GRADE VIII MODEL PAPER 2017

MATHEMATICS

CRQ Paper Marking Scheme

Q1:   6 Marks

If

$$A = \{2,4,6,8\}$$
$$B = \{3,5,7,9\}$$
$$C = \{1,2,3,4,5\}$$

then prove that

$$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$$

Possible Answer:

Solution:

Step 1: $B \cup C = \{3,5,7,9\} \cup \{1,2,3,4,5\}$

$$= \{1,2,3,4,5,7,9\}$$

Step 2: $A \cap (B \cup C) = \{2,4,6,8\} \cap \{1,2,3,4,5,7,9\}$

$$= \{2,4\} \rightarrow (A)$$

Now

Step 3: $A \cap B = \{2,4,6,8\} \cap \{3,5,7,9\} = \{\ \}$

Step 4: $A \cap C = \{2,4,6,8\} \cap \{1,2,3,4,5\} = \{2,4\}$

Step 5: $(A \cap B) \cup (A \cap C) = \{\ \} \cup \{2,4\}$

$$= \{2,4\} \rightarrow (B)$$

Step 6: From A & B $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

L.H.S = R.H.S

Checking Hints:

Total 6 Marks

1 mark for each correct step (6 required)

Q2: 6 Marks

If $\bigcup = \{x \mid x \in w \ and \ 0 \leq x \leq 7\}$

$A = \{x \mid x \in z \ and \ 2 \leq x \leq 5\}$

$B = \{x \mid x \in z \ and \ 4 \leq x \leq 7\}$

then prove that $(A \cap B)' = A' \cup B'$

Possible Answer:

Solution:

Step 1: $\bigcup = \{0,1,2,3,4,5,6,7\}$

   $A = \{2,4,5\} \quad B = \{4,5,6,7\}$

Step 2: $A \cap B = \{2,4,5\} \cap \{4,5,6,7\}$

   $= \{4.5\}$

Step 3: $(A \cap B)' = U - (A \cap B) = \{0,1,2,3,4,5,6,7\} - \{4,5\}$

   $\{0,1,2,3,6,7\} \rightarrow (1)$

Step 4: $A' = U - A = \{0,1,2,3,4,5,6,7\} - \{2,4,5\}$

   $= \{0,1,3,6,7\}$

Step 5: $B' = U - B = \{0,1,2,3,4,5,6,7\} - \{4,5,6,7\}$

   $= \{0,1,2,3\}$

Step 6: $A' \cup B'$

   $= \{0,1,3,6,7\} \cup \{0,1,2,3\}$

   $= \{0,1,2,3,6,7\} \rightarrow (2)$

   From (1) and (2)

   $(A \cap B)' = A \cup B'$

Checking Hints:

Total 6 Marks

1 mark for each correct step (6 required)

Q3:   6 Marks

Find the values of

    i. $\sqrt[3]{216}$

    ii. $\left(\dfrac{1}{5}\right)^3$

<u>Possible Answer:</u>

Steps:

    i. $\sqrt[3]{216}$

Step 1: $\sqrt[3]{216} = \sqrt[3]{6 \times 6 \times 6}$

Step 2: $\sqrt[3]{(6)^3}$

Step 3:   6 Ans

    ii. $\left(\dfrac{1}{5}\right)^3$

Step 1: $\left(\dfrac{1}{5}\right)^3 = \dfrac{1}{5} \times \dfrac{1}{5} \times \dfrac{1}{5}$

Step 2: $= \dfrac{1}{25} \times \dfrac{1}{5}$

Step 3: $\dfrac{1}{125}$ Ans

<u>Checking Hints:</u>

Total 6 Marks

1 mark for each correct step in part i (3 required)

1 mark for each correct step in part ii (3 required)

Q4:   6 Marks

Ali's monthly salary is Rs. 8000. Calculate his income tax at the rate of 5% and the rebate is Rs. 80,000.

Possible Answer:

Solution: Monthly income

               Rs. 8000

               Income for one year

Step 1: 8000×12

Step 2:   96,000

               Rebate income: Rs. 80,000

Step 3: Taxable income = 96000 − 80,00

Step 4: $= 16000$

Step 5: Income tax at 5% $= \dfrac{5}{100} \times 160\,00$

                       = 5x160

Step 6: $= Rs.800$

Checking Hints:

Total 6 Marks

1 mark for each correct step (6 required)

Q5:   6 Marks

Find the value of $x^2 + \dfrac{1}{x^2}$ when $x + \dfrac{1}{x} = -12$

Possible Answer:

As $x + \dfrac{1}{x} = -12$

Step 1: Squaring both sides

Step 2: $\left(x + \dfrac{1}{x} \right)^2 = \left(-12 \right)^2$

Step 3: $x^2 + \dfrac{1}{x^2} + 2\left(\cancel{x} \right)\left(\dfrac{1}{\cancel{x}} \right) = 144$

Step 4: $x^2 + \dfrac{1}{x^2} + 2 = 144$

Step 5: $x^2 + \dfrac{1}{x^2} = 144 - 2$

Step 6: $x^2 + \dfrac{1}{x^2} = 142 \; Ans$

Checking Hints:

Total 6 Marks

1 mark for each correct step (6 required)

Q6: 6 Marks

Ali and Kamal together get pocket money of Rs.150 daily. If Ali gets Rs. 50 more than Kamal then how much pocket money Ali and Kamal gets daily.

Let x be the pocket money of Ali and y be the pocket money of Kamal then we have

Step 1

$$x + y = 150............1$$

$$x + y = 50.............2$$

Step 2

$$x + y = 150$$

$$\underline{x + y = 50}$$

$$2x = 200$$

Step 3

$$x = \frac{200}{2}$$

$$x = 100$$

Step 4 Putting the value of x in equation 1

$$x + y = 150$$

$$100 + y = 150$$

Step 5

$$y = 150 - 100$$

$$y = 50$$

Step 6

So Ali's pocket money is Rs. 100

Kamal's pocket money is Rs. 50

Checking Hints:

Total 6 Marks
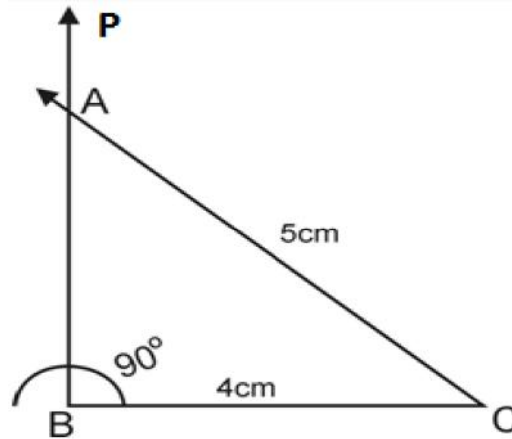
1 mark for each correct step (6 required)

Q7:   6 Marks

Construct a right angled triangle ABC, where $\angle B = 90^o$, $\overline{BC} = 4cm$ and hypotenuse

$\overline{AC} = 5cm$. Also write steps of construction.

Possible Answer:

i.   Draw a line segment $\overline{BC} = 4cm$

ii. At B construct $\angle CBP = 90^o$ with the help of compass

iii. With C as a centre draw arc of radius of 5cm acting BP in A

iv. Join A with C.

ABC is the required right angled triangle with $\angle B$ as its right angle.
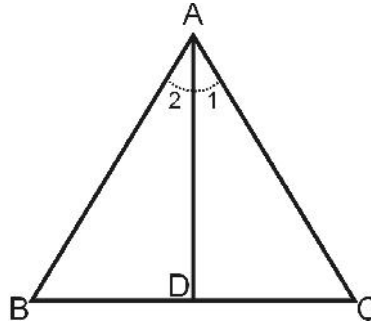

Checking Hints:

Total 6 Marks

Step 01	Writing	Correct Construction	0.5 + 0.5 = 1
Step 02	Writing	Correct Construction	1 + 1 = 2
Step 03	Writing	Correct Construction	1 + 1 = 2
Step 04	Writing	Correct Construction	0.5 + 0.5 = 1

Q8:   6 Marks

Prove: *If two sides of a triangle are congruent, then angels opposite to these sides are congruent.*

Possible Answer:

Solution: Given $\triangle ABC$

$\overline{AB} \equiv \overline{AC}$

To prove

$\angle B \cong \angle C$

Construction: Draw bisector of $\angle A$ which meet BC at point D.

Proof:

Statements	Reasons
If $\triangle ABC \leftrightarrow \triangle ADC$	Given
$m\overline{AB} \cong m\overline{AC}$	Construction
$\angle 1 \cong \angle 2$	Common
$\overline{AD} \equiv \overline{AD}$	$S.A.S \equiv S.A.S$
So, $\triangle ABC \cong \triangle ADC$	Corresponding angles of congruent
Hence, $\angle B \cong \angle C$	triangle

Checking Hints:

Total 6 Marks

1 mark for diagram
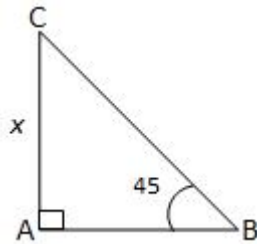1 mark for each statement with reason (5 required)

Q9:	6 Marks

The angle from a point on level ground 40 m from the foot of a tower is 45 degree. What is the height of the tower?

Possible Answer:

Distance from foot of tower = 40m
Angle to the tower = 45^0 Step -1
Height of tower =?

Step - 2

In ΔA

Tan $\theta = \dfrac{p}{b}$ Step – 3

Tan $45^0 = \dfrac{x}{4}$ Step – 4

$1 = \dfrac{x}{4}$ Step – 5

$x = 40$ m   Step - 6

Checking Hints:

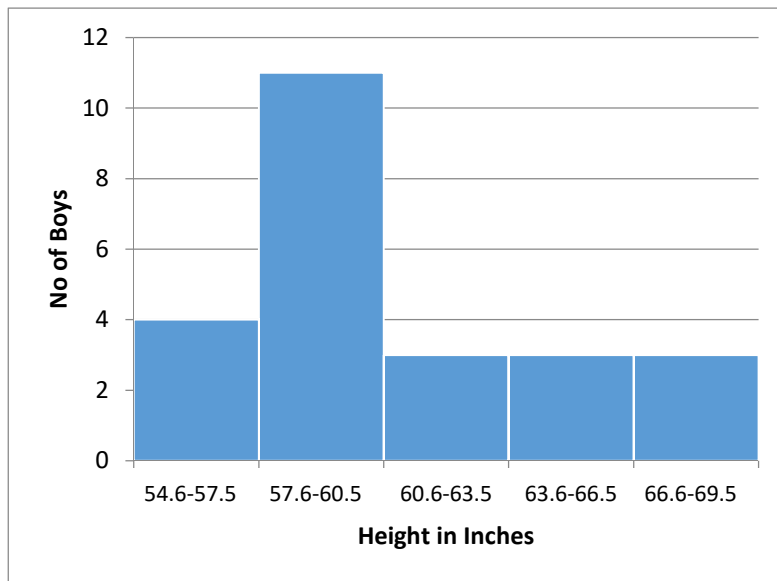Total 6 Marks

1 mark for each step (6 required)

Q10:   6 Marks

The given histogram shows height (in inches) of different boys.

1. What is the total number of boys shown in the histogram?
2. How many boys are with height in the range of 60.6 – 63.5 inches?
3. What is the maximum height of the boys?
4. What is the class interval of the given data? Write down the range of the given data?

Possible Answer:

1. 24
2. 3
3. 11 inches
4. Class interval: 2.9 Range: 54.6 to 69.5

Checking Hints:

Total 6 Marks

1. 1 mark for the number of boys
2. 1 mark for the range
3. 1 mark for the maximum height
   1 mark for the unit
4. 1 mark for the class interval
   1 mark for the range of the data