Useful Knowledge and Formulas

Chapter 2 Identities and Factorization

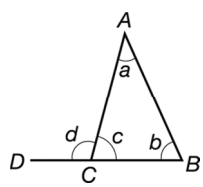
1. $(a+b)^2 \equiv a^2 + 2ab + b^2$
2. $(a-b)^2 \equiv a^2 - 2ab + b^2$
3. $a^2 - b^2 \equiv (a+b)(a-b)$

Chapter 4 Approximation and Errors

1. Absolute error = Estimated value − Exact value
2. Maximum absolute error
   = Largest possible uncertainty of an estimation or a measurement
3. Relative error $= \dfrac{\text{Maximum absolute error}}{\text{Measured value}}$ or $= \dfrac{\text{Absolute error}}{\text{Exact value}}$
4. Percentage error = Relative error × 100%

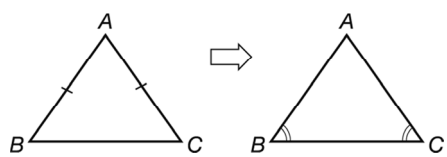
Chapter 5 Angles related to Rectilinear Figures

1. In ΔABC, $a + b + c = 180°$.
   (Reference: *∠ sum of Δ*)

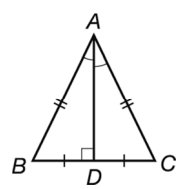


2. If BCD is a straight line, then $a + b = d$.
   (Reference: *ext. ∠ of Δ*)

3. If $AB = AC$, then $\angle B = \angle C$.
   (Reference: *base ∠s, isos. Δ*)



4. In ΔABC, if $AB = AC$ and one of the following conditions is true, then the other two are also true.
   (a) $AD \perp BC$
   (b) $\angle BAD = \angle CAD$
   (c) $BD = CD$
   (Reference: *property of isos. Δ*)



Chapter 1
Rate and Ratio

Warm Up Zone

1. Suppose that USD5 can be converted to HKD39. How much USD can we get with HKD7215? Try Elite Zone Q.1

2. A truck moves 0.9 km in a minute.
   (a) Find the speed of the truck in m/s.

   (b) (i) How far does it travel in 28 s?

   (ii) How long does it take to travel 240 km?

   (c) Find, in km, the distance that the truck travels in $\frac{3}{4}$ hour if its speed is increased by 3 m/s.

Elite Zone

Level Up Questions

1. Suppose that 1 British Pound can be exchanged for 14 Hong Kong Dollars and 1 US Dollar can be exchanged for 7.78 Hong Kong Dollars. How much British Pounds can we get for 2100 US Dollars?

2. Keith drove 6 km at a constant speed of 45 km/h. He then drove the next 6 km at a constant speed of 90 km/h. Find the average driving speed of Keith, in km/h, of the whole journey.

3. Wendy runs for a 400 m-race. It is given that she runs at a speed of 35 km/h in the first 200 m. If she wants to finish the whole race in two minutes, find her running speed, in km/h, of the remaining journey.

Cross-topics

9. The running speed of Barbie is 80% of that of Pinky.

   (a) Find the ratio of the running speed of Pinky to that of Barbie.

   (b) If Barbie and Pinky run from the school to the church, find the ratio of the time taken for Barbie to that for Pinky.

Cross-topics

10. It is given that the cost of painting a wall is in proportional to the area of the wall. Suppose the cost of painting wall A of length 32 m and height 2.8 m is $\$4000$. The length of wall B is 20% longer than wall A and the height of wall B is 40% shorter than wall A.

   (a) Find the ratio of the area of wall B to that of wall A.

   (b) Find the cost of painting wall B.

Special Scenario

22. Chester buys a new clock that runs slightly faster than his watch. He then sets the clock to $16:08:00$ to match the time on his watch. The table below lists the displays of time of the watch and the clock in the following hours.

Watch	Clock
16:08:00	16:08:00
17:08:00	17:08:12
18:08:00	18:08:24
19:08:00	19:08:36

(a) (i) Chester checked the time on the watch and discovered that two hours have passed, how many seconds would have passed if Chester checks the time on the clock now?

(ii) Hence, find the ratio of the number of seconds measured by clock (T_{clock}) to that of the watch (T_{watch}) in a 2-hour period.

(b) Kristy discovers that the time on Chester's watch is different from the actual time. She adjusts Chester's watch the same as the actual time. When Chester is doing the action described in (a), some of the times are recorded by Kristy.

Actual Time	Watch
16:08:00	16:07:48
17:08:00	17:07:36
18:08:00	18:07:24
19:08:00	19:07:12

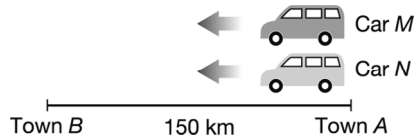
(i) By finding the number of seconds the actual time has passed for two hours, find the ratio of the time measured by the watch (T_{watch}) to that of the actual time (T_{actual}).

(ii) Using (a)(ii) and b(i), find $T_{actual} : T_{clock}$.

(iii) Chester claims that the time measured by the clock is the same as the actual time. Do you agree? Explain your answer. If you do not, find, in seconds, the difference between the time shown by the clock and the actual time after a week

Challenging Questions

23. Town A and town B are 150 km apart. Car M spent 3 hours to travel from town A to town B. Car N travelled from town A to town B at a speed of 45 km/h.



(a) (i) Find the speed of car M.

(ii) Find, in min, the travelling time of car N.

(b) Car M and car N left town A at the same time with the speeds mentioned in (a)(i) and (a)(ii) respectively, and they travelled back and forth continuously between town A and town B.

(i) Find the distance between car M and car N when car M arrived at town B in the first time.

(ii) Let L_n km be the distance between town A and the position where the two cars meet each other at the nth time.

(1) By using (b)(i), find L_1.

(2) Find L_2.

Write down one possible value of n when $L_n = 0$.