# CBSE Board
# Class VII Mathematics

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. When two positive integers are added we get a _____ integer.
   A. Positive
   B. Negative
   C. Either positive or negative
   D. None of above

2. A _____ is a fraction that represents a part of a whole.
   A. improper fraction
   B. proper fraction
   C. mixed fraction
   D. None of above

3. On a number line when we add a positive integer….
   A. we move to the left
   B. we move to the right
   C. we move to the origin
   D. we move away from origin

4. An _____ is a combination of whole and a proper fraction.
   A. improper fraction
   B. proper fraction
   C. mixed fraction
   D. None of above

5. Two vessels contain 20 litres and 60 litres of milk respectively. What is the amount that each vessel would have, if both share the milk equally?
   A. 50
   B. 40
   C. 30
   D. 20

6. A _____ takes on different numerical values; its value is not fixed.
   A. Constant
   B. Variable
   C. Alphabets
   D. None of above

7. A batsman scored the following number of runs in six innings: 36, 35, 50, 46, 60, 55 Calculate the mean runs scored by him in an inning.
   A. 45
   B. 46
   C. 47
   D. 48

8. An _____ is a condition on a variable. The condition is that two expressions should have equal value.
   A. expression
   B. Identity
   C. equation
   D. None

9. When the sum of the measures of two angles is 90°, the angles are called….
   A. Right angles
   B. Adjacent angles
   C. Supplementary angles
   D. Complementary angles

10. A _____ connects a vertex of a triangle to the mid-point of the opposite side.
   A. altitude
   B. median
   C. angle bisector
   D. perpendicular bisector

11. which of the following are not test of congruency
    A. SSS
    B. AAS
    C. SAS
    D. AAA

12. Find the ratio of 3 km to 300 m.
    A. 10 : 1
    B. 1 : 10
    C. 1 : 100
    D. 100 : 1

## Section B

**(Questions 13 to 24 carry 2 marks each)**

13. Use the sign of >, < or = in the box to make the statements true.

| | | |
|---|---|---|
| $(a)(-8)+(-4)$ | $\square$ | $(-8)-(-4)$ |
| $(b)(-3)+7-(19)$ | $\square$ | $15-8+(-9)$ |
| $(c)23-41+11$ | $\square$ | $23-41-11$ |
| $(d)39+(-24)-(15)$ | $\square$ | $36+(-52)-(-36)$ |
| $(e)-231+79+51$ | $\square$ | $-399+159+18$ |

14. In a quiz, team A scored – 40, 10, 0 and team B scored 10, 0 – 40 in three successive rounds. Which team scored more? Can we say that we can add integers in any order?

15. Solve:

(i) $2-\frac{3}{5}$ (ii) $4+\frac{7}{8}$

16. Multiply and reduce to lowest form:

(i) $7\times\frac{3}{5}$ (ii) $4\times\frac{1}{3}$

17. The marks (out of 100) obtained by a group of students in a science test are 85, 76, 90, 85, 39, 48, 56, 95, 81 and 75. Find the:

    (i) Highest and the lowest marks obtained by the students.

    (ii) Range of the marks obtained.

    (iii) Mean marks obtained by the group.

18. The scores in mathematics test (out of 25) of 15 students is as follows:

    19, 25, 23, 20, 9, 20, 15, 10, 5, 16, 25, 20, 24, 12, 20

    Find the mode and median of this data. Are they same?

19. Solve the following equations by trial and error method:

    (i) $5p + 2 = 17$ (ii) $3m - 14 = 4$

20. Solve the following equations

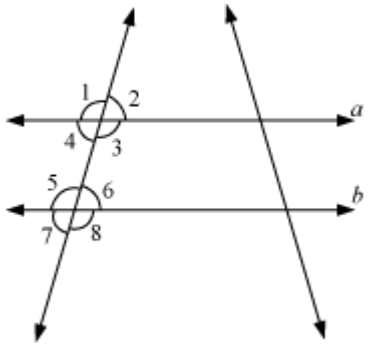
    (i) $2q - 6 = 0$ (ii) $2q + 6 = 0$

21. State the property that is used in each of the following statements?

    (i) If $a \parallel b$, then $\angle 1 = \angle 5$

    (ii) If $\angle 4 = \angle 6$, then $a \parallel b$

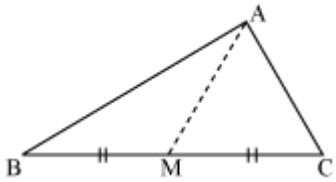
    (iii) If $\angle 4 + \angle 5 = 180°$, then $a \parallel b$



22. AM is a median of a triangle ABC.

    Is AB + BC + CA > 2 AM?

    (Consider the sides of triangles ΔABM and ΔAMC.)




23. In ΔABC, ∠A = 30°, ∠B = 40° and ∠C = 110°

    In ΔPQR, ∠P = 30°, ∠Q = 40° and ∠R = 110°

    A student says that ΔABC ≅ ΔPQR by AAA congruence criterion. Is he justified? Why or why not?

24. Out of 15, 000 voters in a constituency, 60% voted. Find the percentage of voters who did not vote. Can you now find how many actually did not vote?

## Section C

**(Questions 25 to 32 carry 3 marks each)**

25. An elevator descends into a mine shaft at the rate of 6 m/min. If the descent starts from 10 m above the ground level, how long will it take to reach – 350 m.

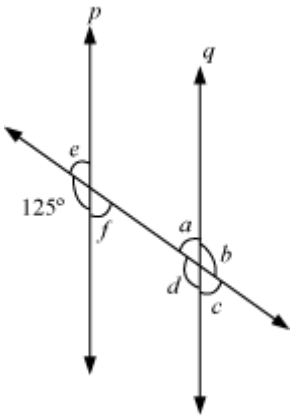
26. A vehicle covers a distance of 43.2 km in 2.4 litres of petrol. How much distance will it cover in one litre of petrol?

27. A coin is flipped to decide which team starts the game. What is the probability that your team will start?

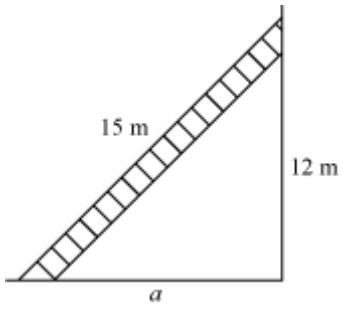
28. Solve the following:

    The teacher tells the class that the highest marks obtained by a student in her class is twice the lowest marks plus 7. The highest score is 87. What is the lowest score?

29. In the adjoining figure, $p \parallel q$. Find the unknown angles.




30. A 15 m long ladder reached a window 12 m high from the ground on placing it against a wall at a distance $a$. Find the distance of the foot of the ladder from the wall.




31. In $\Delta ABC$, $\angle A = 30°$, $\angle B = 40°$ and $\angle C = 110°$

    In $\Delta PQR$, $\angle P = 30°$, $\angle Q = 40°$ and $\angle R = 110°$

    A student says that $\Delta ABC \cong \Delta PQR$ by AAA congruence criterion. Is he justified? Why or why not?

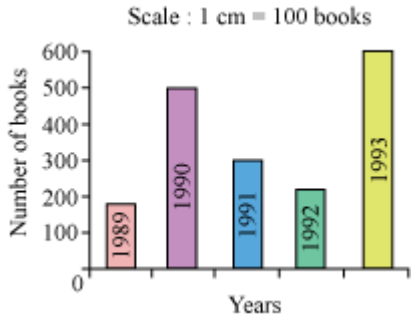
32. What rate gives Rs 280 as interest on a sum of Rs 56,000 in 2 years?

## Section D

**(Questions 33 to 37 carry 4 marks each)**

33. Read the bar graph (see the given figure) and answer the questions that follow:

Number of books sold by a bookstore during five consecutive years.



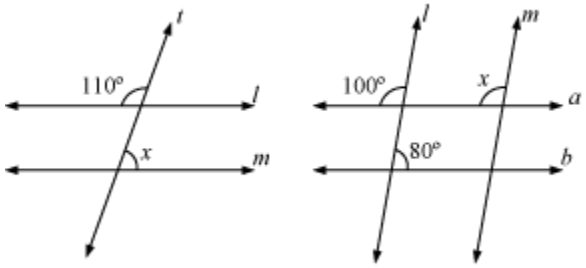

(i) About how many books were sold in 1989? 1990? 1992?

(ii) In which year were about 475 books sold? About 225 books sold?

(iii) In which years were fewer than 250 books sold?

(iv) Can you explain how you would estimate the number of books sold in 1989?

34. Find the value of $x$ in each of the following figures if $l \parallel m$.

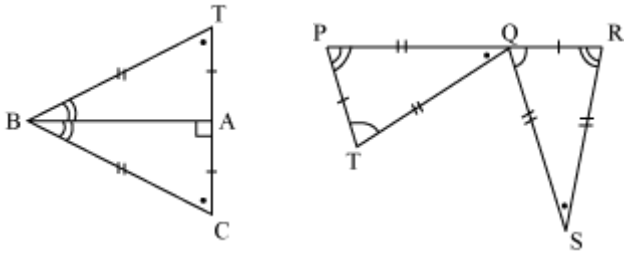



35. Find the perimeter of the rectangle whose length is 40 cm and a diagonal is 41 cm.

36. Complete the congruence statement:

$\Delta BCA \cong ?$

$\Delta QRS \cong ?$




37. Find the amount to be paid at the end of 3 years in each case:

(a) Principal = Rs 1,200 at 12% p.a.

(b) Principal = Rs 7,500 at 5% p.a.

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## Solution

Time: 2 ½ hours Total Marks: 80

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## Section A

1. Correct answer: A
   For example:
   (a) 56 + 73 = 129
   (b) 113 + 82 = 195

2. Correct answer: B
   A proper fraction is a fraction that represents a part of a whole.

3. Correct answer: B
   On a number line when we add a positive integer we move to the right
   Towards or away from origin depends on the number to which it is added.

4. Correct answer: A
   An improper fraction is a combination of whole and a proper fraction.

5. Correct answer: B
   Average of both
   $= \frac{60+20}{2} = 40$

6. Correct answer: B
   A variable takes on different numerical values; its value is not fixed. Variables are denoted usually by letters of the alphabets, such as x, y, z, l, m, n, p, etc.

7. Correct answer: C
   Total runs = 36 + 35 + 50 + 46 + 60 + 55 = 282.
   To find the mean, we find the sum of all the observations and divide it by the number of observations.
   Therefore, in this case, mean = $\frac{282}{6} = 47$

8. Correct answer: C
   an equation is a condition on a variable. The condition is that two expressions should have equal value. Note that at least one of the two expressions must contain the variable.

9. Correct answer: D
   When the sum of the measures of two angles is 90°, the angles are called complementary angles.

10. Correct answer: B
    A median connects a vertex of a triangle to the mid-point of the opposite side.

11. Correct answer: D
    The tests of congruency are
    SSS
    SAS
    AAS,SAA,ASA (all same)

12. Correct answer: A
    First convert both the distances to the same unit.
    So, 3 km = 3 × 1000 m = 3000 m.
    Thus, the required ratio, 3 km : 300 m is 3000 : 300 = 10 : 1.

## Section B

13.

(a)

$$(-8)+(-4)\square(-8)-(-4)$$
$$\Rightarrow -8-4 \quad \square -8+4$$
$$\Rightarrow -12 < -4$$

(b)

$$(-3)+7-(19)\ \square 15-8+(-9)$$
$$\Rightarrow -3+7-19\ \square 15-8-9$$
$$\Rightarrow -15 < -2$$

(c)

$$23-41+11 \square 23-41-11$$
$$\Rightarrow -7 > -29$$

(d)

$$39+(-24)-(15) \square 36+(-52)-(-36)$$
$$\Rightarrow 39-24-15 \quad \square 36-52+36$$
$$\Rightarrow 0 < 20$$

(e)

$$-231+79+51 \square -399+159+81$$
$$\Rightarrow -101 > -159$$

14. The numbers in ascending order are:
Team A scored: – 40, 10, 0

Total score = – 40 + 10 + 0 = – 30

Team B scored: 10, 0, – 40

Total score = 10 + 0 + (– 40)= – 30

$\therefore$ The scores of both teams are equal.

Yes, we can add integers in any order. As we had observed that the scores obtained by both teams in successive rounds were numerically equal but different in order, yet total score of both teams were equal.

15. (i) $2-\frac{3}{5}=\frac{2\times5}{5}-\frac{3}{5}=\frac{10-3}{5}=\frac{7}{5}$

(ii) $4+\frac{7}{8}=\frac{4\times8}{8}+\frac{7}{8}=\frac{(4\times8)+7}{8}=\frac{39}{8}=4\frac{7}{8}$

16.

(i) $7 \times \frac{3}{5} = \frac{21}{5} = 4\frac{1}{5}$

(ii) $4 \times \frac{1}{3} = \frac{4}{3} = 1\frac{1}{3}$

17. We may arrange the marks obtained by group of student in a science test in an ascending order as following –39, 48, 56, 75, 76, 81, 85, 85, 90, 95

(i) Highest marks = 95 Lowest marks = 39

(ii) Range = 95 – 39 = 56

(iii) Mean marks = $\frac{(85+76+90+85+39+48+56+95+81+75)}{10} = \frac{730}{10} = 73$

18. Scores of 15 students in mathematics test are –

19, 25, 23, 20, 9, 20, 15, 10, 5, 16, 25, 20, 24, 12, 20

By arranging these scores in an ascending order

5, 9, 10, 12, 15, 16, 19, 20, 20, 20, 20, 23, 24, 25, 25

Mode of a given data is that value of observation which occurs for the most number of times and the median of the given data is the middle observation while the data is arranged in an ascending or descending order.

As here are 15 terms in the given data so the median of this data will be 8th observation.

Hence, median = 20

Also we may find that 20 occurs 4 times (i.e. maximum number of times).

So, mode of this data = 20.

Yes, both are same.

19.

(i) $5p + 2 = 17$

Put $p = 1$ in L.H.S

$(5 \times 1) + 2 = 7 \neq$ R.H.S

Put $p = 2$ in L.H.S

$(5 \times 2) + 2 = 10 + 2 = 12 \neq$ R.H.S

Put $p = 3$ in L.H.S

$(5 \times 3) + 2 = 17 =$ R.H.S

Hence $p = 3$ is a solution of the given equation.

(ii) $3m - 14 = 4$

Put $m = 4$,

$(3 \times 4) - 14 = -2 \neq$ R.H.S

Put $m = 5$

$(3 \times 5) - 14 = 1 \neq$ R.H.S

Put $m = 6$

$(3 \times 6) - 14 = 18 - 14 = 4 =$ R.H.S

Hence, $m = 6$ is a solution of the given equation.

20.

(i) $2q - 6 = 0$

$2q - 6 + 6 = 0 + 6$

$2\,q = 6$

$$\frac{2q}{2} = \frac{6}{2}$$

$$q = 3$$

(ii) $2q + 6 = 0$

$2q + 6 - 6 = 0 - 6$

$2\,q = -6$

$$\frac{2q}{2} = \frac{-6}{2}$$

$$q = -3$$

21.

(i) Corresponding angles property

(ii) Alternate interior angles property

(iii) Interior angles on the same side of transversal are supplementary.

22. In a triangle sum of lengths of either two sides is always greater than the third side. Now we may find that

    For $\Delta$ ABM

    AB + BM > AM (i)

    Similarly, for $\Delta$ ACM

    AC + CM > AM (ii)

    Adding equation (i) and (ii)

    AB + BM + MC + AC > AM + AM

    AB + BC + AC > 2AM

    Yes, the given expression is true.

23. No, as this property represents that these triangles are having their respective angles of equal measure but this gives no information about their sides. The sides of these triangles may have a ratio somewhat different than 1:1. So, AAA property doesn't prove two triangles congruent.

24. Percentage of voters who voted = 60 %

    Those who did not vote = 100 % – 60 % = 40 %

    Number of people who didn't vote = 40 % of 15000

$$= \frac{40}{100} \times 15000 = 6000$$

    So, 6000 people didn't vote.

## Section C

25. Distance descended is denoted by a negative integer.

Initial height = +10 m

Final depth = – 350 m

Total distance to be descended by the elevator = (– 350) – (+10) = –360 m

Time taken by the elevator to descend – 6 m = 1 min

Thus, time taken by the elevator to descend –360 m = (–360) ÷ (–6)

= 60 minutes = 1 hour

26. Distance covered in 2.4 litres of petrol = 43.2 km

$\therefore$ Distance covered in 1 litre of petrol = $43.2 \div 2.4 = \frac{432}{10} \div \frac{24}{10} = \frac{432}{10} \times \frac{10}{24} = 18$

So, vehicle will cover 18 km. in 1 l petrol.

27. A coin has two faces– Head and Tail. Now one team can opt as either Head or Tail.

Probability = $\frac{\text{number of favourable outcomes}}{\text{number of possible outcomes}}$

Probability (our team start first) = $\frac{1}{2}$

28. Let the lowest score be $l$.

2 × lowest marks + 7 = highest marks

$2l + 7 = 87$

$2l = 87 - 7$ (Transposing 7 to RHS)

$2l = 80$

Dividing both sides by 2

$$\frac{2l}{2} = \frac{80}{2}$$
$$l = 40$$

So, lowest score is 40.

29. $\angle d = 125°$ (corresponding angles)

$\angle e = 180° - 125° = 55°$ (linear pair)

$\angle f = \angle e = 55°$ (vertically opposite angles)

$\angle c = \angle f = 55°$ (corresponding angles)

$\angle a = \angle e = 55°$ (corresponding angles)

$\angle b = \angle d = 125°$ (vertically opposite angles)

30. By applying Pythagoras theorem

$(15)^2 = (12)^2 + a^2$

$225 = 144 + a^2$

$a^2 = 225 - 144 = 81$

$a = 9$ m

So, the distance of the foot of the ladder from the wall is 9m.

31. No, as this property represents that these triangles are having their respective angles of equal measure but this gives no information about their sides. The sides of these triangles may have a ratio somewhat different than 1:1. So, AAA property doesn't prove two triangles congruent.

32.

$$S.I = \frac{P \times R \times T}{100}$$

$$280 = \frac{56000 \times R \times 2}{100}$$

$$R = \frac{280}{560 \times 2} = \frac{1}{4} = 0.25$$

So, 0.25 % gives Rs 280 as interest on the given sum.

## Section D

33.

(i) In 1989, 175 books were sold. In 1990, 475 books were sold. In 1992, 225 books were sold.

(ii) From the graph, we can conclude that 475 books were sold in the year 1990 and 225 books were sold in the year 1992.

(iii) From the graph, we can see that in the years 1989 and 1992, the number of books sold were less than 250.

(iv) From the graph we can conclude that the number of books, sold in the year 1989 is about 1 and $\frac{3}{4}$th part of 1 cm.

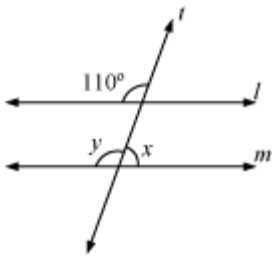
We know that the scale is taken as 1 cm = 100 books.

$100 + \frac{3}{4} \times 100 = 100 + 75 = 175$

So, about 175 books were sold in the year 1989.

34.

(i)



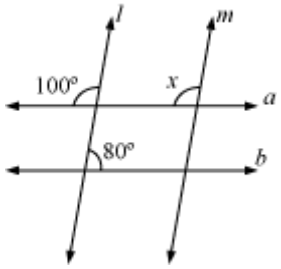

$\angle y = 110°$ (corresponding angles)

$\angle x + \angle y = 180°$ (linear pair)

$\angle y = 180° - 110°$

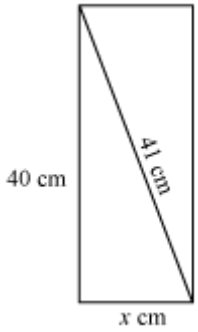
$= 70°$

(ii)




$\angle x = 100°$ (corresponding angles)

35.




We know that in a rectangle all interior angles are of 90º measure. So we can apply Pythagoras theorem here.

$(41)^2 = (40)^2 + x^2$

$1681 = 1600 + x^2$

$x^2 = 1681 - 1600 = 81$

$x = 9$ cm

Perimeter = 2(Length + Breadth)

$= 2(x + 40)$

$= 2\ (9 + 40)$

$= 98$ cm

36. Given that BC = BT

TA = CA

BA is common

So, $\Delta BCA \cong \Delta BTA$

Similarly PQ = RS

TQ = QS
PT = RQ

So, $\Delta QRS \cong \Delta TPQ$

37.

(a) Principal (P) = Rs 1200

Rate (R) = 12 % p.a

Time (T) = 3 years

$$\text{S.I.} = \frac{P \times R \times T}{100}$$

$$= \frac{1200 \times 12 \times 3}{100}$$

= Rs 432

Amount = P + S.I.

= 1200 + 432

= Rs 1632

(b) P = Rs 7500

R = 5% p.a

T = 3 years

$$\text{S.I.} = \frac{P \times R \times T}{100}$$

$$= \frac{7500 \times 5 \times 3}{100}$$

= Rs 1125

Amount = 7500 + 1125

= Rs 8625