Confidence” (CWC) booklet
 - the lesson will be in **Hut 5**
- Monday 24th September: CWC Tracking Test

Assignments

- The first assignment will be made available within the next couple of days
- It is due in on **Wednesday 26th September**
- All assignments will be due in on a **Wednesday** this year
- Over the next couple of weeks, concentrate on the CWC booklet and use it to prepare for the CWC test
- “Backpack” the most difficult questions

Today

Make sure you use today's lesson to sort out any problems you may be having with the Continuing With Confidence booklet.

Discuss these problems with other students on your table.

“Backpack” any questions you have found challenging.

CWC Exercise 9 Question 2

Coded data will always be in the form $Y = aX + b$

If you can rewrite the equation given to you in this form, then finding the mean and standard deviation of your coded data becomes very simple.

$$\text{Mean of coded data: } \bar{Y} = a\bar{X} + b$$

$$\text{Standard deviation of coded data: } \sigma_y = a\sigma_x$$

A meteorologist collected data on the annual rainfall, x mm, at six randomly selected places. The data was coded using $s = 0.01x - 10$ and the following summations were obtained: $\sum s = 16.1$, $\sum s^2 = 147.03$

Work out an estimate for the standard deviation of the actual annual rainfall.

Solution

$$\begin{aligned}\sigma_s &= \sqrt{\left(\frac{\sum s^2}{6}\right) - \left(\frac{\sum s}{6}\right)^2} \\ &= \sqrt{\left(\frac{147.03}{6}\right) - \left(\frac{16.1}{6}\right)^2} \\ &= 4.15989\end{aligned}$$

$$\sigma_s = 0.01 \sigma_x$$

$$\therefore \sigma_x = \frac{4.15989}{0.01} = 4.16 \text{ (3 s.f.)}$$

A question from this year's A level paper

- 1 (a) Find the binomial series expansion of

$$\sqrt{4-9x}, \quad |x| < \frac{4}{9}$$

in ascending powers of x , up to and including the term in x^2
Give each coefficient in its simplest form.

(5)

- (b) Use the expansion from part (a), with a suitable value of x , to find an approximate value for $\sqrt{310}$

Show all your working and give your answer to 3 decimal places.

(3)

(Total 8 marks)

$$a) 2 - \frac{9}{4}x - \frac{81}{64}x^2 \quad b) 17.623 \quad (\sqrt{310} = 10\sqrt{3.1} \text{ use } x = 3.1)$$

Another question from this year's A level paper

3 (i) Given that

$$\frac{13-4x}{(2x+1)^2(x+3)} \equiv \frac{A}{2x+1} + \frac{B}{(2x+1)^2} + \frac{C}{x+3}$$

(a) find the values of the constants A , B and C .

(4)

(b) Hence find

$$\int \frac{13-4x}{(2x+1)^2(x+3)} dx, \quad x > -\frac{1}{2}$$

(3)

(ii) Find

$$\int (e^x + 1)^3 dx$$

(3)

i) a) $A = -2, B=6, C = 1$ b) $-\ln|2x + 1| - \frac{3}{2x+1} + \ln|x + 3| + c$

ii) $\frac{1}{3}e^{3x} + \frac{3}{2}e^{2x} + 3e^x + x + c$