

Useful Knowledge and Formulas

Chapter 1 Errors in Measurement

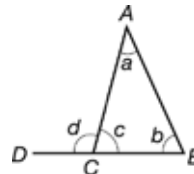
1. Absolute error = Estimated value – Exact value
2. Maximum absolute error
= Largest possible uncertainty of an estimation or a measurement
3. Relative error = $\frac{\text{Maximum absolute error}}{\text{Measured value}}$ or = $\frac{\text{Absolute error}}{\text{Exact value}}$
4. Percentage error =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

Chapter 2 Identities and Factorization

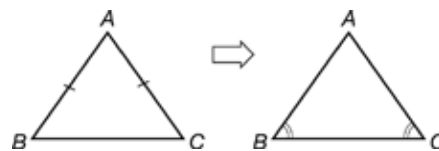
1. $(a + b)^2 \equiv a^2 + 2ab + b^2$
2. $(a - b)^2 \equiv a^2 - 2ab + b^2$
3. $a^2 - b^2 \equiv (a + b)(a - b)$

Chapter 4 Angles related to Rectilinear Figures

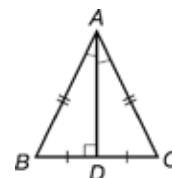
1. In $\triangle ABC$, $a + b + c = 180^\circ$.
(Reference: \angle sum of \triangle)
2. If BCD is a straight line, then $a + b = d$.
(Reference: *ext. \angle of \triangle*)



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




4. In $\triangle ABC$, 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. \triangle*)



Chapter 7

Rate, Ratio and Proportion

★ Warm Up Zone ★

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

8. (a) $(x + y)$ is inversely proportional to x . When $x = 2$, $y = 3$. Find y when $x = 3$.

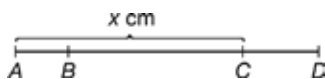
- (b) $(3x - 2y)$ is directly proportional to $(2 - 3y)$. When $x = -\frac{1}{5}$, $y = \frac{5}{3}$. Find x , in terms of π , when $y = \pi$.

Cross-topics

9. Tea A and tea B are mixed in the ratio $x : y$ by weight. Tea A costs \$80/kg and tea B costs \$100/kg. If the cost of tea B is decreased by 12% and that of tea A is increased by 10%, the cost of the mixture per kg remains unchanged. Find $x : y$.

Special Scenario

20. In the figure, the ratio of the length of AB to that of BC is $3 : 14$ while the ratio of the length of BC to that of CD is $8 : 5$. Let $AC = x$ cm.



- (a) Find the half of length of AD in terms of x .

- (b) If the half of length of AD is 18 cm shorter than BC , find x .

Special Scenario **Cross-topics**

21. Let x , y and z be positive integers. If $3^x = 9^y$ and $4^y = 32^z$, find $(x + y) : (y + z) : (x + z)$.

Special Scenario **Cross-topics**

22. Let x , y , z and m be positive constants, and $m \neq 1$. It is given that $x : (z + x) = y : (x + y) = z : (y + z) = m : 1$.

(a) (i) Express x in terms of m and z .

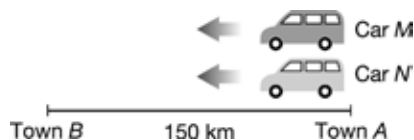
(ii) Express y in terms of x and m .

(iii) Express z in terms of m and y .

(b) Hence, find the value of m .

 **Challenging Questions**

24. 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 n th time.

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

(2) Find L_2 .

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