

GREENLAWNS SCHOOL, WORLI  
First Term Examination - 2017  
MATHEMATICS

STD: VIII  
Date: /01/2017

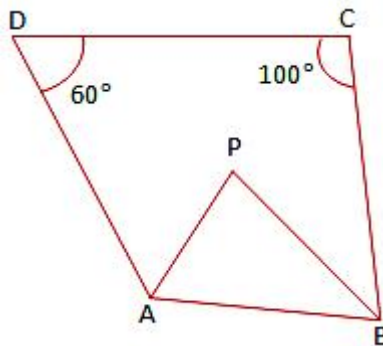
Marks: 80  
Time: 2½hrs

Question 1

- a. In a transaction, the profit percentage is 80% of the cost. If the cost further increases by 20% but the selling price remain the same, how much is the decrease in profit %? [3]
- b. Construct a triangle ABC in which  $AB = BC = 4\text{cm}$  and angle  $ABC = 60^\circ$ . Draw all its lines of symmetry. [3]
- c. i. Find the interior angle of a regular octagon.  
ii. Find the number of sides of a polygon with interior angle of  $160^\circ$ . [4]

Question 2

- a. A race track is in the form of a ring whose inner circumference is 220 m and outer circumference is 308 m. find the width of the track. [3]
- b. A point P (a, b) is reflected in the Y-axis to  $P^1 (-3, 1)$  Write down the values of a and b.  $P^{11}$  is the image of P when reflected in the X axis. Write down the coordinates of  $P^{11}$ .  $P^{111}$  is the image of P when reflected in the origin. Write down the coordinates of  $P^{111}$ . [3]
- c. In the adjacent figure, the bisectors of  $\angle A$  and  $\angle B$  meet in a point P. If  $\angle C = 100^\circ$  and  $\angle D = 60^\circ$ , find the measure of  $\angle APB$ . [4]



Question 3

- a. ABCD is a parallelogram and the diagonals of it intersect at point O. If  $\angle DAO = 33^\circ$ ,  $\angle BAO = 35^\circ$  and  $\angle COD = 100^\circ$ , find  $\angle ODC$ . [3]
- b. A floor of the room 8 m long and 6 m wide is to be covered by square tiles. If each square tile is 0.8 m, find the number of tiles required to cover the floor. Also, find the cost of tiling at the rate of \$7 per tile. [3]
- c. In the parallelogram PQRS,  $PQ = 10\text{ cm}$ . The altitude corresponding to the side PQ and PS are 5 and 6 respectively. Find PS. [4]

Question 4

- a. Each interior angle of a regular polygon is 135 degree then find the number of sides. [3]
- b. A fort had provisions for 300 men for 90 days. After 20 days, 50 men left the fort. How long would the food last at the same rate? [3]
- c. The diameter of a wheel of a motorcycle is 63 cm. How many revolutions will it make to travel 99 km? [4]

Question 5

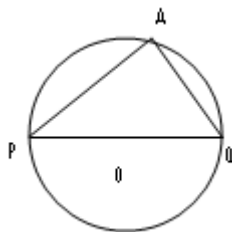
- a. Find the single discount equivalent to two successive discounts of 20% and 10%. [3]
- b. A bag contains \$510 in the form of 50 p, 25 p and 20 p coins in the ratio 2: 3: 4. Find the number of coins of each type. [3]
- c. The ratio of areas of two wheels is 25: 49. Find the ratio of their radii. [4]

Question 6

- a. A trader marks his goods at 40% above the cost price and allows a discount of 25%. What is his gain percent? [3]
- b. In the given figure both RISK and CLUE are parallelograms. Find the value of x. [3]
- c. 6 oxen or 8 cows can graze a field in 28 days. How long would 9 oxen and 2 cows take to graze the same field? [3]

Question 7

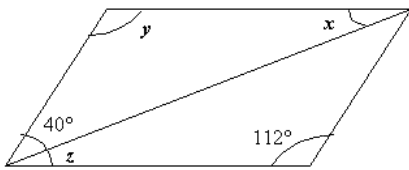
- a. A man bought two bicycles for Rs. 2500 each. If he sells one at a profit of 5%, then how much should he sell the other so that he makes a profit of 20% on the whole? [3]
- b. Given figure is a circle with centre O. PQ is a diameter and A is a point on the circumference of given circle such that AP = 16 cm and AQ is 12 cm; find its radius [3]



- c. The length and breadth of a rectangular courtyard is 75 m and 32 m. find the cost of leveling it at the rate of \$3 per  $\text{m}^2$ . Also, find the distance covered by a boy to take 4 rounds of the courtyard. [4]

Question 8

- a. The cost price of 10 pens is the same as the selling price of  $n$  pens. If there is a loss of 40%, approximately what is the value of  $n$ ? [3]
- b. Consider the following parallelograms. Find the values of the unknowns  $x$ ,  $y$ ,  $z$ . [3]



- c. A piece of wire in the form of rectangle 40 cm long and 26 cm wide is again bent to form a circle. Find the radius of the circle. [4]

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## Answer Key

### Question 1

- a. In a transaction, the profit percentage is 80% of the cost. If the cost further increases by 20% but the selling price remain the same, how much is the decrease in profit percentage? [3]

Solution:

Let us assume CP = Rs. 100.

Then Profit = Rs. 80 and selling price = Rs. 180.

The cost increases by 20% → New CP = Rs. 120, SP = Rs. 180.

Profit % =  $60/120 \times 100 = 50\%$ .

Therefore, Profit decreases by 30%.

- b. Construct a triangle ABC in which AB = BC = 4cm and angle ABC = 60°. Draw all its lines of symmetry. [3]

Ans. construction of angle 60 ----- 1m

Construction of triangle -----1m

Drawing lines of symmetry -----1m

- c. i. Find the interior angle of a regular octagon.  
ii. Find the number of sides of a polygon with interior angle of 160°. [4]

Ans. i. Each interior angle of an octagon =  $\frac{(n-2) \times 180^\circ}{n}$   
 $\frac{(8-2) \times 180^\circ}{8} = 135^\circ$

Each interior angle of an octagon = 135°  
Each interior angle of an octagon (8-sided) is 135°.

- ii. Measure of Each Exterior Angle of a Polygon =  $360/n$   
Each Exterior Angle =  $180 - 160 = 20$   
 $20 = 360/n$   
Number of Sides =  $360/20 = 18$   
So Number of Sides = 18

### Question 2

- a. 2. A race track is in the form of a ring whose inner circumference is 220 m and outer circumference is 308 m. find the width of the track. [3]

Solution:

Let  $r_1$  and  $r_2$  be the outer and inner radii of ring.

Then  $2\pi r_1 = 308$

$2 \times 22/7 r_1 = 308$

$\Rightarrow r_1 = (308 \times 7)/(2 \times 22)$

$\Rightarrow r_1 = 49 \text{ m}$

$2\pi r_2 = 220$

$$\Rightarrow 2 \times \frac{22}{7} \times r_2 = 220$$

$$\Rightarrow r_2 = \frac{(220 \times 7)}{(2 \times 22)}$$

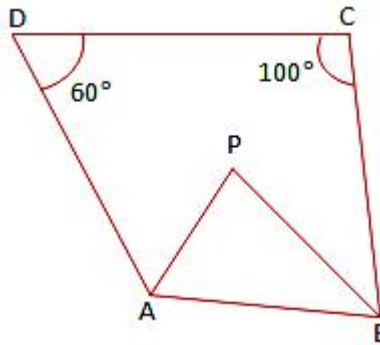
$$\Rightarrow r_2 = 35 \text{ m}$$

Therefore, width of the track =  $(49 - 35) \text{ m} = 14 \text{ m}$

- b. A point P (a, b) is reflected in the Y-axis to P<sup>1</sup> (-3, 1) Write down the values of a and b.  
P<sup>11</sup> is the image of P when reflected in the X axis. Write down the coordinates of P<sup>11</sup>.  
P<sup>111</sup> is the image of P when reflected in the origin. Write down the coordinates of P<sup>111</sup>. [3]

Ans. P (a, b) = (3, 1)  
P<sup>11</sup> = (3, -1)  
P<sup>111</sup> = (-3, -1)

- c. In the adjacent figure, the bisectors of  $\angle A$  and  $\angle B$  meet in a point P. If  $\angle C = 100^\circ$  and  $\angle D = 60^\circ$ , find the measure of  $\angle APB$ . [4]



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Hint:  $60^\circ + 100^\circ + \angle A + \angle B = 360^\circ$   
 $\Rightarrow \angle A + \angle B = 200^\circ$   
 $\Rightarrow \frac{1}{2}\angle A + \frac{1}{2}\angle B = 100^\circ$   
 $\Rightarrow \angle BAP + \angle ABP = 100^\circ$   
But,  $\angle BAP + \angle ABP + \angle APB = 180^\circ$  (why?)  
Now, find  $\angle APB$ .

### Question 3

- a. ABCD is a parallelogram and the diagonals of it intersect at point O. If  $\angle DAO = 33^\circ$ ,  $\angle BAO = 35^\circ$  and  $\angle COD = 100^\circ$ , find  $\angle ODC$ . [3]

Ans. Step 1 Following figure shows the parallelogram ABCD,

According to the question,  $\angle DAO = 33^\circ$ ,  $\angle BAO = 35^\circ$  and  $\angle COD = 100^\circ$ .

$\angle OCD = \angle BAO = 35^\circ$  [Alternate interior angles]

Step 2 In  $\triangle COD$ ,  $\angle COD + \angle OCD + \angle ODC = 180^\circ$  [Since the sum of all the angles of a triangle is  $180^\circ$ ]

$$\Rightarrow 100^\circ + 35^\circ + \angle ODC = 180^\circ \Rightarrow 135^\circ + \angle ODC = 180^\circ \Rightarrow \angle ODC = 180^\circ - 135^\circ$$

$$\Rightarrow \angle ODC = 45^\circ$$

Step 3 Hence, the value of the  $\angle ODC$  is  $45^\circ$ .

- b. A floor of the room 8 m long and 6 m wide is to be covered by square tiles. If each square tile is 0.8 m, find the number of tiles required to cover the floor. Also, find the cost of tiling at the rate of \$7 per tile. [3]

Solution:

Length of the room = 8 m

Breadth of the room = 6 m

Area of the room =  $8 \times 6 \text{ m}^2$  {Area of room = Area of tiles that are put on the floor of the room.}  
=  $48 \text{ m}^2$

Area of one square tile =  $0.8 \times 0.8 \text{ m}^2 = 0.64 \text{ m}^2$

Number of tiles required =  $\frac{\text{Area of floor}}{\text{Area of tiles}}$   
=  $\frac{48}{0.64}$   
=  $48 \times \frac{100}{64}$   
= 75 tiles

For 1 tile, the cost of tiling is \$7

For 75 tiles, the cost of tiling is  $(7 \times 75) = \$525$

- c. In the parallelogram PQRS, PQ = 10 cm. The altitude corresponding to the side PQ and PS are 5 and 6 respectively. Find PS. [4]

Ans. PS = 8.33 cm

The area of a parallelogram = Base  $\times$  Height According to the question, DS

The area of the parallelogram PQRS = PQ  $\times$  DS =  $10 \times 5 = 50 \text{ cm}^2$

Similarly, QE = 6 cm

the area of the parallelogram PQRS = PS  $\times$  QE  $\Rightarrow 50 = \text{PS} \times 6$

$\Rightarrow \text{PS} = \frac{50}{6}$

$\Rightarrow \text{PS} = 8.33 \text{ cm}^2$

Step 3 Hence, PS = 8.33 cm

#### Question 4

- a. Each interior angle of a regular polygon is 135 degree then find the number of sides. [3]

Solution:

Let the number of sides of a regular polygon = n

Then the measure of each of its interior angle =  $\frac{(2n - 4) \times 90^\circ}{n}$

Given measure of each angle =  $135^\circ$

Therefore,  $\frac{(2n - 4) \times 90}{n} = 135$

$$\Rightarrow (2n - 4) \times 90 = 135n$$

$$\Rightarrow 180n - 360 = 135n$$

$$\Rightarrow 180n - 135n = 360$$

$$\Rightarrow 45n = 360$$

$$\Rightarrow n = \frac{360}{45}$$

$$\Rightarrow n = 8$$

Therefore the number of sides of the regular polygon is 8.

- b. A fort had provisions for 300 men for 90 days. After 20 days, 50 men left the fort. How long would the food last at the same rate? [3]

Solution:

Remaining number of men =  $(300 - 50) = 250$ .

Remaining number of days =  $(90 - 20)$  days = 70 days.

300 men had provisions for 70 days

1 man had provisions for  $(300 \times 70)$  days [less men, more days]

250 men had provisions for  $(300 \times 70)/250$  days  
[more men, more days]

= 84 days.

Hence, the remaining food will last for 84 days.

- c. The diameter of a wheel of a motorcycle is 63 cm. How many revolutions will it make to travel 99 km? [4]

Solution:

The diameter of the wheel of a motorcycle = 63 cm

Therefore, circumference of the wheel of motorcycle =  $\pi d$

$$= \frac{22}{7} \times 63$$

$$= 198 \text{ cm}$$

Total distance travelled by motorcycle = 99 km

$$= 99 \times 1000$$

$$= 99 \times 1000 \times 100 \text{ cm}$$

Therefore, number of revolutions =  $(99 \times 1000 \times 100)/198 = 50000$

### Question 5

- a. Find the single discount equivalent to two successive discounts of 20% and 10%. [3]

Solution:

Let the marked price of an article be \$ 100.

Then, first discount on it = \$ 20.

Price after first discount = \$ (100 - 20) = \$ 80.

Second discount on it = 10% of \$ 80

= \$ {80 × (10/100)} = \$ 8.

Price after second discount = \$ (80 - 8) = \$ 72.

Net selling price = \$ 72.

Single discount equivalent to given successive discounts = (100 - 72)% = 28%.

- b. A bag contains \$510 in the form of 50 p, 25 p and 20 p coins in the ratio 2 : 3 : 4. Find the number of coins of each type. [3]

Solution:

Let the number of 50 p, 25 p and 20 p coins be 2x, 3x and 4x.

Then  $2x \times 50/100 + 3x \times 25/100 + 4x \times 20/100 = 510$

$x/1 + 3x/4 + 4x/5 = 510$

$(20x + 15x + 16x)/20 = 510$

$\Rightarrow 51x/20 = 510$

$x = (510 \times 20)/51$

$x = 200$

$2x = 2 \times 200 = 400$

$3x = 3 \times 200 = 600$

$4x = 4 \times 200 = 800.$

Therefore, number of 50 p coins, 25 p coins and 20 p coins are 400, 600, 800 respectively.

- c. The ratio of areas of two wheels is 25 : 49. Find the ratio of their radii. [4]

Solution:

If  $A_1$  and  $A_2$  are the area of wheels,  
 $A_1/A_2 = 25/49$



$$\Rightarrow (\pi r_1^2)/(\pi r_2^2) = 25/49$$

$$\Rightarrow (r_1^2)/(r_2^2) = 25/49$$

$$\Rightarrow r_1/r_2 = \sqrt{(25/49)}$$

$$\Rightarrow r_1/r_2 = 5/7$$

Therefore, ratio of their radii is 5 : 7.

#### Question 6

- a. A trader marks his goods at 40% above the cost price and allows a discount of 25%. What is his gain percent? [3]

Solution:

Let the cost price be \$ 100.

Then, marked price = \$ 140.

Discount = 25% of Marked Price

$$= (25\% \text{ of } \$ 140)$$

$$= \$ \{140 \times (25/100)\}$$

$$= \$ 35.$$

Selling price = (marked price) - (discount)

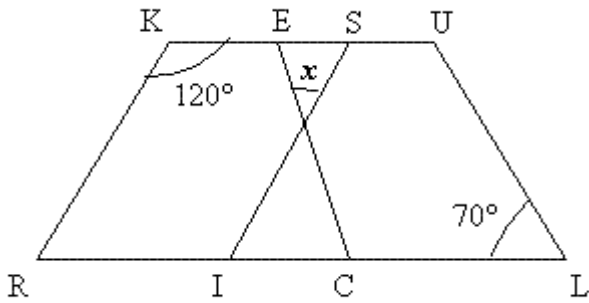
$$= \$ (140 - 35)$$

$$= \$ 105.$$

$$\text{Gain\%} = (105 - 100) \% = 5\%.$$

Hence, the trader gains 5%.

- b. In the given figure both RISK and CLUE are parallelograms. Find the value of x. [3]



Answer: In parallelogram RISK

$$\angle ISK = 180^\circ - 120^\circ = 60^\circ$$

Similarly, in parallelogram CLUE

$$\angle CEU = 180^\circ - 70^\circ = 110^\circ$$

Now, in the triangle

$$x = 180^\circ - (110^\circ - 60^\circ) = 10^\circ$$

- c. 6 oxen or 8 cows can graze a field in 28 days. How long would 9 oxen and 2 cows take to graze the same field? [3]

Solution:

$$6 \text{ oxen} = 8 \text{ cows}$$

$$\Rightarrow 1 \text{ ox} = 8/6 \text{ cows}$$

$$\Rightarrow 9 \text{ oxen} \equiv (8/6 \times 9) \text{ cows} = 12 \text{ cows}$$

$$\Rightarrow (9 \text{ oxen} + 2 \text{ cows}) \equiv (12 \text{ cows} + 2 \text{ cows}) = 14 \text{ cows}$$

Now, 8 cows can graze the field in 28 days

1 cow can graze the field in  $(28 \times 8)$  days [less cows, more days]

14 cows can graze the field in  $(28 \times 8)/14$  days

[more cows, less days]

$$= 16 \text{ days}$$

Hence, 9 oxen and 2 cows can graze the field in 16 days.

### Question 7

- a. A man bought two bicycles for Rs. 2500 each. If he sells one at a profit of 5%, then how much should he sell the other so that he makes a profit of 20% on the whole? [3]

Solution:

Before we start, it's important to note here that it is not 15% to be added to 5% to make it a total of 20%.

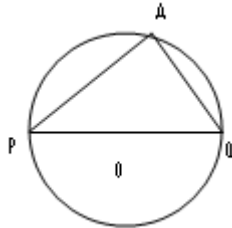
Let the other profit percent be  $x$ .

Then, our equation looks like this.

$$105/100 * 2500 + [(100+x)/100] * 2500 = 120/100 * 5000 \rightarrow x = 35.$$

Hence, if he makes a profit of 35% on the second, it comes to a total of 20% profit on the whole.

- b. In the given figure is a circle with centre O. PQ is a diameter and A is a point on the circumference of given circle such that AP = 16 cm and AQ is 12 cm; find the length of radius [3]



- Ans. Angle A =  $90^\circ$  (angle in semicircle)  
PQ = 20 cm (by Pythagoras theorem)  
Radius =  $PQ/2 = 20/2 = 10$  cm

- c. 5. The length and breadth of a rectangular courtyard is 75 m and 32 m. find the cost of leveling it at the rate of \$3 per  $m^2$ . Also, find the distance covered by a boy to take 4 rounds of the courtyard. [4]

Solution:

Length of the courtyard = 75 m

Breadth of the courtyard = 32 m

$$\begin{aligned} \text{Perimeter of the courtyard} &= 2(75 + 32) \text{ m} \\ &= 2 \times 107 \text{ m} \\ &= 214 \text{ m} \end{aligned}$$

$$\begin{aligned} \text{Distance covered by the boy in taking 4 rounds} &= 4 \times \text{perimeter of courtyard} \\ &= 4 \times 214 \\ &= 856 \text{ m} \end{aligned}$$

$$\begin{aligned} \text{We know that area of the courtyard} &= \text{length} \times \text{breadth} \\ &= 75 \times 32 \text{ m}^2 \\ &= 2400 \text{ m}^2 \end{aligned}$$

For 1  $m^2$ , the cost of levelling = \$3

$$\begin{aligned} \text{For } 2400 \text{ m}^2, \text{ the cost of levelling} &= \$3 \times 2400 \\ &= \$7200 \end{aligned}$$

Question 8

- a. The cost price of 10 pens is the same as the selling price of  $n$  pens. If there is a loss of 40%, approximately what is the value of  $n$ ? [3]

Solution:

Let the price of each pen be Re. 1.

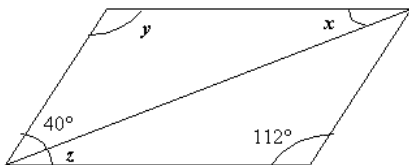
Then the cost price of  $n$  pens is Rs.  $n$  and the selling price of  $n$  pens is Rs. 10.

Loss =  $n-10$ .

Loss of 40%  $\rightarrow$   $(\text{loss}/\text{CP}) \times 100 = 40$

Therefore,  $[(n-10)/n] \times 100 = 40 \rightarrow n = 17$  (approx)

- b. Consider the following parallelograms. Find the values of the unknowns  $x$ ,  $y$ ,  $z$ . [3]



Answer:  $y = 112^\circ$ , as opposite angles are equal in a parallelogram

$$x = 180^\circ - (112^\circ - 40^\circ) = 28^\circ$$

As adjacent angles are complementary so angle of the bottom left vertex  $= 180^\circ - 112^\circ = 68^\circ$

$$\text{So, } z = 68^\circ - 40^\circ = 28^\circ$$

Another way of solving this is as follows:

As angles  $x$  and  $z$  are alternate angles of a transversal so they are equal in measurement.

- c. A piece of wire in the form of rectangle 40 cm long and 26 cm wide is again bent to form a circle. Find the radius of the circle. [4]

Solution:

Length of wire = Perimeter of rectangle

$$= 2(l + b)$$

$$= 2(40 + 26)$$

$$= 2 \times 66$$

$$= 132 \text{ cm}$$

When it is again bent to form a circle, then

Perimeter of circle = Perimeter of rectangle

$$2 \pi r = 132 \text{ cm}$$

$$\Rightarrow 2 \times \frac{22}{7} \times r = 132$$

$$\Rightarrow r = \frac{(132 \times 7)}{(2 \times 22)}$$

$$\Rightarrow r = 21 \text{ cm}$$