MATHS

BOOKS - S CHAND IIT JEE FOUNDATION

PERIMETER AND AREA

Solved Examples

1. Expenditure incurred in cultivating a square field at the rate of Rs. 170 per hectare is Rs.

680. What would be the cost of fencing the field at the rate of Rs. 3 per metre ?

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2. The length of the diagonal of a square and that of the side of another square are both 10 cm. What is the ratio of the area of the first square to that of the second ?

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3. The length of one pair of opposite sides of a square is reduced by 10% and that of the other pair is increased by 10%. Compare the area of the new rectangle with the area of the original square.

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4. The perimeter of the top of a rectangular table is 28 m whereas its ara is $48m^2$. What is the length of its diagonal ?

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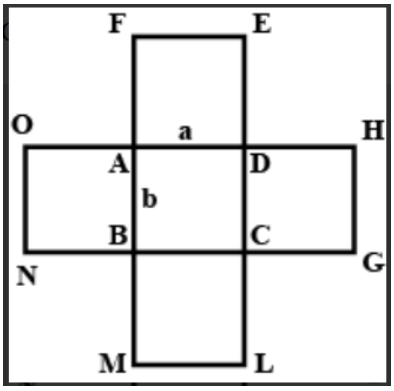
5. In the given diagram, ABCD is a rectangle. ADEF, CDHG, BCLM and ABNO are four squares. If the perimeter of ABCD is 16 cm and total area of the four squares is 68 cm^2, then what is the area of ABCD ?



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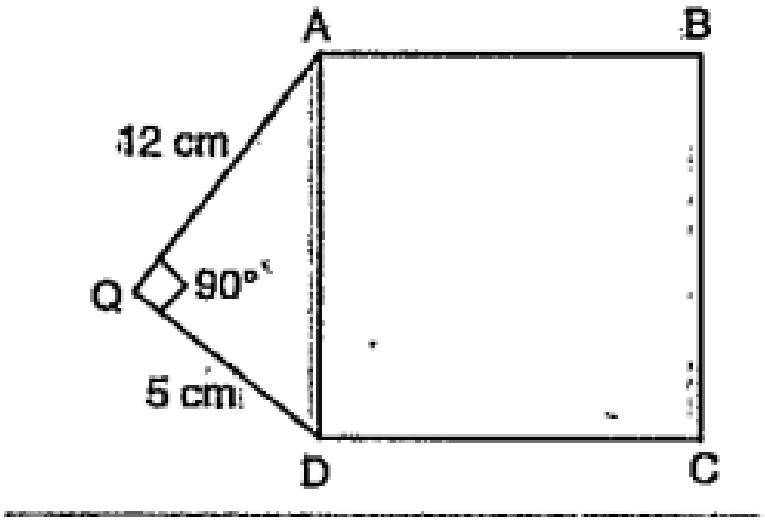
6. What is the area of the square ABCD shown in the diagram ?



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7. Find the area of a figure formed by a square of side 8 cm and an isosceles triangle with

base as one side of the square and perimeter as 18 cm.

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8. If the perimeter of a right angled isosceles triangle is $\sqrt{2}+1$, then what is the length of the hypotenuse ?

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9. If x is the length of a median of an equilateral triangle, then its area is x^2 (b) $\frac{1}{2}x^2$ (c) $\frac{\sqrt{3}}{2}x^2$ (d) $\frac{\sqrt{3}}{3}x^2$

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10. From a point in the interior of an equilateral triangle the perpendiculr distances of the sides are $\sqrt{3}$ cm, $2\sqrt{3}$ cm and $5\sqrt{3}$. What is the perimeter (in cm) of the triangle ?

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11. The sides of a triangle are 3 cm, 4 cm and 5 m . The area (in cm^2) of the triangle formed by joining the mid points of this triangle is :

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12. ABCD is a square of area 1 m^2. P and Q are the midpoints of AB and BC respectively. What is the area of Δ DPQ ?

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13. If the height of a triangle is decreased by 40% and its base is increased by 40%, what will be the effect on its area? (a) No change (b) 8% decrease (c) 16% increase (d) 16% decrease

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14. If an equilateral triangle of area X and a square of area Y have the same perimeter, then X is equal to Y (b) greater than Y (c) less than Y (d) less than or equal to Y

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15. A lawn is in the form of an isosceles triangle. The cost of turfing it come to Rs. 1200 at Rs. 4 per m^2. If the base be 40 m long, find the length of each side.

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16. If the sides of an equilateral triangle are increased by 20%, 30% and 50% respectively to form a new triangle, what is the percentage

increase in the perimeter of the equilateral triangle ?

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17. The base of a triangular field is three time its height. If the cost of cultivating the field at Rs. 26.38 per hectare is Rs. 356.13, find the base and height of the field.

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18. The adjacent sides of a parallelogram are 15 cm and 8 cm. If the distance between thelonger sides is 4 cm, find the distance between the shorter sides.

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19. If the base of a parallelogram is (x + 4), altitude to the base $(x-3)$ and the area is $\left(x^2-4\right)$, then the actual area is equal to .

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Question Bank 21 A

1. The length of a rectangle is increased by 60%. By what percent would the width have to be reduced to maintain the same area ?

A. $37\frac{1}{2}\%$

B. 60%

C. 75%

D. 120%

Answer: A

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2. A rectangular field has dimensions 25m by 15m. Two mutually perpendicular passages, 2 m wide have been left in its central part and grass has been grown in rest of the field. The area (in sq. metres) under the grass is (a) 295 (b) 299 (c) 300 (d) 375

A. 295 m^2

B. 299 m^2

C. 300 m^2

D. 375 m^2

Answer: B

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3. The diagonal of a square is $4\sqrt{2}$ cm. The diagonal of another square whose area is double that of the first square is

A. 8 cm

B. $8\sqrt{2}$ cm

C. 16 cm

D. $4\sqrt{2}$ cm

Answer: A

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4. If the length and breadth of a rectangular plot are each increased by 1 m, then the area of the floor is increased by 21 sq m. If the

length is increased by 1 m and breadth is decreased by 1 m, then the area is decreased by 5 sq m. What is is the perimeter of the floor ?

A. 30 m

B. 32 m

C. 36 m

D. 40 m

Answer: D

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5. A typist uses a sheet measuring 20 cm by 30 cm lengthwise. If a margin of 2 cm is left on each side and a 3 cm margin on top and bottom, then the percent of page used for typing is

A. 40%

B. 60%

C. 64%

D. 72%

Answer: C

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6. A rectangular farm has to be fenced on one long side, one short side and the diagonal. If the cost of fencing is Rs 100 per m, the area of the farm is 1200 m2 and the short side is 30 m long, how much would the job cost? (a) Rs 7000 (b) Rs 12000 (c) Rs 14000 (d) Rs 15000

A. Rs. 14,000

B. Rs. 12,000

C. Rs. 7000

D. Rs. 15,000

Answer: B

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7. The diagonal of a rectangle is $\sqrt{41}cm$ and its area is 20 sq. cm. The perimeter of the rectangle must be (a) 9 cm (b) 18 cm (c) 20 cm (d) 41 cm

A. 9 cm

B. 18 cm

C. 41 cm

D. 20 cm

Answer: B

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8. The length and breadth of a rectangle are in the ratio 3 : 2 respectively. If both the length and breadth are extended by 1 m, the ratio of

length to breadth becomes 10 : 7. Find the area of the original rectangle in square metres.

A. 23 m^2

B. 11 m^2

C. 54 m^2

D. 10 m^2

Answer: C

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9. The area of a 6 metres wide road outside a garden in all its four sides is 564 sq metres. If the length of the garden is 20 metres, what is its breadth ?

A. 18 metres

B. 16 metres

C. 15 metres

D. 19 metres

Answer: C

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10. The ratio between the length and breadth of a rectangular garden is 5 : 3. If the perimeter of the garden is 160 metres, what will be the area of 5 metre wide road around its outside ?

A. 600 m^2

B. 1200 m^2

C. 900 m^2

D. 1000 m^2

Answer: C

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11. A square S_1 encloses another square S_2 in such a manner that each corner of S_2 is at the mid-point of the side of S_1 . If A_1 is the area of S_1 and A_2 is the area of S_2 , then $A_1 = 4\,A_2$ (b) $A_1 = 2\,A_2$ (c) $A_2 = 2\,A_1$ (d) $A_1 = A_2$

A. $A_1 = A_2$

B. $A_2 = 2A_1$

C. $A_1 = 2A_2$

D. $A_1 = 4A_2$

Answer: C

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12. The perimeter of a rectangle and a square are 160 m each. The area of the rectangle is less than that of the square by 100 sq. m. The length of the rectangle is (a) 30m (b) 40m (c) 50m (d) 60m

A. 30 m

B. 60 m

C. 40 m

D. 50 m

Answer: D

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13. The ratio between the length and perimeter of a rectangular plot is 1 : 3. What is

the rato between the length and breadth of the plot ?

A. $1:2$

B. $2:1$

C. $3:2$

D. $1:3$

Answer: B

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14. A rectangular paper, when folded into two congruent parts had a perimeter of 34 cm for each part folded along one set of sides and the same is 38 cm when folded along the other set of sides. What is the area of the paper? (a) 140cm2 (b) 240cm2 (c) 560cm2 (d) None of these

A. 140 cm^2

B. 240 cm^2

C. 560 cm^2

D. 646 cm^2

Answer: A

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15. 50 square stone slabs of equal size were needed to cover a floor area of 72 sq. m. The length of each stone slab is (a) 102cm (b) 120cm (c) 201cm (d) 210cm

A. 102 cm

B. 120 cm

C. 201 cm

D. 210 cm

Answer: B

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16. In a rectangle, the difference between the sum of adjacent sides and the diagonal is half the length of longer side. What is the ratio of the shorter to the longer side ?

A. $\sqrt{3}:2$

B. $1:\sqrt{3}$

C. $2:5$

D. $3:4$

Answer: D

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17. A took 15 seconds to cross a rectangular field diagonally walking at the rate of 52 m/min and B took the same time to cross the

same field along its sides walking at the rate of 68 m/min. The area of the field is (a) 30m2 (b) 40m2 (c) 50m2 (d) 60m2

A. 30 m^2

B. 40 m^2

C. 50 m^2

D. 60 m^2

Answer: D

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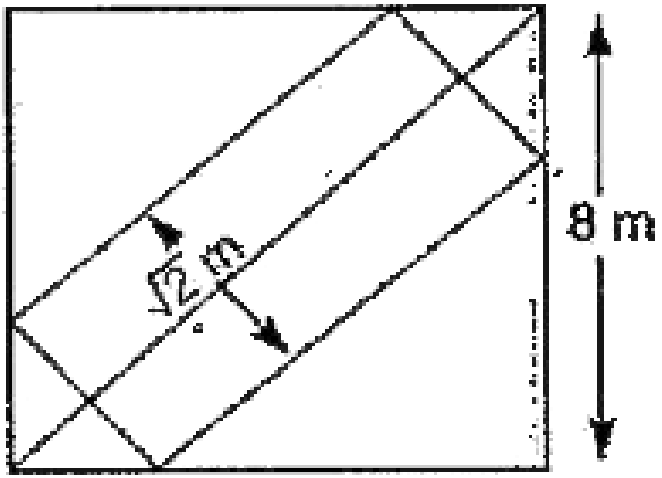
18. A rectangular plank $\sqrt{2}$ m wide is placed symmetrically on the diagonal of a square of side 8 metres as shown. What is the area of the plank ?



A. $\left(16\sqrt{2}-3\right)$ sq m

B. $7\sqrt{2}$ sq m

C. 98 sq m

D. 14 sq m

Answer: D

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19. Four sheets of 50 cm $\times$ 5 cm are to be arranged in such a manner that a square could be formed. What will be the area of inner part of the square so formed ?

A. 2000 cm^2

B. 2025 cm^2

C. 1800 cm^2

D. 2500 cm^2

Answer: B

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Question Bank 21 B

1. The base of a triangle is 15cm and height is 12cm. The height of another triangle of double the area having the base 20cm is (a) 8cm (b) 9cm (c) 12.5cm (d) 18cm

A. 8 cm

B. 9 cm

C. 12.5 cm

D. 18 cm

Answer: D

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2. If the area of a triangle is 1176 cm2 and base : corresponding altitude is 3 : 4, then the altitude of the triangle is (a) 42 cm (b) 52 cm (c) 54 cm (d) 56 cm

A. 42 m

B. 52 m

C. 54 m

D. 56 m

Answer: D

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3. The hypotenuse of a right-angled isosceles triangle is 5 cm. The area of the triangle is (a) 5 cm2 (b) 6.25 cm2 (c) 6.5 cm2 (d) 12.5 cm2

A. 5 cm^2

B. 6.25 cm^2

C. 6.5 cm^2

D. 12.5 cm^2

Answer: B

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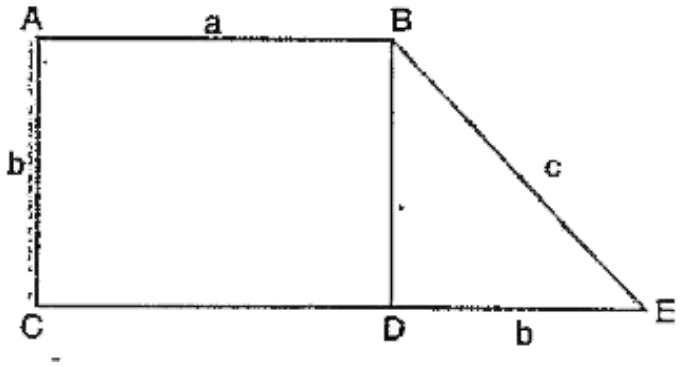
4. What is the area of the given figure ? ABCD is a rectangle and BDE is an isosceles right triangle.



A. ab

B. ab^2

C. cab

D. $b(a+b/2)$

Answer: D

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5. The ratio of bases of two triangles is $x:y$ and that of their areas is $a:b$. Then the ratio of their corresponding altitudes will be $ax:by$

(b) $\frac{a}{x}:\frac{b}{y}$ (c) $ay:bx$ (d) $\frac{x}{a}:\frac{b}{y}$

A. $\frac{a}{x}.\frac{b}{y}$

B. $ax:by$

C. $ay:bx$

D. $\frac{x}{a}.\frac{b}{y}$

Answer: A

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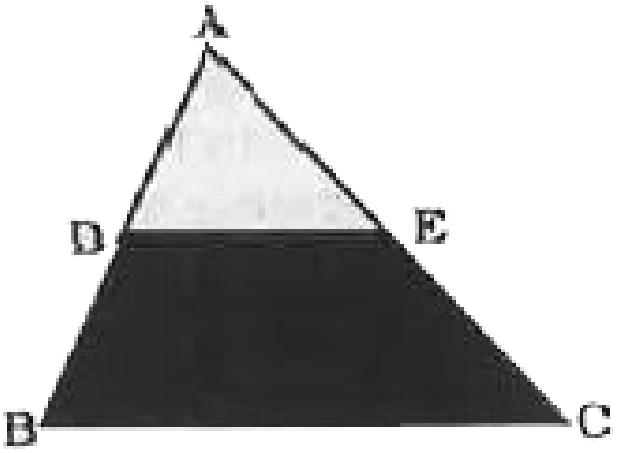
6. If D and E are the mid points of the sides AB and AC respectively of the triangle ABC in the figure given here, the shaded region of the

triangle is what per cent of the whole triangular region?



A. 0.5

B. 0.25

C. 0.75

D. 0.6

Answer: C

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7. The perimeter of a right angled triangle is 60 cm. Its hypotenuse is 26 cm. The area of the triangle is

A. 120 cm^2

B. 240 cm^2

C. 390 cm^2

D. 780 cm^2

Answer: A

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8. The area of an equilateral triangle is $400\sqrt{3}$ sq.m. Its perimeter is :

A. 120 m

B. 150 m

C. 90 m

D. 135 m

Answer: A

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9. The areas of two equilateral triangles are in the ratio 25:36. Their altitudes will be in the ratio (a) 25:36 (b) 36:25 (c) 5:6 (d) $\sqrt{5} : \sqrt{6}$

A. $36 : 25$

B. $25 : 36$

C. $5 : 6$

D. $\sqrt{5} : \sqrt{6}$

Answer: C

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10. From a point within an equilateral triangle, perpendiculars drawn to the three sides are 6 cm, 7 cm and 8 cm respectively. The length of the side of the triangle is

A. 7 cm

B. 10.5 cm

C. $14\sqrt{3}$ cm

D. $\frac{14\sqrt{3}}{3}$ cm

Answer: C

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11. The height of an equilateral triangle is 10 cm. Its area is

A. $\frac{100}{3}cm^2$

B. 30 cm^2

C. 100 cm^2

D. $\frac{100}{\sqrt{3}} cm^2$

Answer: D

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12. An equilateral triangle is described on the diagonal of a square. What is the ratio of the area of the triangle to that of the square?

$2 : \sqrt{3}$ (b) $4 : \sqrt{3}$ (c) $\sqrt{3} : 2$ (d) $\sqrt{3} : 4$

A. $2 : \sqrt{3}$

B. $4:\sqrt{3}$

C. $\sqrt{3}:2$

D. $\sqrt{3}:4$

Answer: C

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13. A square and an equilateral triangle have the same perimeter. If the diagonal of the square is $12\sqrt{2}$ cm, then the area of the triangle is

A. $24\sqrt{3}cm^2$

B. $24\sqrt{2}cm^2$

C. $64\sqrt{3}cm^2$

D. $32\sqrt{3}cm^2$

Answer: C

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14. If the side of an equilateral triangle is decreased by 20%, its area is decreased by (a) 36% (b) 40% (c) 60% (d) 64%

A. 0.36

B. 0.64

C. 0.4

D. 0.6

Answer: A

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15. If the sides of a triangle are 5 cm, 4 cm and $\sqrt{41}$ cm, then the area of the triangle is

A. 20 cm^2

B. $\left(5+4+\sqrt{41}\right)cm^2$

C. $\frac{5+4+\sqrt{41}}{2}cm^2$

D. 10 cm^2

Answer: D

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16. The area of a triangle is 216 cm2 and its sides are in the ratio 3:4:5. The perimeter of

the triangle is (a) 6cm (b) 12cm (c) 36cm (d) 72cm

A. 6 cm

B. 12 cm

C. 36 cm

D. 72 cm

Answer: D

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17. In a triangular field having sides 30 m, 72 m and 78 m, the length of the altitude to the side measuring 72 m is

A. 25 m

B. 28 m

C. 30 m

D. 35 m

Answer: C

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18. If every side of an equilateral triangle is doubled, the area of the new triangle is K times the area of the old one. K is equal to

A. $\sqrt{2}$

B. 2

C. 3

D. 4

Answer: D

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19. If the perimeter of a right angled isosceles triangle is $\left(6+3\sqrt{2}\right)$ m, then the area of the triangle will be

A. 4.5 m^2

B. 5.4 m^2

C. 9 m^2

D. 81 m^2

Answer: A

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20. If A be the area of a right triangle and b one of the sides containing the right angle, prove that the length of the altitude on the hypotenuse is $\frac{2AB}{\sqrt{b^4+4A^2}}$

A. $\frac{2Ab}{\sqrt{b^2+4A^2}}$

B. $\frac{2Ab}{b^2+4A^2}$

C. $\frac{2Ab}{\sqrt{b^4+4A^4}}$

D. $\frac{2Ab}{\sqrt{b^4+4A^2}}$

Answer: D

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21. Inside an equiangular triangular park, there is a flower bed forming a similar triangle. Around the flower bed runs a uniform path of such a width that the sides of the park are exactly double the corresponding sides of the flower bed. The ratio of the areas of the path to the flower bed is

A. $1:1$

B. $1:2$

C. $1:3$

D. $3:1$

Answer: D

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Question Bank 21 C

1. A rectangle and a parallelogram have equal areas. If the sides of a rectangle are 10 m and

12 m and the base of the parallelogram is 20 m, then the altitude of the parallelogram is

A. 7 m

B. 6 m

C. 5 m

D. 3 m

Answer: B

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2. If a parallelogram with area P , a rectangle with area R and a triangle with area T are all constructed on the same base and all have the same altitude, then which of the following statements is false? $P = R$ (b) $P + T = 2R$ (c) $P = 2T$ (d) $T = \frac{1}{2}R$

A. P = 2T

B. $T = \frac{1}{2}R$

C. P = R

D. $P + T = 2R$

Answer: D

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3. The base of a parallelogram is three times its height. If the area of the parallelogram is 75 sq cm, then its height is

A. 5 cm

B. $5\sqrt{2}$ cm

C. $3\sqrt{2}$ cm

D. 15 cm

Answer: A

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4. A triangle and a parallelogram are constructed on the same base such that their areas are equal. If the altitude of the parallelogram is 100m, then the altitude of the triangle is $10\sqrt{2}m$ (b) $100m$ (c) $100\sqrt{2}m$ (d) $200m$

A. 100 m

B. 200 m

C. $100\sqrt{2}$ m

D. $10\sqrt{2}$ m

Answer: B

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5. A rectangle and a parallelogram have equal areas. The base of the parallelogram is 20 cm and the altitude is 6 cm. Which one of the

following cannot be the ratio of dimensions of the rectangle ?

A. $7:5$

B. $40:3$

C. $15:2$

D. $30:1$

Answer: A

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6. A parallelogram has sides 30 m, 70 m and one of its diagonals is 80 m long. Its area will be

A. 600 m^2

B. $1200\sqrt{3}m^2$

C. 1200 m^2

D. $600\sqrt{3}m^2$

Answer: B

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7. One diagonal of a parallelogram is 40 cm and the perpendicular distance of this diagonal from either of the outlying vertices is 19 cm. The area of the parallelogram (in sq cm) is

A. 700 cm^2

B. 380 cm^2

C. 760 cm^2

D. 1140 cm^2

Answer: C

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8. The ratio of two adjacent sides of a parallelogram is 3 : 4. Its perimeter is 105 cm. Find its area if altitude corresponding to the larger side is 15 cm.

A. 900 cm^2

B. 600 cm^2

C. 300 cm^2

D. 450 cm^2

Answer: D

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9. The area of a rhombus is 128 cm^2 and its perimeter is 32 cm. The altitude of the rhombus is

A. 7 cm

B. 8 cm

C. 16 cm

D. 12 cm

Answer: C

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10. ABCD is a parallelogram P and R are two points on AB such that the area of parallelogram ABCD is 8 times the area of Δ DPR. If PR = 5 cm, then CD is equal to

A. 10 cm

B. 5 cm

C. 20 cm

D. 12 cm

Answer: C

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Self Assessment Sheet

1. Two sides of a parallelogram are 10 cm and 15 cm. If the altiude corresponding to the side of length 15 cm is 5 cm, then what is the altitude to the side of length 10 cm ?

A. 5 cm

B. 7.5 cm

C. 10 cm

D. 15 cm

Answer: B

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2. What is the area of a right angled isosceles triangle whose hypotenuse is $6\sqrt{2}$cm?

A. 12 cm^2

B. 18 cm^2

C. 24 cm^2

D. 36 cm^2

Answer: B

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3. If A is the area of a triangle in cm^2, whose sides are 9 cm, 10 cm and 11 cm, then which one of the following is correct ?

A. $A < 40cm^2$

B. $40cm^2 < A < 45cm^2$

C. $45cm^2 < A < 50cm^2$

D. $A > 50cm^2$

Answer: B

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4. The cost of turfing a triangular field at the rate of Rs. 45 per 100 m^2 is Rs. 900. If double

the base of the triangle is 5 times the height, then the height is :

A. 50 m

B. 45 m

C. 60 m

D. 40 m

Answer: D

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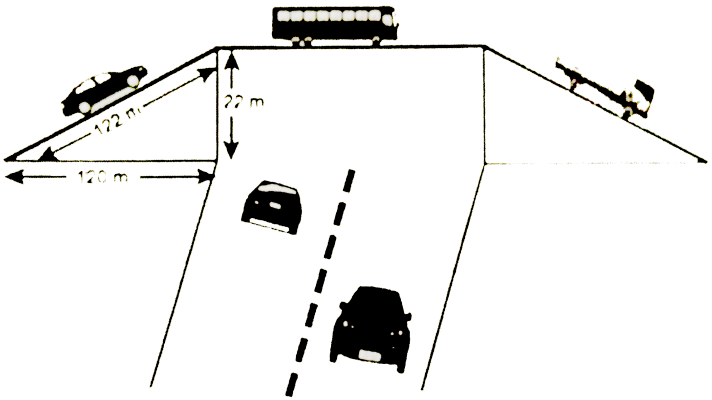
5. This triangular side walls of a flyover have been used for advertisements. This sides of the walls are 122 m, 22m and 120 m (see figure). The advertisements yield an earning of Rs. 500 per m^2 per year. A company hired one of its walls for 3 months. How much rent did it pay ?



A. 1750000

B. 1600000

C. 1650000

D. None of these

Answer: C

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6. Ther perimeter of a square is 48 m. The area of a rectangle is 4 sq m less than the area of

given square. If the length of the rectangle is 14 m, find the breadth.

A. 8 m

B. 9 m

C. 10.5 m

D. 10 m

Answer: D

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7. A rectangle lawn $80m \times 60m$ has two roads each with 10 m wide running in the middle of it,one parallel to the length and the other parallel to the breadth. The cost of gravelling them at 30 paise sq. m is

A. Rs. 38000

B. Rs. 40000

C. Rs. 39000

D. Rs. 39500

Answer: C

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8. The length of one diagonal of a rhombus is 80% of the other diagonal. The area of the rhombus is how many times the square of the length of the other diagonal? $\frac{4}{5}$ (b) $\frac{2}{5}$ (c) $\frac{3}{4}$ (d) $\frac{1}{4}$

A. $\frac{2}{5}$

B. $\frac{4}{5}$

C. $\frac{3}{4}$

D. $\frac{1}{4}$

Answer: A

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9. The area of a rhombus, one of whose diagonals measures 8 cm and the side is 5 cm, is :

A. 25 cm^2

B. 24 cm^2

C. 24.5 cm^2

D. 26 cm^2

Answer: B

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10. A parallelogram has two sides 60 m and 25 m and a diagonal 65 m long. The area of the parallelogram is :

A. 1000 m^2

B. 1400 m^2

C. 1600 m^2

D. 1500 m^2

Answer: D

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