TB(2A) Ch. 4 Approximation & Errors
Conventional Questions

1. [13-14 S.2 Mid-year Exam #11]

Figure 2 is a Test Report which shows the exact marks for the Chinese, English and Maths tests that Amy Chan took last month. However, part of the report was torn. Amy only remembers that her total marks are 230 correct to the nearest 10.

(a) Find the lower limits of her
- **(i)** total marks; **(1 mark)**
- **(ii)** Maths marks. **(2 marks)**

(b) Amy estimates that her Maths marks should be the lower limit found in **(a)(ii)**. After checking, her actual mark is 85. Find the relative error of her estimation of her Maths marks. **(2 marks)**

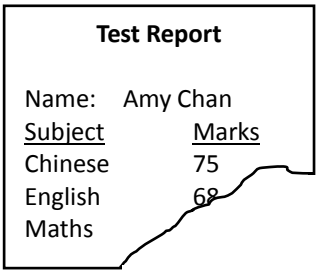

Figure 2

2. [13-14 S.2 Mid-year Exam #14]

To lay a new railway track, it is estimated to use 100 identical steel bars with an absolute error of 2 bars. The measured length of each steel bar is 12.5 m with a maximum absolute error of 1 cm. Find the range of the total true length (in m) of the railway track. **(3 marks)**

3. [13-14 S.2 Final Exam #9]

The time required to travel from Choi Hung to Yau Tong by MTR is 12 min, correct to the nearest 2 min.

(a) Find the maximum absolute error of the estimated time. **(1 mark)**

(b) Find the percentage error of the estimated time. **(2 marks)**

(c) Zoe entered a train at Choi Hung MTR station at 5:59 p.m. and she claimed to her mother that she should be able to arrive at Yau Tong MTR station at 6:10 p.m. Do you agree with her claim? Explain your answer. **(2 marks)**

4. [13-14 S.6 Mock Exam #1]

Amy goes on a holiday trip. The weight of her luggage is measured to be 22.5 kg, correct to the nearest 0.5 kg. Find the percentage error of the measurement. **(2 marks)**

5. [14-15 S.2 Mid-Year Exam #4]

Stephanie takes 62.5 seconds to complete 1 lap of round-the-campus run. It is given that the maximum absolute error of the measurement is 0.25 second.

(a) Find the relative error of the measured time. **(2 marks)**

(b) Write down the upper limit of Stephanie's finishing time. **(1 mark)**

(c) Write down the scale interval of the measuring tool used. **(1 mark)**

6. [14-15 S.2 Mid-Year Exam #10]

There are about 46 400 articles, correct to 3 significant figures, in a whole set of encyclopedia.

(a) Find the percentage error of the above estimation. **(2 marks)**

(b) There are about 590 words, correct to the nearest 10, in each article on average. Is it possible that there are 28 million words in the whole set of encyclopedia? Explain your answer. **(2 marks)**

7. [14-15 S.6 Mock Exam #4]

The length, width and height of a cuboid are measured as 13.8 cm, 6.2 cm and 7.4 cm respectively, correct to the nearest 0.2 cm.

(a) Find the percentage error of the measured height.

(b) By rounding up all the measurements to the nearest cm, estimate the volume of the cuboid.

8. [14-15 S.2 Final Exam #3]

The depth of the water in a swimming pool is measured to be 1.8 m, correct to the nearest 0.1 m.

(a) Find the maximum absolute error of the measurement. **(1 mark)**

(b) Find the percentage error of the measurement. **(2 marks)**

9. [14-15 S.2 Mid-year #4]

A box of sugar weighed 5 kg, correct to the nearest 0.05 kg. Find

(a) the maximum absolute error, **(1 mark)**

(b) the relative error, **(1 mark)**

(c) the percentage error. **(1 mark)**

10. [15-16 S.2 Mid-year #12]

There is a production rule in VT juice manufacturer on the box capacity. For a box of 250 mL juice, the percentage error of the capacity cannot exceed 1%. Find the range of the capacity of a box of 250 mL juice produced by this manufacturer. **(3 marks)**

11. [15-16 S.2 Final Exam, #11]

George measured the weight of an orange and the result was 200 g correct to the nearest x g. If the percentage error was 2.5%, find x. **(2 marks)**

12. [16-17 S.2 Mid-year #3]

In 2016, there were 827 graduates in ABC school.

(a) Round off the number of graduates to the nearest 100. **(1 mark)**

(b) Find **(i)** the absolute error and **(1 mark)**

(ii) the percentage error **(1 mark)**

of the approximation in **(a)**.

13. [16-17 S.2 Mid-year #10]

Jim used a ruler to measure the length of a cubic box as 7.5 cm. The scale interval of the ruler is 0.1 cm.

(a) Find the maximum absolute error of the measurement. **(1 mark)**

(b) Find the percentage error of the measurement. **(2 marks)**

(c) Jim lost his ruler and he wanted to measure the dimension of a cardboard. He then used the cubic box to measure the dimensions of the cardboard. The length and width of the cardboard are 6 times and 3 times the length of a side of the cubic box respectively.

(i) Find the range of possible value of the actual length of the cardboard. **(2 marks)**

(ii) Write down the minimum area of the cardboard. **(1 mark)**

14. [16-17 S.2 Final Exam, #3]

The length of an AAA battery is measured as 44.5 mm, correct to the nearest 0.1 mm.

(a) Write down the scale interval of the measuring tool used. **(1 mark)**

(b) Write down the range of the actual length of an AAA battery. **(1 mark)**

(c) There is an AAA battery box of x mm tall. Its width is just fit for one AAA battery. It is given that $x \geq 135$. Is it possible to put three AAA batteries in a row inside the box? Explain your answer. **(2 marks)**

15. [17-18 S.2 Mid-year #3]

The actual number of visitors of a fun fair is 2829. Find the percentage error when the number of visitors is correct to the nearest hundred. **(2 marks)**

16. [17-18 S.2 Mid-year #9]

The measured capacity of a bottle is 400 mL, correct to the nearest 10 mL.

(a) Find the maximum absolute error and the range of the actual capacity of the bottle. **(3 marks)**

(b) Write down the relative error of the measured capacity of the bottle. **(1 mark)**

(c) A factory produces 1000 bottles of juice every day. Miss Lam claims that the total capacity of the juice produced must be more than 2780 L for 7 days. Do you agree? Explain your answer. **(2 marks)**

17. [17-18 S.2 Final Exam, #5]

The net weight of a pack of gummy bear is measured as 8 g correct to the nearest g.

(a) Find the least possible net weight of the pack of gummy bear. **(1 mark)**

(b) Find the percentage error of the measurement. **(2 marks)**

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