



Grade 7



# CREST Mathematics Olympiad (CMO)

# Sample Paper

## Pattern and Marking Scheme

Grade	Topic/Section	No. of Questions	Marks per Question	Total Marks
Grade 7	Practical Mathematics	40	1	40
	Achiever's Section	10	2	20
<b>Grand Total</b>			<b>50</b>	<b>60</b>

The total duration of the exam is 60 minutes.

## Syllabus

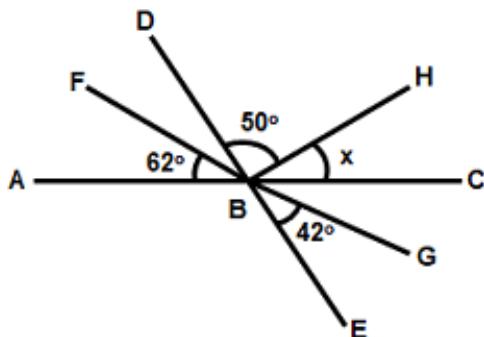
**Section 1:** Integers, Fractions and Decimals, Exponents and Powers, Algebraic Expressions, Simple Linear Equations, Lines and Angles, Comparing Quantities, The Triangle and its Properties, Symmetry, Congruence of Triangles, Rational Numbers, Perimeter and Area, Data Handling, Visualizing Solid Shapes, Practical Geometry.

**Achievers Section:** Higher Order Thinking Questions - Syllabus as per Section 1

For more details, visit <https://www.crestolympiads.com/math-olympiad-cmo>

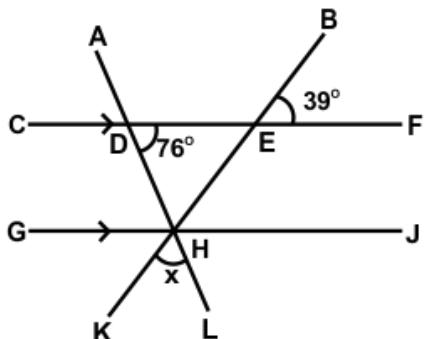
## Practical Mathematics (Each Question is 1 Mark)

1. Find the value of  $\angle x$ :



- a.  $26^\circ$
- b.  $36^\circ$
- c.  $42^\circ$
- d.  $54^\circ$

2. Find the value of  $\angle x$ :



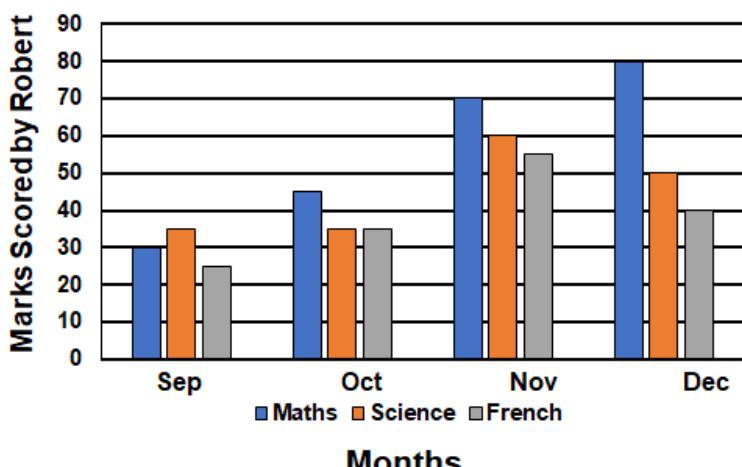
- a.  $46^\circ$
- b.  $49^\circ$
- c.  $58^\circ$
- d.  $65^\circ$

3. Fill in the blank:

If two angles and included side of one triangle are equal to two angles and the included side of the other triangle, then the triangles are congruent as per the \_\_\_\_\_

- a. SSS congruence property
- b. SAS congruence property
- c. ASA congruence property
- d. RHS congruence property

4. What fraction of the marks did he score in December to the total marks in Science?



- a.  $\frac{2}{9}$   
b.  $\frac{5}{18}$   
c.  $\frac{7}{18}$   
d.  $\frac{4}{9}$
5. A submarine submerges at the rate of 5 m per minute. If it descends from 20 m above the sea level, how long will it take to reach 250 m below the sea level?
- a. 48 minutes  
b. 54 minutes  
c. 62 minutes  
d. 78 minutes
6. The LCM of two numbers is 45 times their HCF. If one of the numbers is 125 and the sum of HCF and LCM is 1150, the other number is:
- a. 215  
b. 220  
c. 225  
d. 235
7. Which of the following numbers are cubes of rational numbers?  
( $\frac{27}{64}$ ,  $\frac{125}{128}$ , .001331, 0.04)
- a.  $\frac{27}{64}$ , .001331  
b.  $\frac{125}{128}$   
c. 0.04  
d. None of these
8. A class has girls and boys in a ratio of 4:5. Among the girls, the ratio of mathematics to physics students is 3:1. If the ratio of mathematics and physics students in the entire class is 3:2, then what percentage of class comprises girls studying mathematics?
- a. 33.3%  
b. 30%  
c. 25%  
d. 18%
9. The cash difference between the selling prices of an article at a profit of 4% and 6% is \$3. The ratio of these two selling prices is:
- a. 51:52  
b. 52:53  
c. 51:53  
d. 52:55
10. The sum of money that will amount to \$5105 in  $6\frac{1}{2}$  years at  $4\frac{1}{4}$  per cent per annum simple interest is:
- a. \$3600  
b. \$4500  
c. \$4000  
d. \$4400
11. The sum of three consecutive even numbers is 24. If the smallest of the three numbers is n, then find the largest number.
- a. 6  
b. 8  
c. 10  
d. 12

**12.** If two numbers are in the ratio 2:3 and the product of their HCF and LCM is 33750, then the sum of the numbers is:

- a. 250
- b. 425
- c. 325
- d. 375

**13.** Which of the following is not the reciprocal of  $(2/3)^4$ ?

- a.  $(3/2)^4$
- b.  $(2/3)^{-4}$
- c.  $(3/2)^{-4}$
- d.  $3^4/4^2$

**14.** 40% of 60% of  $3/5^{\text{th}}$  of a number is 504. What is 25% of  $2/5^{\text{th}}$  of that number?

- a. 180
- b. 175
- c. 360
- d. 350

**15.** LM is a straight line and O is a point on LM. Line ON is drawn not coinciding with OL or OM. If  $\angle MON$  is three times of  $\angle LON$ , then  $\angle MON$  is equal to:

- a.  $45^{\circ}$
- b.  $60^{\circ}$
- c.  $105^{\circ}$
- d.  $135^{\circ}$

**16.** 1500 sheets are required to make 100 notebooks. How many sheets will be required to make 12 notebooks?

- a. 180
- b. 200
- c. 120
- d. 100

**17.** Ross scored 61 out of 100 in English, 93 out of 100 in Maths and 56 out of 100 in Science. Find out his overall % of marks.

- a. 60%
- b. 70%
- c. 75%
- d. 80%

**18.** The population of a village increases at the rate of 5% p.a. If the present population is 8000, then after how many years the population will be 9261?

- a. 2 years
- b. 3 years
- c.  $3 \frac{1}{2}$  years
- d. 4 years

**19.** A shopkeeper has just enough money to buy 52 cycles worth \$525 each. If each cycle costs \$21 more, then the number of cycles, he will be able to buy with that amount of money, is \_\_\_\_\_.

- a. 40
- b. 30
- c. 50
- d. 20

**20.** Factorisation of  $15x^2 - 26x + 8$  is:

- a.  $(3x - 4)(5x - 2)$
- b.  $(3x + 4)(5x + 2)$
- c.  $(3x - 4)^2$
- d.  $(5x - 2)^2$

**21.** A total of 500 pieces of sweets is to be divided among Reo, Sia, and Ken, respectively in the ratio of 3:8:14. How many pieces of sweets will Reo get?

- a. 60
- b. 80
- c. 160
- d. 280

**22.** Which of the following represents statistical data?

- a. The name of owners of shops located in a shopping complex
- b. A list giving the names of all states of India
- c. A list of all European countries and their respective capital cities
- d. The volume of rainfall in a certain geographical area recorded every month for 24 consecutive months

**23.** The product of two numbers is  $16/3$ . If one of the numbers is  $26/3$ , then find the other number.

- a.  $1/13$
- b.  $8/13$
- c.  $9/13$
- d.  $16/9$

**24.** Two numbers are in the ratio 17:45. One-third of the smaller is less than One-fifth of the bigger by 15. The smaller number is:

- a.  $25 \frac{1}{2}$
- b.  $67 \frac{1}{2}$
- c.  $76 \frac{1}{2}$
- d.  $86 \frac{1}{2}$

**25.** Father is 5 years older than the mother and the mother's age is now thrice the age of her daughter. The daughter is now 10 years old. What was the father's age when the daughter was born?

- a. 20 years
- b. 15 years
- c. 25 years
- d. 30 years

**26.** In a particular type of fertilizer, the ratio of two chemicals A and B is 2:5. In 21 kg of this fertilizer, if 3 kg of A is added, then what will be the ratio of A to B in the new fertilizer?

- a. 1:1
- b. 2:3
- c. 3:5
- d. 4:5

**27.** The ratio of the length and breadth of a rectangle is 5:2, respectively. The respective ratio of its perimeter and area is 1:3 (irrespective of the unit). What is the length of the rectangle?

- a. 27 units
- b. 32 units
- c. 21 units
- d. 84 units

**28.** Which of the following is a solution of  $12x - 5 > 8x + 3$ ?

- a. 0
  - b. 1
  - c. 2
  - d. 3

29. The difference between a two-digit number and the number formed by reversing the digits is always divisible by \_\_\_\_\_.



**30.** The number of diagonals of a n-sided convex polygon is given by  $[n(n - 3)]/2$ .  
The number of diagonals of a decagon is \_\_\_\_\_.



**31.** If  $A = 4x^3 - 6x^2 + 5$  and  $B = 2x^3 + 3x^2 + 5x$ , then find the value of  $A - 2B$ .

- |              |                      |
|--------------|----------------------|
| a. 0         | b. $5x$              |
| c. $10x - 5$ | d. $5 - 10x - 12x^2$ |

**32.** In an isosceles trapezium PQRS, if line  $PQ \parallel$  line  $RS$  and  $\angle QRS = 108^\circ$ , then find the measure of  $\angle RSP$ .

- a.  $108^\circ$       b.  $72^\circ$   
c.  $100^\circ$       d.  $92^\circ$

**33.** If  $\sqrt{2} = 1.414$  and  $\sqrt{5} = 2.236$ , then what is the value of  $\sqrt{50} + \sqrt{20}$ ?



**34.** If  $2^a = 4^b = 16^c = 256$ , then what is the value of  $2a + 3b + 4c$ ?



**35.** If  $x + y = 0$ , then  $x$  and  $y$  are \_\_\_\_\_.

- a. Equal
  - b. Additive inverse to each other
  - c. Multiplicative inverse to each other
  - d. Cannot say

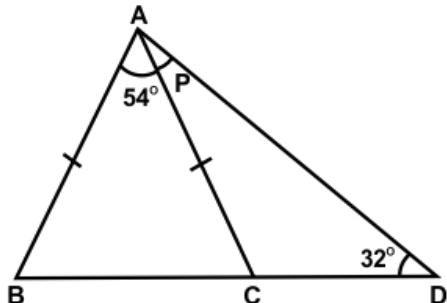
**36.** Frame the formula from the following table and make x as the subject of the formula:

x	3	5	7	9	11
y	5	9	13	17	21

- a.  $x = (y - 1)/2$   
 c.  $x = (y/2) - 1$

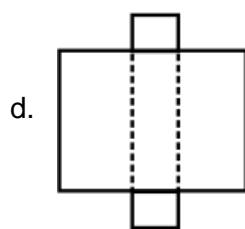
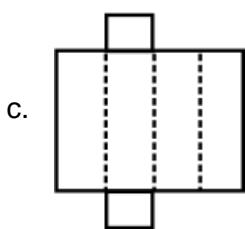
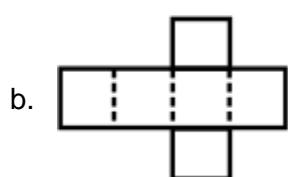
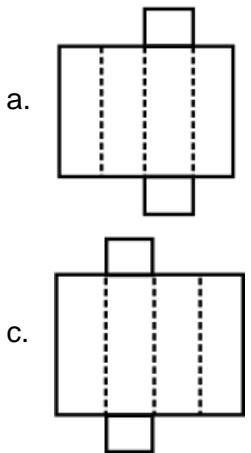
- b.  $x = 2y - 1$   
 d.  $x = (y + 1)/2$

37. In the figure shown below, ABC is an isosceles triangle and BCD is a straight line. The value of p is:

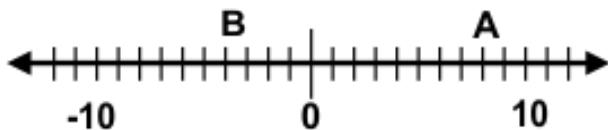


- a.  $29^\circ$   
 c.  $42^\circ$
- b.  $31^\circ$   
 d.  $53^\circ$

38. Which of these nets matches that of a cube?

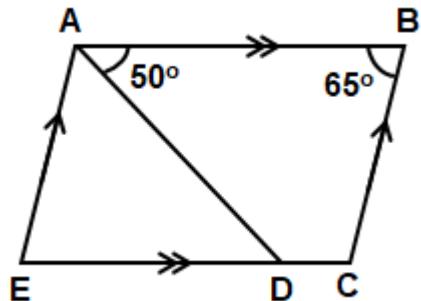


39. In which of the following situations evaporation does not cause cooling?



- a. B is greater than -10  
 c. A is greater than B
- b. A is greater than 0  
 d. B is greater than 0

40. In the figure, ABCE is a parallelogram. Find  $\angle ADC$ :



- a.  $130^\circ$   
c.  $50^\circ$

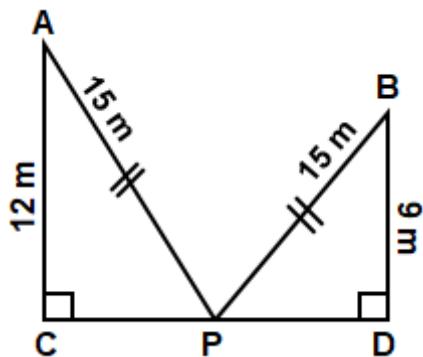
- b.  $150^\circ$   
d.  $115^\circ$

## Achiever's Section (Each Question is 2 Marks)

41. There are 4 cubical containers arranged in ascending order of their heights. If the biggest one has a height of  $2x/17 = 13.5$  cm and the other containers are in the heights of  $x/8$ ,  $x/4$  and  $x/2$ , respectively, then find the heights of the other three containers respectively.

- a. 11.234 cm, 24.6875 cm, 59.75 cm  
c. 12.344 cm, 22.425 cm, 54.25 cm
- b. 14.344 cm, 28.6875 cm, 57.375 cm  
d. 14.344 cm, 21.6875 cm, 51.25 cm

42. Find the length of CD.



- a. 9 m  
c. 21 m
- b. 12 m  
d. 24 m

43. In a certain store, the profit is 320% of the cost. If the cost increases by 25% but the selling price remains constant, then approximately what percentage of the selling price is the profit?

- a. 30%  
c. 100%
- b. 70%  
d. 250%

44. For the purchase of a building, a man has to pay \$17,000 when a single discount of 15% is allowed. How much will he have to pay for it if two successive discounts of 5% and 10%, respectively are allowed?

- a. \$17,000  
c. \$17,100
- b. \$17,010  
d. \$18,000

45. A laptop is listed at \$1400 and the discount offered is 10%. What additional discount must be given to bring the net selling price to \$1200?

- a.  $16\frac{2}{3}\%$   
c.  $4\frac{16}{21}\%$
- b. 5%  
d. 6%

46. An article is listed at \$900 and two successive discounts of 8% and 8% are given on it. How much would the seller gain or lose, if he gives a single discount of 16%, instead of two discounts?

- a. Gain, \$4.76  
c. Gain, \$5.76

- b. Loss, \$5.76  
d. Loss, \$4.76

**47.** A man invested \$16,000 at compound interest for 3 years, interest compounded annually. If he got \$18,522 at the end of 3 years, then the rate of interest is:

- a. 4%  
c. 6%

- b. 5%  
d. 7%

**48.** The ratio of the radius of the back wheel of a tractor to that of the front wheel is 7:5. The diameter of the back wheel is 70 cm. What is the distance moved by the front wheel after it has turned 10 rounds? Take  $\pi = 22/7$ , Round off your answer to the nearest whole number).

- a. 1440 cm  
c. 1571 cm

- b. 1500 cm  
d. 1600 cm

**49.** A hall is 15 m long and 12 m broad. If the sum of the area of the floor and the ceiling is equal to the sum of the areas of the four walls, the volume of the hall is:

- a. 720 m<sup>3</sup>  
c. 1200 m<sup>3</sup>

- b. 900 m<sup>3</sup>  
d. 1800 m<sup>3</sup>

**50.** The HCF of  $(x^2 - 4)$   $(x + 2)$  and  $(x + 2)^2$   $(x^3 - 8)$  is \_\_\_\_\_.

- a.  $(x + 2)(x^2 - 4)$   
c.  $(x - 2)^2(x + 2)$

- b.  $(x + 2)(x - 2)$   
d.  $(x^3 - 8)(x + 2)$

## Answer Key

1.	a	2.	d	3.	c	4.	b	5.	b	6.	c	7.	a
8.	a	9.	b	10.	c	11.	c	12.	d	13.	c	14.	d
15.	d	16.	a	17.	b	18.	b	19.	c	20.	a	21.	a
22.	d	23.	b	24.	c	25.	c	26.	c	27.	c	28.	d
29.	a	30.	b	31.	d	32.	a	33.	d	34.	c	35.	b
36.	d	37.	b	38.	b	39.	d	40.	a	41.	b	42.	c
43.	b	44.	c	45.	c	46.	b	47.	b	48.	c	49.	c
50.	a												