Exam/Study Tip # 35: Strategies for Calculation Based Exam Questions

- Make a list of all the numbers and variables given to you in the problem.

- In most cases, all of the data provided in the question will be needed to solve the problem.

- When tackling worded questions, visualise the scenario or insert yourself into the given situation so it's easier to understand what's happening, and what may be required of you.

- Sketch diagrams or pictures to help visualise what's going on. A picture does tell a thousand words! You'll find that in many questions, once you transfer all the given data to a diagram, the requirements of the question become much clearer and easier to process.

- If graphs and figures have been given, study them carefully. Is the graph origin at $(0,0)$? What are the intervals for the axes? Are any numbers skipped on the axes? What are the units of measurement?

- Read questions carefully to ensure that you're clear as to what's required, what formulae will be required, and how answers should be presented. For example, when given a time question, should the answer be expressed in hours/minutes or as an actual time?

- Look for identifying characteristics of a question that will give you clues as to what type of problem it is, and what must be done to solve it.

- Try estimating the answer before calculating it. What will be the relative size of the answer? Will it be positive or negative? Prior estimation can help you avoid making formula or calculation errors.

- Compare the estimated and calculated answers. If time permits, rework the problem using another method.

- If permitted, use a calculator for all arithmetic, even the simplest operations.

- If time permits, re-enter numbers into the calculator to confirm that you get the same answer. Check all decimal places and signs.

- If you run into trouble setting up an answer or solving a formula, don't give up. Substitute in numbers that represent the real-life scenario to see if the question makes more sense. Think of real-life situations when the formulas or concepts were used. If fractions are a problem, substitute in whole numbers instead.

- Information in the earlier parts of a multi-part question are often required later in subsequent parts. So, what do you do if you can't answer an earlier part? Make up an answer and use it for the remainder of the question. You may be awarded consequential marks if you answer the subsequent parts correctly. Note that you won't, however, obtain full marks.

- Include **brief** statements that indicate what method/solution process you're applying. If your answer is a complete mess but your approach is correct, you could be awarded consequential marks. For example:

  For max/min, let $\dfrac{dy}{dx} = 0$.

- Always choose the simplest and quickest method. No extra marks are awarded for fancy solutions, and you place yourself into a situation where it becomes easier to make mistakes, losing valuable marks.

- Rewrite worded questions in the following format: Find ____*x*____ when ____*y*____ = ____5____

- Highlight or circle the answers in multi-part or linked questions. This will reduce the time you need to spend looking for answers when addressing subsequent parts.

$$\frac{dg}{dt} = (t-1)^2 \times -e^{-t} + e^{-t} \times 2(t-1)$$
$$= -e^{-t}(t^2-2t+1) + 2e^{-t}(t-1)$$
$$= e^{-t}\left[2(t-1) - (t^2-2t+1)\right]$$
$$= e^{-t}(2t-2-t^2+2t-1)$$
$$= e^{-t}(-t^2+4t-3)$$
$$\therefore b = 4 \quad c = -3$$
$$= e^{-t}\left[2(t-1) - (t^2-2t+1)\right]$$
$$= e^{-t}(2t-2-t^2+2t-1)$$
$$= e^{-t}(-t^2+4t-3)$$

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- Never scrub out incorrect responses. Just insert a neat line through your workings and write what you believe to be correct underneath. Even if you're wrong, but there is merit in your thinking, you could score 1 or 2 marks.

- Marks are often lost due because students fail to address key instructions eg. Not stating answers to the correct number of decimal places or using exact values. Underline key words and instructions as they appear.

Expand 2(x + y)

$$2(x+y)$$
$$2(x + y)$$
$$2(x + y)$$
$$2(x + y)$$

3. Find x.

x

3 cm

4 cm
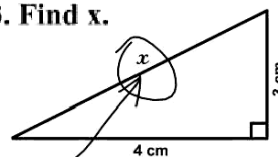
Here it is

- Marks are also frequently lost due to transcription errors i.e. Copying data from the given information incorrectly. Check what you've written is correct by working backwards. For example, if the given value is 1.2346 you would check that you have written 6, 4, 3, 2, ., 1.

- Check answers by finding an estimate or by substituting random numbers into the equation to obtain an approximate. Does your answer make sense, given the information in the problem?

- For inequalities, try substituting other numbers besides the answer to see if they make sense.

- When answering calculation-style questions, cross-check answers against the given domain or physical constraints to make sure they're valid.

- **Assume nothing!**

  Do not assume something is true unless the question says so, or there is information on a diagram which supports your assumption. For example, don't assume a triangle is right-angled or that a sequence is arithmetic just because it looks like it might be.

- **Re-read every question before you move onto the next one to ensure that all components (and/or the correct components) have been answered.**

  For example: A rectangular block, the length of whose base is twice the width, has a total surface area of $300 \, cm^2$. Find the height of the block if it is of maximum volume.
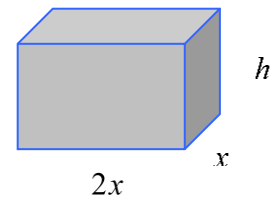
  Answer

  Find the value of h **not** x !

- Include the appropriate units in your answers, even if units are not specifically requested.

- Always check questions to see if units have changed or are different from the typical units used. Exam writers love to try and trick students where they can.

  For example, time can be defined as minutes at the beginning of a question and a later part could ask you to solve the equation at 2 hours.

- Make sure you have answered all parts of the question and have used the correct units of measurement.

- Use pencil so you can make corrections neatly.

- Pay attention to + and – signs.

- Simplify answers.

- Don't get bogged down on one problem at the cost of skipping others.

Regards,
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