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PRACTICE PAPER 07 (2023-24)

PERIMETER AND AREA & ALGEBRAIC EXPRESSIONS

(ANSWERS)

SUBJECT: MATHEMATICS **MAX. MARKS : 40**

CLASS : VII **DURATION : 1½ hr**

General Instructions:

(i). **All** questions are compulsory.

(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.

(iii). **Section A** comprises of **6 MCQs** of **1 mark** each. **Section B** comprises of **1 CCT question** of **4 marks** each which contains **4 MCQs**. **Section C** comprises of 3 questions of **2 marks** each. **Section D** comprises of 4 questions of **3 marks** each and **Section E** comprises of 3 questions of **4 marks** each.

SECTION – A

Questions 1 to 6 carry 1 mark each.

1. The circumference of two circles are in the ratio 2 : 3. The ratio of their areas is

(a) 2 : 3 (b) 4 : 9 (c) 9 : 4 (d) none of these

Ans: (b) 4 : 9

$$\frac{2\pi r_1}{2\pi r_2}=\frac{2}{3}\Rightarrow\frac{r_1}{r_2}=\frac{2}{3}\Rightarrow\frac{r_1^2}{r_2^2}=\frac{4}{9}\Rightarrow\frac{\pi r_1^2}{\pi r_2^2}=\frac{4}{9}$$

So, the ratio of the areas of two circles is 4 : 9

2. In making 1000 revolutions, a wheel covers 88 km. The diameter of the wheel is

(a) 14 m (b) 24 m (c) 28 m (d) 40 m

Ans: (c) 28 m

Distance covered in 1 revolution = circumference of wheel = 88m

$$\pi\times d=88\Rightarrow\frac{22}{7}\times d=88\Rightarrow d=88\times\frac{7}{22}=28cm$$

3. A wire is in the shape of a square of side 10 cm. If the wire is rebent into a rectangle of length 12 cm, find its breadth.

(a) 12 cm (b) 7 cm (c) 8 cm (d) 9 cm

Ans: (c) 8 cm

Let a be the side of a square, l be the length and b be the breadth of rectangle.

As length of wire is constant, perimeter of both shapes would be same,

$\Rightarrow 4a = 2(1 + b) \Rightarrow 40 = 2(12 + b) \Rightarrow b = 8$ cm

4. What should be value of 'a' if $y^2 + y - a$ equals to 3 for y=1

(a) –1 (b) –5 (c) 5 (d) 0

Ans: (a) –1

5. Which of the following is a pair of like terms?

(a) $-7xy^2z, -7x^2yz$ (b) $-10xyz^2, 3xyz^2$ (c) $3xyz, 3x^2y^2z^2$ (d) $4xyz^2, 4x^2yz$

Ans: (b) $-10xyz^2, 3xyz^2$

The terms having the same algebraic factors are called like terms.

6. The length of a side of square is given as 2x + 3. Which expression represents the perimeter of the square?

(a) 2x + 16 (b) 6x + 9 (c) 8x + 3 (d) 8x + 12

Ans: (d) 8x + 12

We know that, perimeter of the square = 4 × side

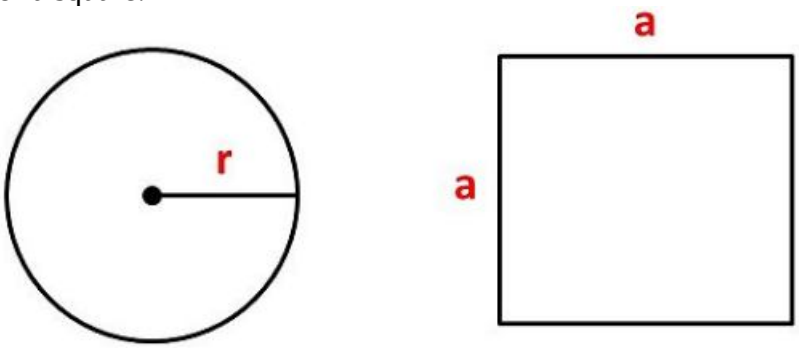
From the question it is given that, side length of the top of square table is 2x + 3.
Then, perimeter = 4 × (2x + 3) = (4 × 2x) + (4 × 3) = 8x + 12

SECTION – B(CCT Questions)

Questions 7 to 10 carry 1 mark each.

CCT Question

Aditi bought two wires of same length 44cm. She bent one wire into the shape of a circle and another wire into the shape of a square.



Answer the following questions based on the above information:

7. Find the radius of the circle.
(a) 8cm (b) 7cm (c) 5cm (d) 6cm
Ans: (b) 7cm
If the wire is bent into a circle,
We know that the circumference of the circle = $2\pi r$
$\Rightarrow 44 = 2 \times (22/7) \times r$
$\Rightarrow 44 = 44/7 \times r \Rightarrow (44 \times 7)/44 = r \Rightarrow r = 7$ cm

8. Find the area of the circle.
(a) 154 cm^2 (b) 150 cm^2 (c) 125 cm^2 (d) 160 cm^2
Ans: (a) 154 cm^2
Area of the circle = $\pi r^2 = 22/7 \times 7^2 = 22/7 \times 7 \times 7 = 22 \times 7 = 154$ cm^2

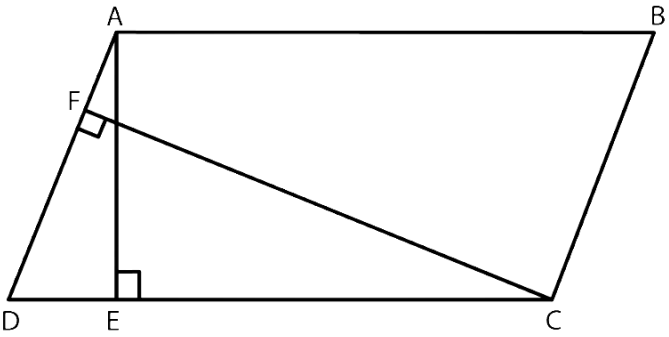
9. What is length of each side of the square?
(a) 22 cm (b) 14 cm (c) 11 cm (d) 7 cm
Ans: (c) 11 cm
The length of each side of the square = 44/4 = 11 cm

10. What is the difference between the area of the circle and area of the square?
(a) 25 cm^2 (b) 33 cm^2 (c) 22 cm^2 (d) 55 cm^2
Ans: (b) 33 cm^2
Area of the square = Length of the side of square^2 = $11^2 = 121$ cm^2
Difference = 154 – 121 = 33 cm^2

SECTION – C

Questions 11 to 13 carry 2 marks each.

11. Two sides of a parallelogram are 20 cm and 25 cm. If the altitude corresponding to the sides of length 25 cm is 10 cm, find the altitude corresponding to the other pair of sides.
Ans: Let ABCD is a parallelogram with longer side AB = 25 cm and altitude AE = 10 cm.
Therefore AB = CD (opposite sides of parallelogram are equal).
The shorter side is AD = 20 cm and the corresponding altitude is CF.
We know that area of a parallelogram = Base x Height



We have two altitudes and two corresponding bases.
So, by equating them we get AD x CF = CD x AE
$\Rightarrow$ 20 x CF = 25 x 10 $\Rightarrow$ CF = 12.5 cm
Hence, the altitude corresponding to the other pair of the side AD is 12.5 cm.

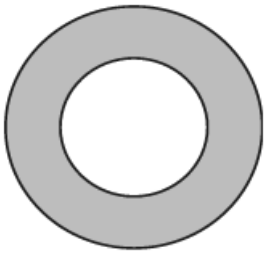
12. A rectangular field is 48 m long and 20 m wide. How many right triangular flower beds, whose sides containing the right angle measure 12 m and 5 m can be laid in this field?
Ans: Given length of the rectangular field = 48 m
Breadth of the rectangular field = 20 m
Area of the rectangular field = Length x Breadth = 48 m x 20 m = 960 m^2
Area of one right triangular flower bed = ½ (12 x 5) = 30 m^2
Therefore, required number of right triangular flower beds = area of the rectangular field/ area of one right triangular flower bed = 960/30
Number of right triangular flower beds = 32

13. When a = 0, b = – 1, find the value of the given expressions:
(i) 2a + 2b (ii) $2a^2 + b^2 + 1$
Ans: (i) From the question, it is given that a = 0, b = -1
Then, substitute the value of a and b in the question.
= (2 × 0) + (2 × -1) = 0 – 2 = -2
(ii) From the question, it is given that a = 0, b = -1
Then, substitute the value of a and b in the question.
= $(2 \times 0^2) + (-1)^2 + 1 = 0 + 1 + 1 = 2$

SECTION – D

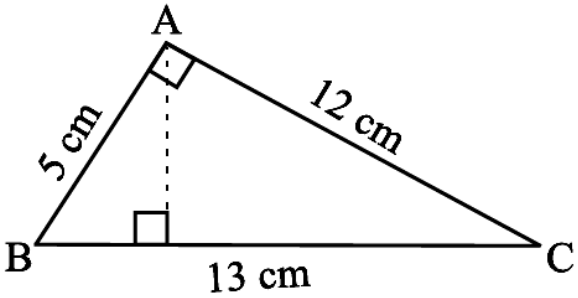
Questions 14 to 17 carry 3 marks each.

14. A gardener wants to fence a circular garden with a diameter of 21 m. Find the length of the rope he needs to purchase, if he makes 2 rounds of the fence. Also, find the cost of the rope, if it costs ₹ 4 per meter. (Take $\pi = 22/7$)



Ans: From the question, it is given that, Diameter of the circular garden = 21 m
We know that radius (r) = d/2 = 21/2 = 10.5 m
Then, Circumference of the circle = $2\pi r = 2 \times (22/7) \times 10.5 = 462/7 = 66$ m
So, the length of rope required = 2 × 66 = 132 m.
Cost of 1 m rope = ₹ 4 [given]
Cost of 132 m rope = ₹ 4 × 132 = ₹ 528
So, the cost of the rope = ₹ 528.

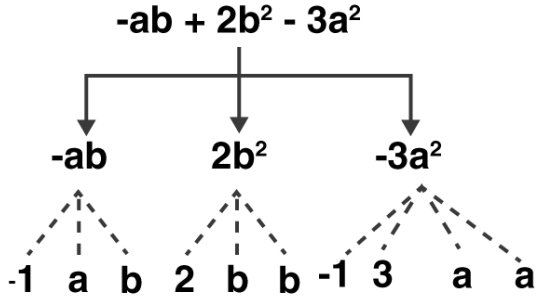
15. ΔABC is right angled at A (see below figure). AD is perpendicular to BC. If AB = 5 cm, BC = 13 cm and AC = 12 cm, Find the area of ΔABC. Also find the length of AD.



Ans: Here, AB = 5 cm, BC = 13 cm, AC = 12 cm
Then, We know that, Area of the ΔABC = ½ × Base × Height
= ½ × AB × AC = ½ × 5 × 12 = 1 × 5 × 6 = 30 cm^2
Now, Area of ΔABC = ½ × Base × Height
⇒ 30 = ½ × AD × BC ⇒ 30 = ½ × AD × 13
⇒ (30 × 2)/13 = AD ⇒ AD = 60/13 ⇒ AD = 4.6 cm

16. If p = – 2, find the value of:
(i) 4p + 7 (ii) $-3p^2 + 4p + 7$ (iii) $-2p^3 - 3p^2 + 4p + 7$
Ans: (i) 4p + 7
substitute the value of p in the question.
= (4 × (-2)) + 7 = -8 + 7 = -1
(ii) $-3p^2 + 4p + 7$
substitute the value of p in the question.
= $(-3 \times (-2)^2) + (4 \times (-2)) + 7$ = (-3 × 4) + (-8) + 7 = -12 – 8 + 7 = -20 + 7 = -13
(iii) $-2p^3 - 3p^2 + 4p + 7$
substitute the value of p in the question.
= $(-2 \times (-2)^3) - (3 \times (-2)^2) + (4 \times (-2)) + 7$ = (-2 × -8) – (3 × 4) + (-8) + 7
= 16 – 12 – 8 + 7 = 23 – 20 = 3

17. Identify the terms and their factors in the following expressions: $-ab + 2b^2 - 3a^2$
Show the terms and factors by tree diagrams.
Ans: Expression: $-ab + 2b^2 - 3a^2$
Terms: $-ab$, $2b^2$, $-3a^2$
Factors: -a, b; 2, b, b; -3, a, a



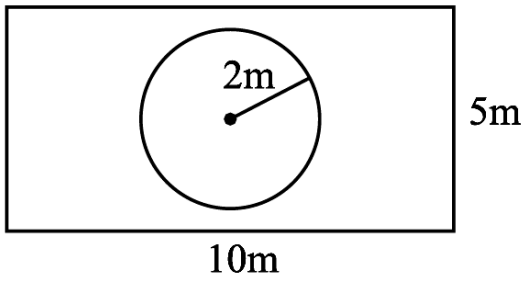
SECTION – E

Questions 18 to 20 carry 4 marks each.

18. Simplify the expressions and find the value if x is equal to 2
(i) x + 7 + 4 (x – 5) (ii) 3 (x + 2) + 5x – 7 (iii) 6x + 5 (x – 2) (iv) 4(2x – 1) + 3x + 11
Ans: (i) From the question, it is given that x = 2
We have, x + 7 + 4x – 20 = 5x + 7 – 20
Then, substitute the value of x in the equation.
= (5 × 2) + 7 – 20 = 10 + 7 – 20 = 17 – 20 = – 3
(ii) From the question, it is given that x = 2

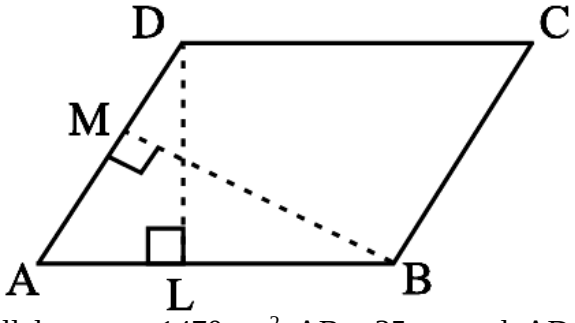
We have, $3x + 6 + 5x – 7 = 8x – 1$
Then, substitute the value of x in the equation.
$= (8 \times 2) – 1 = 16 – 1 = 15$
(iii) From the question, it is given that $x = 2$
We have, $6x + 5x – 10 = 11x – 10$
Then, substitute the value of x in the equation.
$= (11 \times 2) – 10 = 22 – 10 = 12$
(iv) From the question, it is given that $x = 2$
We have, $8x – 4 + 3x + 11 = 11x + 7$
Then, substitute the value of x in the equation.
$= (11 \times 2) + 7 = 22 + 7 = 29$

19. The adjoining figure represents a rectangular lawn with a circular flower bed in the middle. Find:
(i) the area of the whole land (ii) the area of the flower bed
(iii) the area of the lawn excluding the area of the flower bed
(iv) the circumference of the flower bed.



Ans: (i) From the figure,
Length of rectangular lawn = 10 m
Breadth of rectangular lawn = 5 m
Area of the rectangular lawn = Length × Breadth = $10 \times 5 = 50$ m^2
(ii) From the figure, Radius of the flower bed = 2 m
Area of the flower bed = $\pi r^2 = 3.14 \times 2^2 = 3.14 \times 4 = 12.56$ m^2
(iii) The area of the lawn excluding the area of the flower bed = Area of rectangular lawn –
Area of flower bed = $50 – 12.56 = 37.44$ m^2
(iv) The circumference of the flower bed = $2\pi r = 2 \times 3.14 \times 2 = 12.56$ m

20. DL and BM are the heights on sides AB and AD, respectively, of parallelogram ABCD (see below Figure). If the area of the parallelogram is 1470 cm^2, AB = 35 cm and AD = 49 cm, find the length of BM and DL.



Ans: Here, Area of the parallelogram = 1470 cm^2, AB = 35 cm and AD = 49 cm
Then, We know that, Area of the parallelogram = Base × Height
$\Rightarrow 1470 = AB \times BM \Rightarrow 1470 = 35 \times DL$
$\Rightarrow DL = 1470/35 \Rightarrow DL = 42$ cm
And, Area of the parallelogram = Base × Height
$\Rightarrow 1470 = AD \times BM \Rightarrow 1470 = 49 \times BM$
$\Rightarrow BM = 1470/49 \Rightarrow BM = 30$ cm