1. In 2000, the population of Switzerland was 7 087 000.

   a) Write the population correct to **3 significant figures**.

   b) Write the population in **standard form.**

2. Sachin's heart beats 72 times per minute.

   a. Calculate how many times it beats in 1 year. [Use 1 year = 365 days.].

   b. Write your answer to part (a) in standard form, correct to **3 significant figures**.

3.. a) Evaluate : $\sqrt{20} \times \sqrt{10} \times \sqrt{8}$.

   b) Evaluate : $\left(\sqrt{12} - \sqrt{3}\right)^2$**.**

4. Given that $u = 2 + \sqrt{5}$ and $v = 2 - \sqrt{5}$, simplify the following expressions:-

   a) $u + v$
   b) $u - v$
   c) uv

   d) $\dfrac{u}{v}$

5. a) $\sqrt{162}$ can be written in the form $m\sqrt{n}$ where m and n are positive integers.

   Find the values of m and n .

   b) If $x = \sqrt{18} + \sqrt{2}$, show that $x^2 = 32$.

   c) If $\dfrac{2 + \sqrt{3}}{2 - \sqrt{3}} = a + b\sqrt{3}$, find the values of a and b .

6. Simplify the following expressions by rationalising the denominators:

   a) $\dfrac{5}{\sqrt{7}}$

   b) $\dfrac{5}{7 + \sqrt{3}}$

   c) $\dfrac{\sqrt{2} + 1}{\sqrt{2} + 2}$

   d) $\dfrac{2\sqrt{3} - 10}{\sqrt{3} - 5}$

7.. Rewrite the following expressions with rational denominators : -

a) $\dfrac{1}{\sqrt{3}-1}$ b) $\dfrac{4}{\sqrt{6}-2}$ c) $\dfrac{-3}{\sqrt{5}+1}$

d) $\dfrac{\sqrt{5}-1}{\sqrt{5}+3}$ e) $\dfrac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+4}$ f) $\dfrac{5+2\sqrt{3}}{\sqrt{5}+\sqrt{3}}$

8.   Simplify the following:-

a) $\dfrac{4}{\sqrt{2}+1}+\dfrac{3}{\sqrt{2}+5}$

b) $\dfrac{4}{\sqrt{3}+\sqrt{7}}+\dfrac{5}{\sqrt{3}+2\sqrt{7}}$

c) $\dfrac{8+\sqrt{5}}{2}-\dfrac{4-2\sqrt{5}}{3}$

d) $\dfrac{4}{\sqrt{2}-1}+\dfrac{4+\sqrt{3}}{\sqrt{2}-3}$

e) $\dfrac{3\left(\sqrt{2}-7\right)}{\sqrt{5}}-\dfrac{5\left(\sqrt{2}+1\right)}{2}$

9.   Aminata bought 20 metres of cloth at a cost of $80. She sold 15 metres of the cloth at $5.40 per metre and 5 metres at $3 per metre.

a) Calculate the profit she made.

b) Calculate this profit as a percentage of the original cost.

10.   Chris goes to a shop to buy meat, vegetables and fruit.

a) (i) The costs of the meat, vegetables and fruit are in the ratio

meat : vegetables : fruit = 2 : 2 : 3.

The cost of the meat is $2.40.

Calculate the total cost of the meat, vegetables and fruit.

(ii) Chris pays with a $20 note. What percentage of the $20 has he spent?

(b) The masses of the meat, vegetables and fruit are in the ratio

meat : vegetables : fruit = 1 : 8 : 3.

The total mass is 9 kg.

Calculate the mass of the vegetables.

(c) The cost of the meat, $2.40, is an increase of 25% on the cost the previous week.
Calculate the cost of the meat previous week.

11. If 60% people in a city like cricket, 30% like football and the remaining like other games, then what per cent of the people like other games? If the total number of people are 50 lakh, find the exact number who like each type of game.

12. Sohan bought a second hand refrigerator for Rs.2,500, then spent Rs.500 on its repairs and sold it for Rs.3,300. Find his loss or gain per cent.

13. If Chameli had Rs.600 left after spending 75% of her money, how much did she have in the beginning?

14. A shopkeeper purchased 200 bulbs for Rs.10 each. However 5 bulbs were fused and had to be thrown away. The remaining were sold at Rs.12 each. Find the gain or loss%.

15. Meenu bought two fans for Rs.1200 each. She sold one at a loss of 5% and the other at a profit of 10%. Find the selling price of each. Also find the total profit or loss.

16. The population of a place increased to 54,000 in 2003 at a rate of 5% per annum.
(i) find the population in 2001
(ii) what would be its population in 2005?

17. There are 100 students in a hostel. Food provision for them is for 20 days. How long will these provisions last if 25 more students join the group?

18. If a box of sweets is divided among 24 children, they will get 5 sweets each. How many would each get, if the number of the children is reduced by 4?

19. Lin scored 18 marks in a test and Jon scored 12 marks. Calculate Lin's mark as a percentage of Jon's mark.

20. A student played computer game 500 times and won 370 of these games. He then won the next 'x' games and lost none. He has now won 75% of the games he has played. Find the value of x.

21. Alphonse, his wife and child fly from Madrid to the Olympic Games in Beijing.
The adult fare is 450 euros. The child fare is 68% of the adult fare.

(a) Show that the total plane fare for the family is 1206 euros.
(b) The ratio of the money spent on , plane fares : accommodation : tickets = 6 : 5 : 3.

Calculate the total cost.

22. Aida, Bernado and Christiano need $30,000 to start a business.

(a) (i) They borrow $\frac{2}{5}$ of this amount. Show that they still need $18,000.

(ii) They provide the $18,000 themselves in the ratio

Aida : Bernado : Christiano = 5 : 4 : 3.

Calculate the amount each of them provides.

(b) (i) Office equipment costs 35% of the $30,000. Calculate the cost of the equipment.

(ii) Office expenses cost another $6500. Express this a percentage of $30000.

(iii) How much remains of the $30000 now?

(c) They invest $12500. After one year this has increased to $15500. Calculate this

percentage increase.

23. Beatrice has an income of $40000 in one year.

(a) She pays :

no tax on the first $10000 of her income;
10% tax on the next $10000 of her income;
25% tax on the rest of her income.

Calculate
(i) the total amount of tax Beatrice pays.
(ii) the total amount of tax as a percentage of the $40000.

(b) Beatrice pays a yearly rent of $10800. After she has paid her tax, rent and bills, she
has $12000. Calculate how much Beatrice spends on bills.

(c) Beatrice divides the $12000 between shopping and saving in the ratio

shopping : saving = 5 : 3.

(i) Calculate how much Beatrice spends on shopping in one year.

(ii) What percentage of the original $40000 does Beatrice save?

(d) The rent of $10800 is an increase of 25% on her previous rent. Calculate her
previous rent.

24. Each year a school organises a concert.

(a) (i) In 2004 the cost of organising the concert was $385.

In 2005 the cost was 10% less than in 2004. Calculate the cost in 2005.

(ii) The cost of $385 in 2004 was 10% more than the cost in 2003.
Calculate the cost in 2003.

(b) (i) In 2006 the number of tickets sold was 210. The ratio

Number of adult tickets : Number of student tickets = 23 : 19.

How many adult tickets were sold?

(ii) Adult tickets were $2.50 each and student tickets were $1.50 each. Calculate
the total amount received from selling the tickets.

(iii) In 2006 the cost of organising the concert was $410. Calculate the percentage
profit in 2006.