CBSE Board
Class VII Mathematics
Term II
Sample Paper 1

Time: 2 ½ hours   Total Marks: 80

General Instructions:

1. **All** questions are **compulsory**.
2. **Section A** comprises of **12** questions carrying 1 mark each.
3. **Section B** comprises of **12** questions carrying 2 marks each.
4. **Section C** comprises of **8** questions carrying 3 marks each.
5. **Section D** comprises of **5** questions carrying 4 marks each.

Section A
(Questions 1 to 12 carry 1 mark each)

1. If there is a discount of 40% on an article costing Rs 7000, then the price after discount is
   A. Rs 4500
   B. Rs 4200
   C. Rs 4400
   D. Rs 4600

2. Which of the following is the greatest rational number?
   A. $\dfrac{15}{7}$
   B. $\dfrac{15}{8}$
   C. $\dfrac{15}{10}$
   D. $\dfrac{15}{12}$

3. To construct an equilateral triangle, the minimum requirement is
   A. Measure of one angle
   B. Measure of one side
   C. Measure of two sides
   D. Measure of one side and one angle
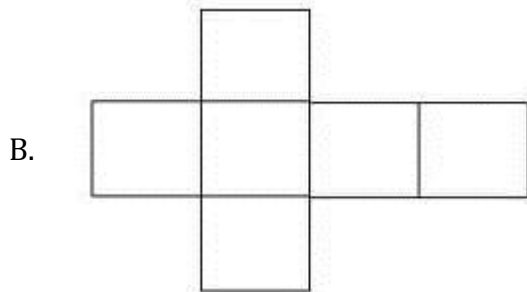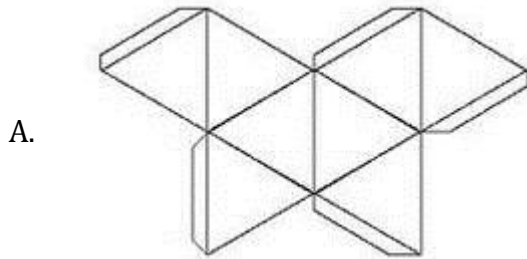
figure?
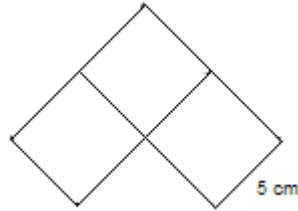
A. 15 cm
B. 30 cm
C. 40 cm
D. 50 cm

5. a × a × a × a × y × y × y × y × z × z can be written as
   A. $a^4y^4z^2$
   B. ayz^{10}
   C. ay^8xz^2
   D. ayz^8

6. Which of the following figure has 7 lines of symmetry?
   A. Regular hexagon
   B. Regular octagon
   C. Regular heptagon
   D. Regular triangle

7. A number is chosen at random from 1 to 5. What is the probability that the number chosen is odd?
   A. $\dfrac{2}{5}$
   B. $\dfrac{3}{5}$
   C. $\dfrac{1}{4}$
   D. $\dfrac{1}{6}$

8. A regular hexagon has _____ center of rotation.
   A. 1
   B. 2
   C. 3
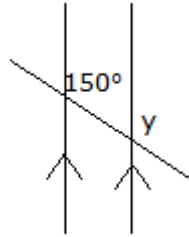   D. 4

9. Net for the following solid is

A.

B.

C.

D.
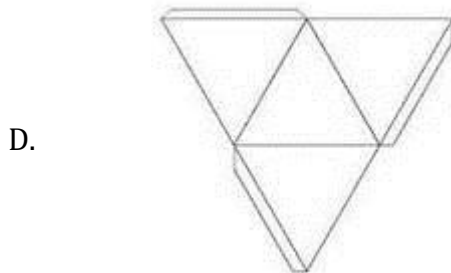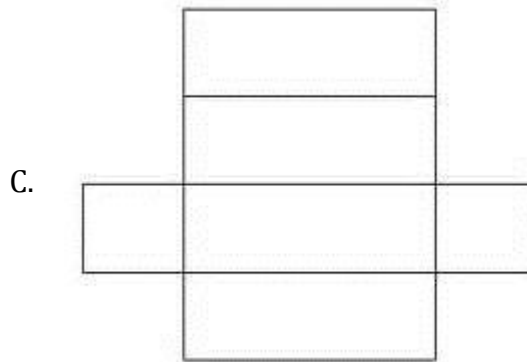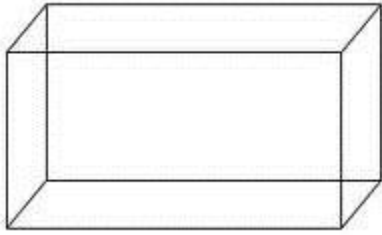
10. For what value of k, we have $7x^2 - 5x + k = -4$, given that x = -2,
    A. 22
    B. -42
    C. -22
    D. 42

11. In the figure given below, the measure of y is
    A. 30°
    B. 120°
    C. 130°
    D. 150°

12. -5 + 9 + (-5) + (-10) + (1) is equal to
   A. 13
    B. -13
    C. -10
    D. 10

Section B
(Questions 13 to 24 carry 2 marks each)

13. If $\dfrac{2x-1}{3} = \dfrac{x+2}{2}$, then find the value of x.

14. A family reduced the consumption of sugar from 10 kg to 8 kg per month due to increase in price. Find the percentage decrease in consumption.

15. Write the rational form of the decimal and represent it on a number line:
    (i) -0.25   (ii) 0.8

16. Find AB, if the area of the triangle ABC is 48 m² and the height CD is 12 m.
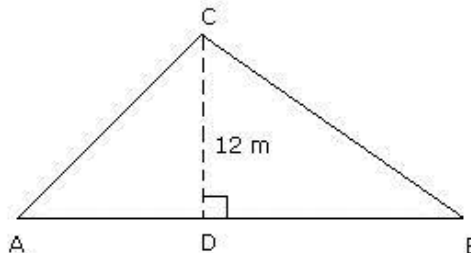
17. Simplify: 3(a + b) - 2(2a - b) + 4a - 7.

18. If $5^{2x+1} \div 25 = 125$, find the value of x.

19. Give an example of an alphabet which has 2 lines of symmetry as well as rotational symmetry of order 2.

20. Count the number of unit cubes in the following solid.
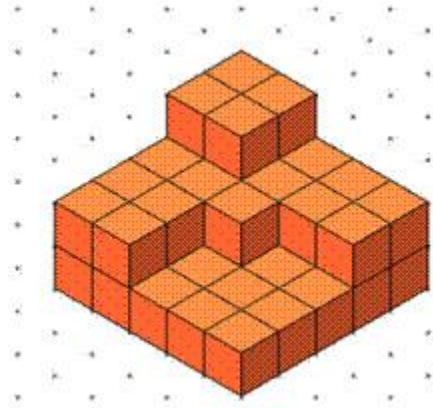
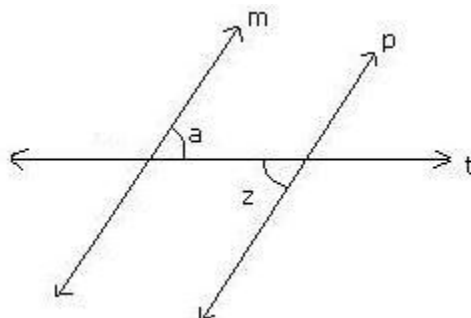**21.** Complete the following images whose one half and axis of symmetry is given.
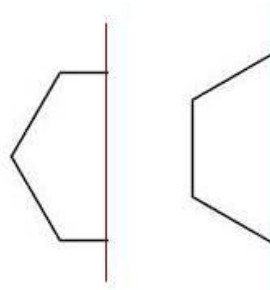
22. Express the following numbers in exponent form.
(i) 343000   (ii) 2048

23. A farmer sold $\dfrac{3}{5}$ of his $56\dfrac{1}{2}$ tons of hay. How many tons of hay did he sell?

24. In the figure below, lines m and p are parallel; t is a transversal.
If $\angle a = 57°$, then find $\angle z$.

Section C
(Questions 25 to 32 carry 3 marks each)

25. Raju owns a plot which is $1\frac{1}{3}$ acres in size. If the value of land in his area is Rs 48,000 per acre, what is the value of his plot?

26. Mohan purchased an old scooter for Rs 12000 and spent Rs 2850 on its overhauling. Then, he sold it to his friend Sohan for Rs 13860. How much percent did he gain or lose?

27. Draw an angle ABC of 60° such that BC = 3 cm, through B draw a line parallel to AB.

28. In triangle ABC, AC = 10 cm, BC = 4 cm and AD = 6 cm. Find the length of BL.
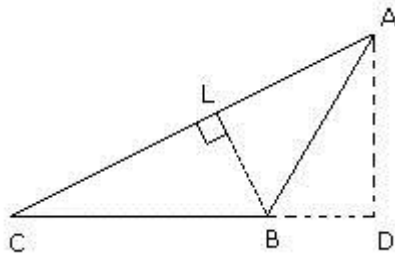
29. A wire is in the shape of a square of side 22 cm. If the wire is re-bent into a circle, find its radius. Also, find the area of circle.

30. A number is increased by 20% and then decreased by 20%. Find the net increase or decrease percent?

31. Construct triangle ABC where AB = 5 cm, BC = 3 cm and ∠ABC = 70°.

32. In ΔABC shown below, AD⊥BC, BE⊥AC and AD = BE. Prove that AE = BD.
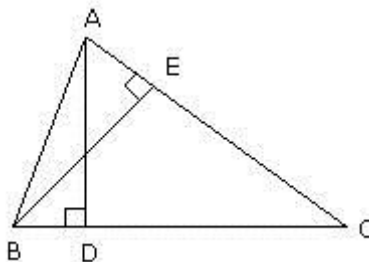
## Section D

(Questions 33 to 37 carry 4 marks each)

33. Draw a line l, take a point A above it. Construct a line through A and parallel to l.

34. Simplify:

(i) $\dfrac{a^2 \times a^3 \times b^3 \times b^4}{a^5 \times b^2}$

(ii) $\left(\dfrac{a^3}{b^4}\right)^2 \times \left(\dfrac{b^2}{a^3}\right)^3$

35. The given figure represents a rectangular lawn with a circular fountain in the centre. The dimensions of the lawn are 18 m × 14 m and the diameter of the fountain is 7 m. Find the area of the lawn excluding the flower bed area.
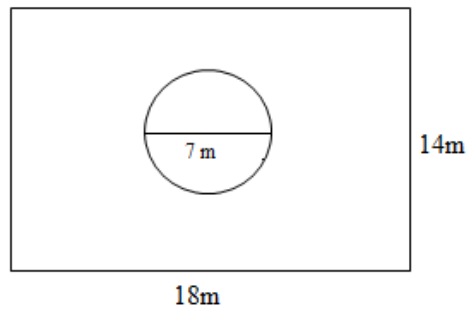
36. The percentage profit earned by selling an article for Rs. 1920 is equal to the percentage loss incurred by selling the same article for Rs. 1280. At what price should the article be sold to make 25% profit?

37. If the sum of the sides of a right triangle is 49 inches and the hypotenuse is 41 inches, find the two sides.

Time: 2 ½ hours   Total Marks: 80

Section A

1. Correct answer: B
    Discount = 40% on Rs 7000 = $\dfrac{4}{100} \times 7000$ = Rs 2800
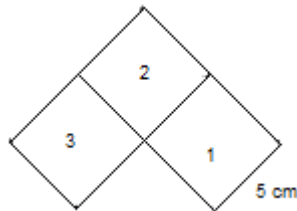   Therefore, SP = Rs (7000 - 2800) = Rs 4200.

2. Correct answer: A
    Since the numerators are equal, so the rational number with the least denominator is the greatest.

3. Correct answer: B
    Measure of one side.

4. Correct answer: C

    Perimeter of the figure = outer boundary of the figure

    = boundary of (1st square+2nd square+3rd square)

    = (5+5+5) + (5+5) + (5+5+5) cm

    = 40 cm

5. Correct answer: A
    $a \times a \times a \times a \times y \times y \times y \times y \times z \times z = a^4 y^4 z^2$

6. Correct answer: C
    Number of lines of symmetry of a regular polygon is equal to its number of sides.
    Since, regular heptagon has 7 sides, it has 7 lines of symmetry.

7. Correct answer: B
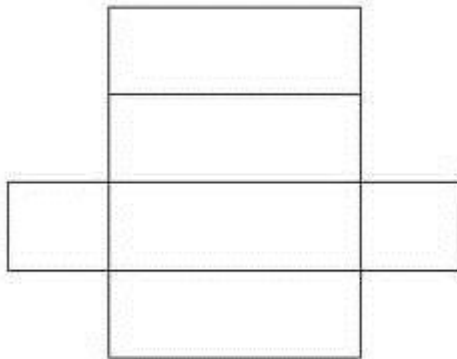
A number is chosen from numbers 1 to 5.

Odd numbers are 1, 3 and 5.

Required probability= $\dfrac{\text{Number of ways to choose an odd number}}{\text{Total number of numbers}} = \dfrac{3}{5}$

8. Correct answer: A

A regular hexagon has 1 centre of rotation.

9. Correct answer: C

10. Correct answer: B

Substituting the value of x in the given expression, we get:

$7 \times (-2)^2 - 5 \times (-2) + k = -4$

$28 + 10 + k = -4$

$38 + k = -4$

Thus, k = -42

11. Correct answer: D

Since, the angle measuring 150° and y are corresponding angles. Therefore, y = 150°.

(As the lines are parallel, corresponding angles are equal)

12. Correct answer: C

-5 + 9 + (-5) + (-10) + (1)

-5 + 9 = 4

4 + (-5) = -1

-1 + (-10) = -1 - 10 = -11

-11 + 1 = -10

So, -5 + 9 + (-5) + (-10) + (1) = -10

Section B

13. $\dfrac{2x-1}{3} = \dfrac{x+2}{2}$

Multiply both sides by 6 (L.C.M of 3 and 2)

2 (2x -1) = 3 (x + 2)

4x - 2 = 3x + 6

Transpose 3x to L.H.S and -2 to R.H.S

4x -3x = 6 + 2

x = 8

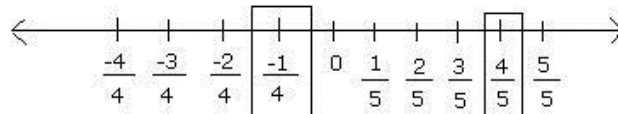**14.** Decrease in consumption = 10 - 8 = 2 kg

Therefore,

$$\text{Percentage Decrease} = \left(\frac{\text{Decrease in value}}{\text{Original value}} \times 100 \right)\%$$

$$= \frac{2}{10} \times 100 = 20\%$$

15. The rational form of the given decimals are:

(i) -0.25 = $\dfrac{-25}{100}$ = $\dfrac{-5}{20}$ = $\dfrac{-1}{4}$

(ii) 0.8 = $\dfrac{8}{10}$ = $\dfrac{4}{5}$

The rational numbers obtained above can be represented as follows:

16. Area of the triangle ABC = 48 m²

Height, CD = 12 m

Area = $\dfrac{1}{2}$ x base x height

48 = $\dfrac{1}{2}$ x AB x 12

6 x AB = 48

AB = 8 m

Thus, base AB = 8 m

17. Consider:

3(a + b) - 2(2a - b) + 4a - 7

= 3a + 3b - 4a + 2b + 4a - 7

= (3a - 4a + 4a) + (2b + 3b) - 7

= 3a + 5b - 7

18. We have,

$$5^{2x+1} \div 25 = 125$$

$$\Rightarrow 5^{2x+1} \div (5 \times 5) = 5 \times 5 \times 5$$

$$\Rightarrow 5^{2x+1} \div 5^2 = 5^3$$

$$\Rightarrow 5^{2x+1-2} = 5^3$$

$$\Rightarrow 5^{2x-1} = 5^3$$

Since bases are equal, powers are also equal.

$$\therefore 2x - 1 = 3$$

$$\Rightarrow 2x = 3 + 1 = 4$$

$$\Rightarrow x = \frac{4}{2} = 2$$

Hence, x = 2

19. The alphabet is H

It has 2 lines of symmetry as shown below:

After rotating the letter H through 180º, we find that the image remains same. So the order of rotational symmetry is 2.

90^0 180^0 270^0 360^0
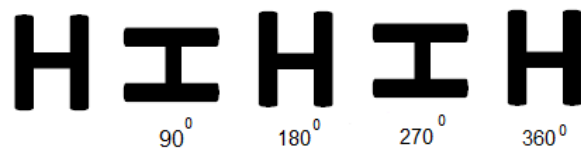
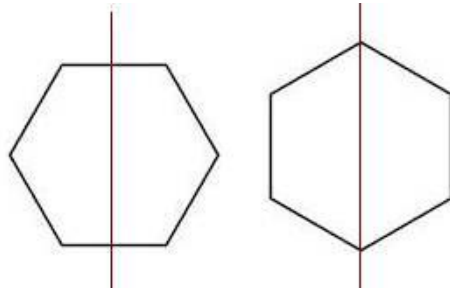**20.** Number of cubes in the first layer = 5 x 5 = 25

Number of cubes in the second layer = 13 + 4 = 17

Number of cubes in third layer = 4

Hence, total number of cubes = 25 + 17 + 4 = 46

21. Drawing the relational part, the images become as follows:

22.

    i. $343000 = 343 \times 1000$
           $= 7 \times 7 \times 7 \times 10 \times 10 \times 10$
           $= 7^3 \times 10^3$

    ii. $2048 = 2 \times 1024$
           $= 2 \times 2 \times 512$
           $= 2 \times 2 \times 2 \times 256$
           $= 2 \times 2 \times 2 \times 2 \times 128$
           $= 2 \times 2 \times 2 \times 2 \times 2 \times 64$
           $= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 32$
           $= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 16$
           $= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 8$
           $= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$
           $= 2^{11}$

23. Total tons of hay owned by the farmer = $56\frac{1}{2}$ tons

Amount of hay sold by him = $\frac{3}{5}$ of $56\frac{1}{2}$ tons

i.e. $\frac{3}{5} \times 56\frac{1}{2}$ ['of' means multiplication]

$$= \frac{3}{5} \times \frac{113}{2}$$
$$= \frac{3 \times 113}{5 \times 2}$$
$$= \frac{339}{10}$$
$$= 33\frac{9}{10}$$

Thus, the farmer sold $33\frac{9}{10}$ tons of hay.

24. Given that, m ∥ p and t is the transversal.
We know that if two parallel lines are cut by a transversal, each pair of alternate interior angles are equal.
So, ∠a = ∠z (pair of alternate interior angles)
Thus, ∠z = 57°.

Section C

25. This is a problem of multiplication of rational numbers.

Size of Raju's plot = $1\frac{1}{3}$ acres

Value of land per acre = Rs. 48,000 per acre

So, value of Raju's plot = Rs. 48000 × $1\frac{1}{3}$ = Rs. 48000 × $\frac{4}{3}$ = Rs. (16000 × 4)

= Rs. 64,000
Thus, the value of Raju's land is Rs. 64,000.

26. Cost Price of the scooter = Rs. 12000
Overheads = Rs. 2850
Total cost price = Rs. (12000 + 2850) = Rs. 14850
Selling Price = Rs. 13860
Since CP > SP, Mohan suffers a loss.
Loss = Rs. (14850 - 13860) = Rs. 990

$$\text{Loss\%} = \left(\frac{\text{loss}}{\text{total CP}} \times 100\right)\%$$

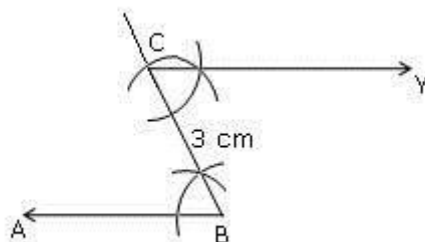$$= \left(\frac{990}{14850} \times 100\right)\%$$

$$= 6\frac{2}{3}\%$$

27. Steps of construction:
1. Draw an angle ABC of 60°.
2. Cut BC = 3 cm.
3. Through C, draw a line parallel to AB by making an angle of 60° on BC, as shown.
4. Hence, CY is parallel to AB.

28. Given that, in ΔABC,
BC = base = 4 cm;
AD = height = 6 cm
Area of triangle ABC

$= \dfrac{1}{2} \times b \times h$

$= \dfrac{1}{2} \times 4 \times 6$

$= 12 \text{ cm}^2$

Also, in ΔABC,
AC = base = 10 cm;
BL = height = h (say)
Area = 12 cm²

Area of triangle $= \dfrac{1}{2} \times b \times h$

$12 = \dfrac{1}{2} \times 10 \times h$

$5h = 12$

$h = \dfrac{12}{5} = 2.4 \text{ cm}$

Thus, the height (BL) of the triangle = 2.4 cm

29. Given that the side of the square = 22 cm
Length of the wire = perimeter of the square = 4 × side = 4 × 22 = 88 cm
Since the same wire is used to make the circle, both will have the same perimeter.
So, perimeter of the circle = 88

$2\pi r = 88$

$\Rightarrow \dfrac{44}{7}r = 88$

$\Rightarrow r = \dfrac{88 \times 7}{44} = 14 \text{ cm}$

Thus, radius of circle = 14 cm

Now, area of circle $= \pi r^2 = \dfrac{22}{7} \times 14 \times 14 = 616 \text{ cm}^2$

30.

Let the given number be x.

Increased number = 120% of x = $\dfrac{120}{100} \times x = \dfrac{6x}{5}$

Decreased number = 80% of $\dfrac{6x}{5} = \left(\dfrac{80}{100} \times \dfrac{6x}{5}\right) = \dfrac{24x}{25}$
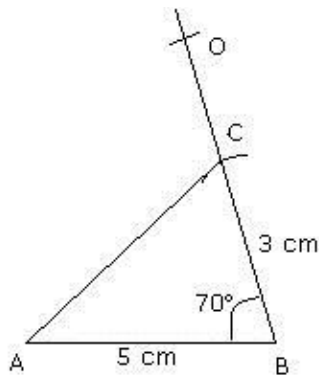
Net decrease = $\left(x - \dfrac{24x}{25}\right) = \dfrac{x}{25}$

Net decrease percent = $\left(\dfrac{x}{25} \times \dfrac{1}{x} \times 100\right)\% = 4\%$

Hence, net decrease percent = 4%

31. Steps of construction:
1. Draw a line segment AB = 5 cm.
2. Draw an angle of 70° at B.
3. Cut BC = 3 cm on BO.
4. Join AC.
5. Hence, ABC is the required triangle.

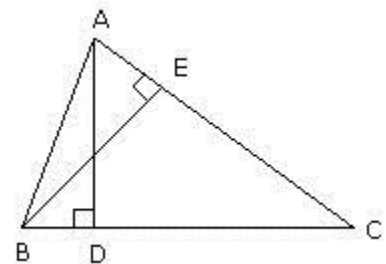**32.** Given: AD $\perp$ BC, BE $\perp$ AC and
AD = BE
To prove: AE = BD
Proof:
$\angle$ADB = $\angle$BEA (right angles)

AB = AB (common)
AD = BE (given)
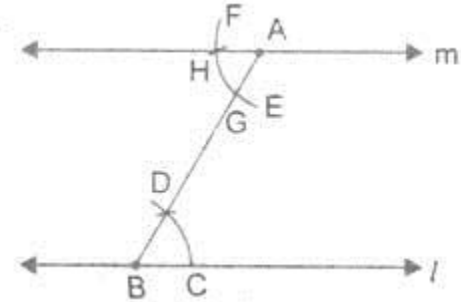Thus, $\triangle$ABD $\cong \triangle$BAE (By RHS congruence rule).
Hence, BD = AE (As corresponding parts of congruent triangles are equal)

Section D

33. Steps of constructions:

1. Draw a line ▯ of any length and take a point A above it.

2. Take any point B on ▯ and join AB.

3. Taking B as a centre and any small radius draw an arc CD.

4. With the same radius and A as a centre, draw an arc EF which cut AB at G.

5. Measure the arc CD using compass and with same measure cut the arc EF from G to H.

6. Join the points AH and extend in both the directions, name this line as m.

7. Now, m is the required parallel line.

34.

1.

(i) $\dfrac{a^2 \times a^3 \times b^3 \times b^4}{a^5 \times b^2}$	(ii) $\left(\dfrac{a^3}{b^4}\right)^2 \times \left(\dfrac{b^2}{a^3}\right)^3$
$= \dfrac{a^{2+3} \times b^{3+4}}{a^5 \times b^2}$	$= \dfrac{\left(a^3\right)^2}{\left(b^4\right)^2} \times \dfrac{\left(b^2\right)^3}{\left(a^3\right)^3}$
$= \dfrac{a^5 \times b^7}{a^5 \times b^2}$	$= \dfrac{a^6}{b^8} \times \dfrac{b^6}{a^9}$
$= a^{5-5} \times b^{7-2}$	$= \dfrac{a^6}{a^9} \times \dfrac{b^6}{b^8}$
$= a^0 \times b^5$	$= a^{6-9} \times b^{6-8}$
$= 1 \times b^5$	$= a^{-3} \times b^{-2}$
$= b^5$	

35. In a rectangle, l = 18, b = 14m

Area of rectangle = l x b = 18 x 14 = 252 m²

For the circular fountain, d = 7 m i.e. r = 3.5 m

Area of circular fountain = πr² $= \dfrac{22}{7} \times \dfrac{7}{2} \times \dfrac{7}{2}$ = 38.5 m²

Area of the lawn excluding the fountain = 252 – 38.5 = 213.5 m²

If SP = Rs. 1920, then

$$\text{Profit \%} = \frac{\text{Profit}}{\text{CP}} \times 100$$

Thus, Profit % = $\dfrac{1920 - x}{x} \times 100$

If SP = Rs 1280, then

$$\text{Loss \%} = \frac{\text{Loss}}{\text{CP}} \times 100$$

Thus, loss % = $\dfrac{x - 1280}{x} \times 100$

As given in the question,

$$\frac{1920 - x}{x} \times 100 = \frac{x - 1280}{x} \times 100$$
$$\Rightarrow 1920 - x = x - 1280$$
$$\Rightarrow 2x = 3200$$
$$\Rightarrow x = 1600$$

Therefore, required SP = 125% of Rs. 1600
i.e.

$$Rs.\left(\frac{125}{100} \times 1600\right) = Rs.2000$$

37. Let 'a' and 'b' be the lengths of the two shorter sides.
The sum is a + b = 49.
So, a = 49 - b
Using the Pythagorean Theorem:
Perpendicular^2 + Base^2 = hypotenuse^2
$(49 - b)^2 + b^2 = 41^2$ (by substitution)
$2401 - 98b + b^2 + b^2 = 1681$
$2b^2 - 98b + 720 = 0$ (take 2 common from L.H.S)
$b^2 - 49b + 360 = 0$
$(b - 9)(b - 40) = 0$
b = 9 or b = 40
In this case, either solution will do.
If b = 9, then a = 49 - b = 49 - 9 = 40.
Or if b = 40, then a = 49 - b = 49 - 40 = 9.
Thus, one side is 40 inches long, and the other side is 9 inches long.