# Guidelines for the preparation of post-tutorial work and assignments

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- Work must be tidy and legible.
  Do not try to cram all of your work onto one page.
- Don't submit rough drafts.
  Make a neat final submission. In particular, torn out pages from Spirax notebooks are not acceptable. Provide plenty of space on the left and right margins so that the marker can provide comments and suggestions on your work.
- Handwritten assignments are preferred to typed assignments.
  We recommend that you utilise your time effectively by working on your problems rather than typing up the answers.
- Show your working.
  Most importantly, you must show all your working in a tidy and orderly way: no working translates into no marks. Working will help the marker to understand and appreciate your arguments, which will translate into better marks.
- Present your work in a logical and coherent way.
  Write out and justify your arguments carefully and explicitly. Present both the question and your solution clearly – don't try to cram 15 lines of calculations onto 2 lines. Quote the formulas that you are using. Answers must be clearly identifiable at the end of your question.
  {A good assignment should communicate the ideas clearly and neatly: if you look at any good undergraduate mathematics textbook, you will see there is usually a balance between the author's use of English sentences and mathematical expressions, where one clarifies the other and vice versa.}
- Use mathematical notation correctly.
- When you are dealing with numerical computations, simplify your answer as much as possible, but express numbers algebraically (that is, leave your solutions in closed form). Unless requested explicitly, do not write decimal expansions in your final answer. For example, 1/3 is far more precise than 0.333333333.

- Do not use red pens, since the markers also use red pens to evaluate assignments.
- If your assignment requires the presentation of the graph of some function, please use a ruler for all graphs and label the graph and all axes appropriately. In addition, draw graphs within the presentation of your solution - do not draw on the original assignment sheet graphs.

On the next page you will find two examples of potential assignment questions and various ways in which answers are formulated, ranging from a reasonably bad presentation to progressively better ways to answer the question. For both questions, the first answer would not yield full marks; the last answer is much preferable to the previous three presentations, because the reader better understands the argument that the student is trying to make.

Without a calculator, how can you determine whether 9 or $4\sqrt{5}$ is bigger?

(1) $4\sqrt{5} = 8.944$ so 9 is bigger.

(2) $(4\sqrt{5})^2 = 16 \times 5 = 80$ so 9 is bigger.

(3) Since $(4\sqrt{5})^2 = 16 \times 5 = 80$ which is less than $9^2 = 81$, we see that 9 is bigger than $4\sqrt{5}$.

(4) For non-negative values, the squaring function is increasing, so if

$$a^2 > b^2 \quad \text{then} \quad a > b.$$

Since $(4\sqrt{5})^2 = 16 \times 5 = 80$ and $9^2 = 81$, we can then see $9 > 4\sqrt{5}$.

Find The equation of The line Through $(2,1)$ which is perpendicular to The line $2x + 3y = 5$.

(1)

$$m_1 = \frac{-1}{2}$$

$$y = -\frac{1}{2}x + b$$

$$1 = -\frac{1}{2} \times 2 + b$$

$$b = 2$$

(2)

$$m_1 = \frac{-1}{-2/3} = \frac{3}{2}$$

$$y = \frac{3}{2}x + b$$

$$1 = \frac{3}{2}(2) + b$$

$$b = -2$$

$$y = \frac{3}{2}x - 2$$

(3)

$$2x + 3y = 5$$

$$= \frac{2}{3}x + y = \frac{5}{3}$$

$$= y = -\frac{2}{3}x + \frac{5}{3}$$

$$= -\frac{2}{3}$$

$$-y = \frac{3}{2}$$

$$y = \frac{3}{2}x + b$$
$$1 = \frac{3}{2}(2) + b$$
$$= -2$$
$$y = \frac{3}{2}x - 2$$

④ Rearranging, the line we are given is $y = -\frac{2}{3}x + \frac{5}{3}$. This has a gradient of $-\frac{2}{3}$. For non horizontal/vertical perpendicular lines, the product of the gradients is $-1$. If the gradient of the line we want is $m$, then

$$m \times \left(-\frac{2}{3}\right) = -1,$$

giving $m = \frac{3}{2}$. Since the line passes through $(2,1)$ we will use the fact that a line of slope $m$ with point $(a,b)$ has equation

$$y = m(x-a) + b.$$

The equation we want is then

$$y = \frac{3}{2}(x-2) + 1.$$