S4 Formal Homework 1

Core:

1. Expand the brackets and simplify
   a. $(4k - 5)(k - 2)$ b. $(j - 9)(2j^2 + j + 3)$

2. Neil bought a Massey-Fergusson tractor for £28,695.
   The tractor is predicted to depreciate at a rate of 31.7% p.a.
   How much will the tractor be worth in 3 years' time?
   Give your answer correct to 3 significant figures.

3. A straight line, l_1, passes through the points P(2, 1) and Q(-3, 11).

   a. Find the equation of the straight line l_1.

   b. Find the coordinates of the x-intercept of l_1.

4. Express $\sqrt{75} - 2\sqrt{3} + \sqrt{27}$ as a surd in its simplest form (non-calculator).

5. Mel is recording the speed of a river as part of her Geography project.
   She records the speed at the same time every day.
   A sample of recorded speeds (ms^{-1}) is shown below.

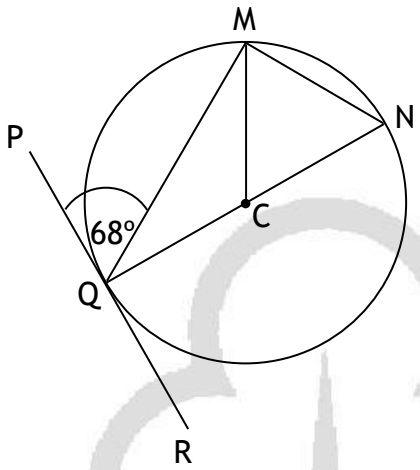
   5.9, 4.8, 5.1, 5.3, 4.9

   a. Calculate the mean and standard deviation of this sample correct to 1 decimal place.

   After some heavy rainfall she takes a further set of measurements and finds that the mean is 6.8 ms^{-1} and the standard deviation is 1.1.

   b. Make two statements comparing the data before and after the rainfall.

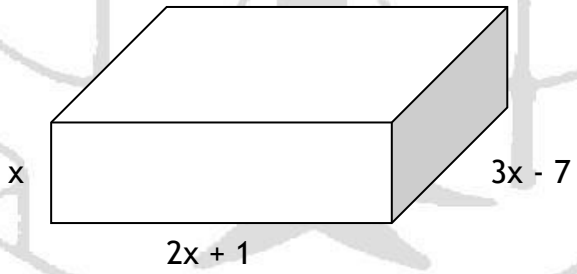
6. The diagram below shows a circle, centre C.



QN is a diameter.
PR is a tangent to the circle.
Angle PQM is 68°.
Calculate the size of angle CNM.

Extension:

1. Find an expression for the volume of the cuboid shown below.



Write your answer in the form $ax^3 + bx^2 + cx$ and clearly state the values of a, b and c.