MATHS

BOOKS - S CHAND IIT JEE FOUNDATION

POLYGONS AND QUADRILATERALS

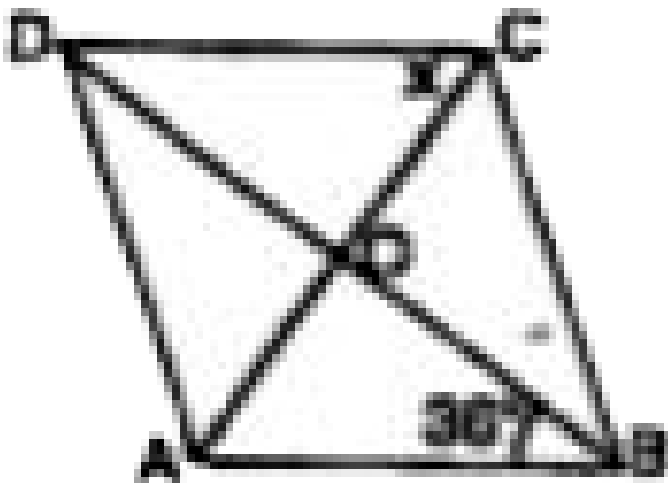**Solved Examples**

1. PQRS is a rhombus with $\angle PQR = 54°$. Determine $\angle PRS$.

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2. Show that the quadrilateral formed by joining the mid-points of the consecutive sides of a rectangle is a rhombus.
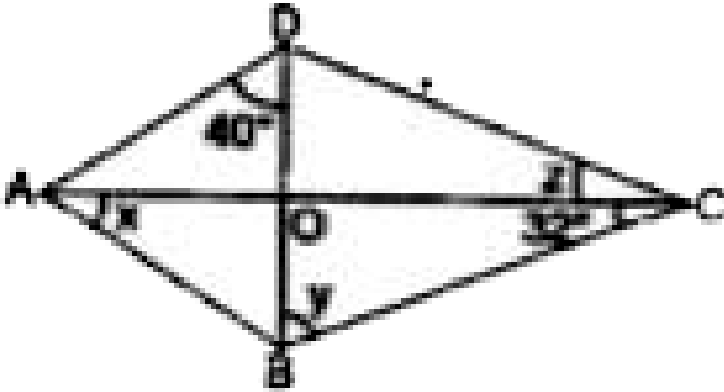
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3. Find x in the given rhombus.

4. In the given kite, calculate x, y and z.

5. The alternate sides of any regular pentagon are produced to meet so as to form a star shaped figure, shown in the given figure. Show that $\angle x + \angle y + \angle z + \angle t + \angle u = 180°$

6. KLMN is an isosceles trapezium whose diagonals cut at X and KL is parallel to NM. If $\angle KNL = 25°$, $\angle KMN = 30°$ $\angle KLN = 40°$, find $\angle NKX$

Question Bank 23

1. If one side of a regular polygon with seven sides is produced, the exterior angle (in degrees) has the magnitude :

   A. 60

   B. $51\dfrac{3}{7}$

   C. 45

   D. 40

Answer: B

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2. How many sides does a regular polygon have, whose interior angle is eight times its exterior angle ?
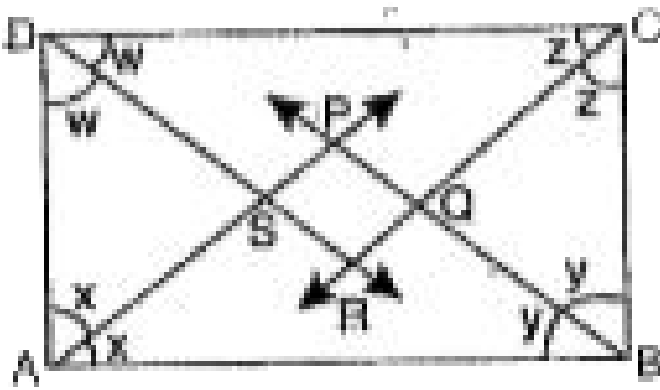
A. 16

B. 24

C. 18

D. 20

Answer: C

3. Any cyclic parallelogram having unequal adjacent sides is necessarily a

A. square

B. rectangle

C. rhombus

D. trapezium

Answer: B

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4. In the given figure, ABCD is a parallelogram. The quadrilateral PQRS is exactly

A. a square

B. a parallelogram

C. a rectangle

D. a rhombus

Answer: C

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5. If angles A, B, C and D of the quadrilateral ABCD, taken in order are in the ratio 3 : 7 : 6 : 4, then ABCD is a

A. rhombus

B. parallelogram

C. trapezium
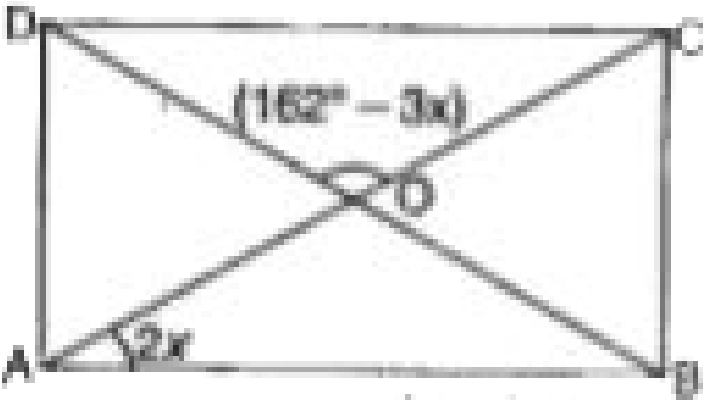
D. kite

Answer: C

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6. The figure formed by joining the mid-points of adjacent sides of a rhombus is

A. a square

B. rectangle

C. trapezium

D. none of these

7. ABCD is a rectangle. Find x.

A. $54°$

B. $36°$

C. $24°$

D. $18°$

Answer: D

8. PQRS is a parallelogram. Then y equals.
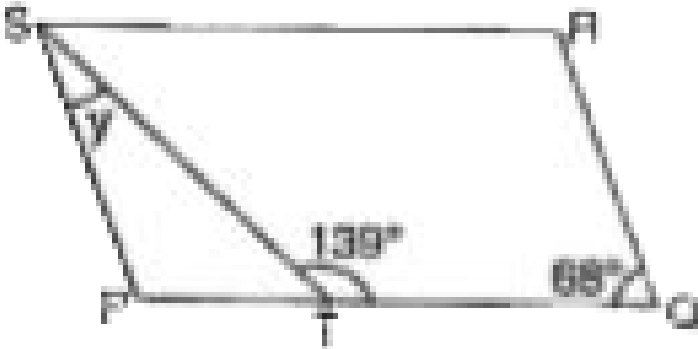
A. $27°$

B. $61°$

C. $41°$

D. $28°$

Answer: A

9. ABCD is a rhombus. $\angle DAB = 2x + 15°$, angle DCB =$3x - 30°$, angle BDC equals

10. PQRS is a kite. $\angle P = 70°$, $\angle S = 90.5°$, $\angle R$ equals
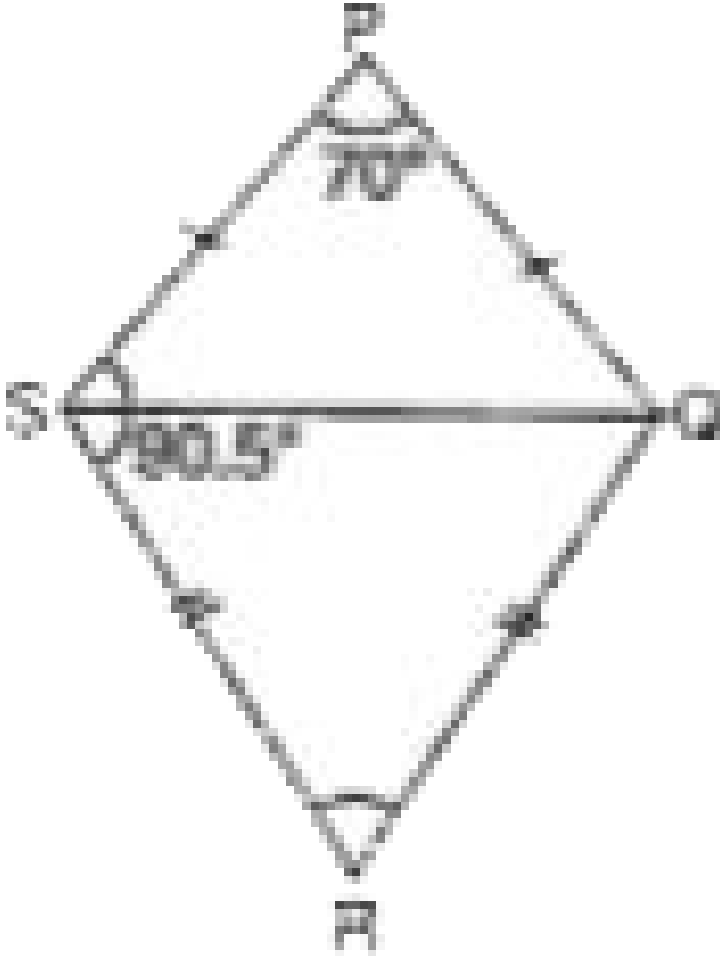
A. $99°$

B. $91°$

C. $111°$

D. $109°$

Answer: D

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11. If the bisector of the angles A and B of a quadrilateral ABCD meet at O, then $\angle AOB$ is equal to:

A. $\angle C + \angle D$

B. $\dfrac{1}{2}(\angle C + \angle D)$

C. $\dfrac{1}{2}\angle C + \dfrac{1}{3}\angle D$

D. $\dfrac{1}{3}\angle C + \dfrac{1}{2}\angle D$

Answer: B

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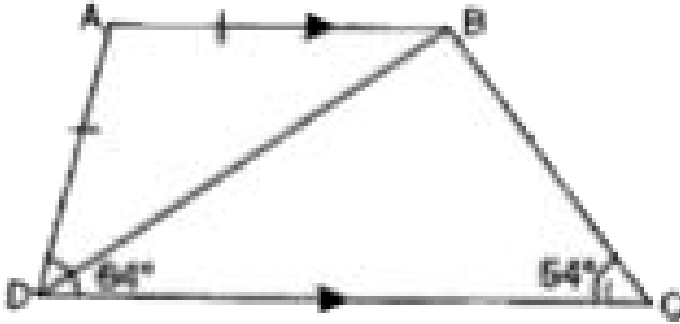**12.** ABCD is a rectangle with $\angle BAC = 48°$. Then $\angle DBC$ equals

A. $38°$

B. $48°$

C. $132°$

D. $42°$

Answer: D

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13. In a trapezium ABCD, AB||DC, AB = AD, $\angle ADC = 64°$ and $\angle BCD = 54°$. Find $\angle DBC$.

A. $64°$

B. $72°$
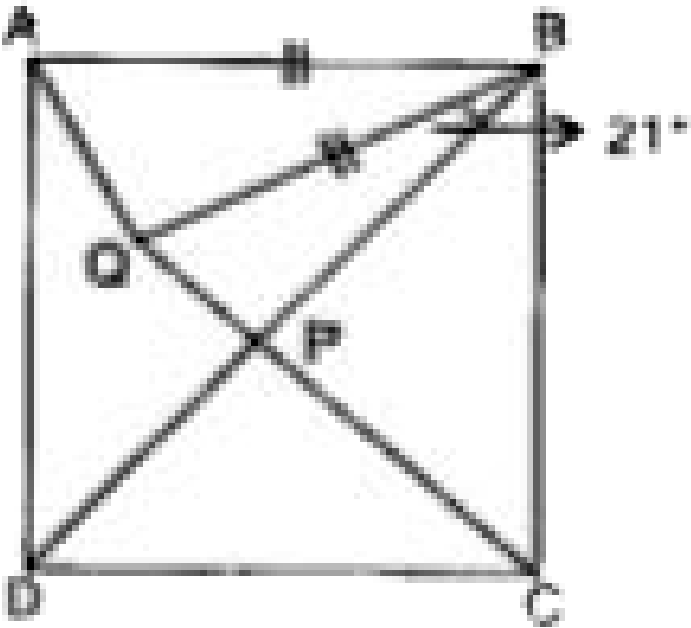
C. $94°$

D. $116°$

Answer: C

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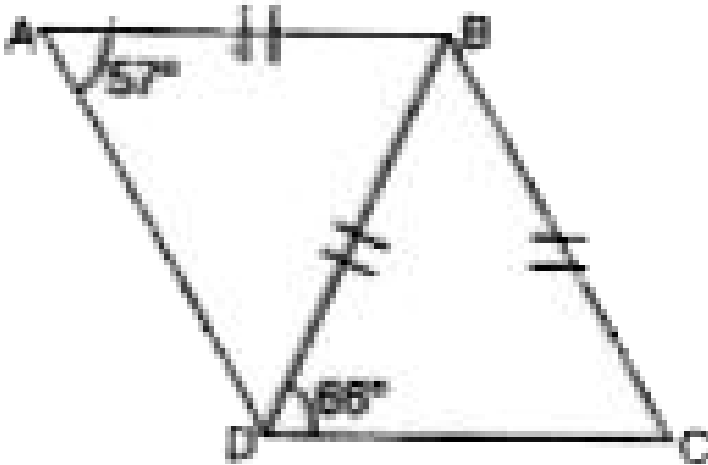**14.** ABCD is a square, BA = BQ, QRC and BPD are straight lines and $\angle PBQ = 21°$. Then, $\angle BAQ$ equals

A. $60°$

B. $84°$

C. $78°$

D. $74.5°$

Answer: C

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15. In the diagram, ABD and BCD are isosceles triangles, where AB = BC = BD. The sqecial name that is given to quadrilateral ABCD is :
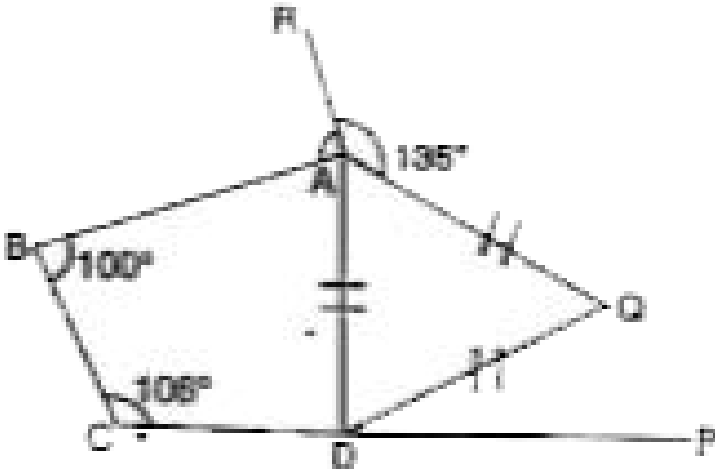

A. rectangle

B. kite

C. parallelogram

D. trapezium

Answer: D

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16. In the diagram, CDP is a straight line, △ AQD is equilateral $\angle BAR = 90°$, $\angle QAR = 135°$, $\angle BCD = 106°$ and $\angle ABC = 100°$. Then, $\angle PDQ$ equals.

A. $39°$

B. $21°$
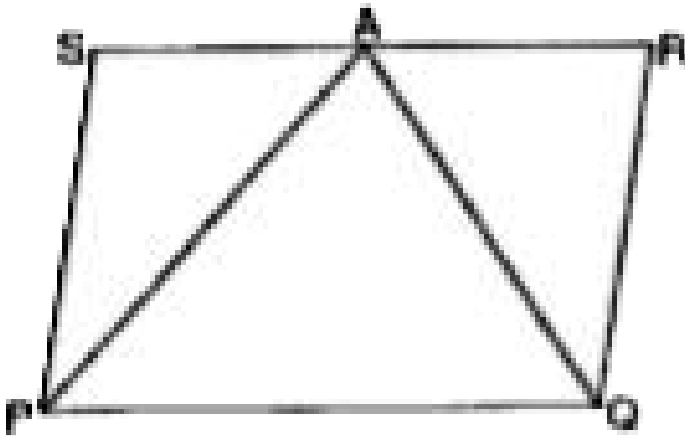
C. $41°$

D. $53°$

Answer: C

17. In the given figure, PQRS is a parallelogram and $\angle SPQ = 60°$. If the bisectors of $\angle P$ and $\angle Q$ meet at A on RS, then which of the following is not correct ?
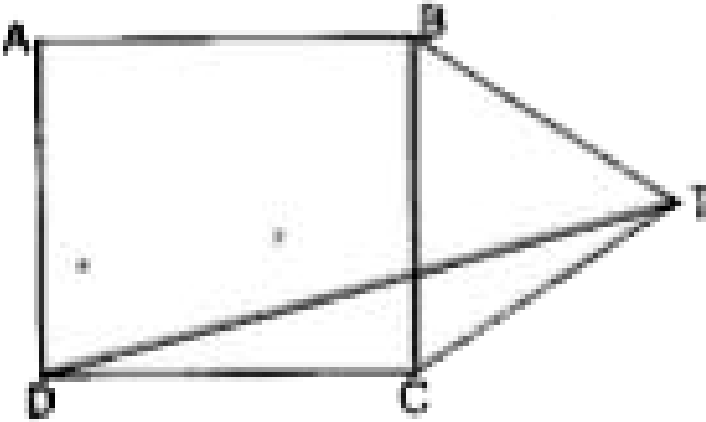

A. AS = SP

B. AS = AR

C. AR = SP

D. AQ = PQ

Answer: D

18. In the given diagram, ABCD is a square and $\triangle$ BCT is an equilateral triangle. $\angle$ BTD equals
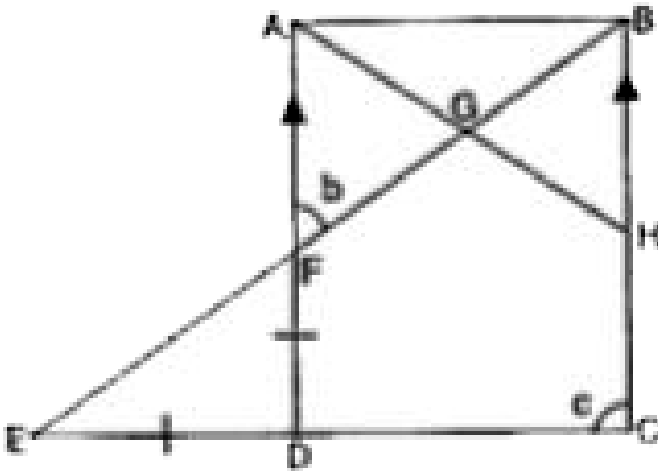

A. 30°

B. 15°

C. 45°

D. $35°$

Answer: C

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19. In the given figure, AD||BC, $\angle AFG = b$ and $\angle BCD = c$.

Express b in terms of c.

A. $\dfrac{c}{2}$

B. $\dfrac{90° + c}{2}$

C. $180° - \dfrac{c}{2}$

D. $90° - \dfrac{c}{2}$

Answer: D

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20. If the angles of a triangle are in the ratio $4 : 7 : 7$, then what type of triangle is it ?

A. Isosceles

B. Scalene

C. Equilateral

D. Right-angled

Answer: A

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1. Given a trapezium ABCD in which AB||CD and AD = BC. If $\angle C = 76°$, then $\angle D$ equals

    A. $14°$

    B. $104°$

    C. $76°$

    D. none of these

Answer: C

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2. The figure formed by joining the mid-points of the sides of a quadrilateral ABCD taken in order is a square only, if

    A. ABCD is a rhombus.

    B. diagonals of ABCD are equal.

    C. diagonals of ABCD are equal and perpendicular.

    D. diagonals of ABCD are perpendicular.

Answer: C

3. A diagonal of a rectangle is inclined to one side of a rectangle at $34°$. The acute angle between the diagonals is :
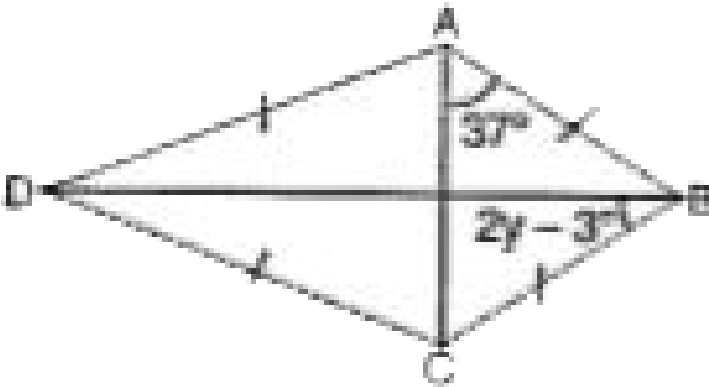
    A. $34°$

B. $56°$

C. $68°$

D. $42°$

Answer: C

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4. In the given kite, y equals

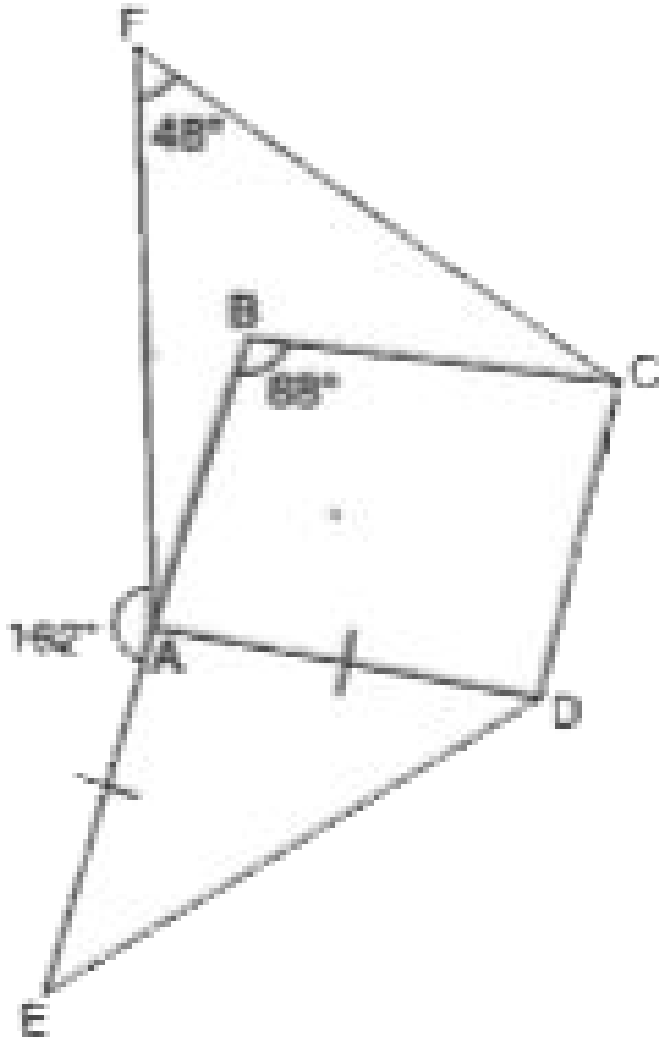A. $37°$

B. $28°$

C. $20°$

D. $40°$

Answer: B

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5. In the given figure, ABCD is a parallelogram, AD = AE, BAE is a straight line, $\angle ABC = 88°$, $\angle EAF = 162°$ and $\angle AFC = 48°$.

Then ∠ BCF equals.

A. $18°$

B. $28°$

C. $22°$

D. $32°$

Answer: C

6. Diagonals of a quadrilateral PQRS bisect each other at right angles. If PQ = 5.5 cm, then the perimeter of PQRS is
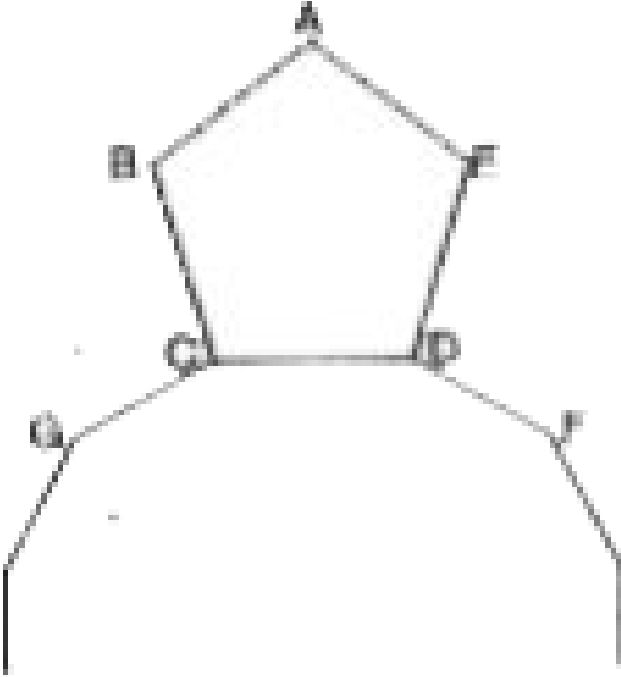
A. $11 cm$

B. $22 cm$

C. $16.5 cm$

D. $5.5(1 + \sqrt{2})$ cm

Answer: B

7. ABCDE is a regular pentagon with sides of length 6 cm. CD is also a side of a regular polygon with n sides. Given that $\angle EDF = 90°$, find n.
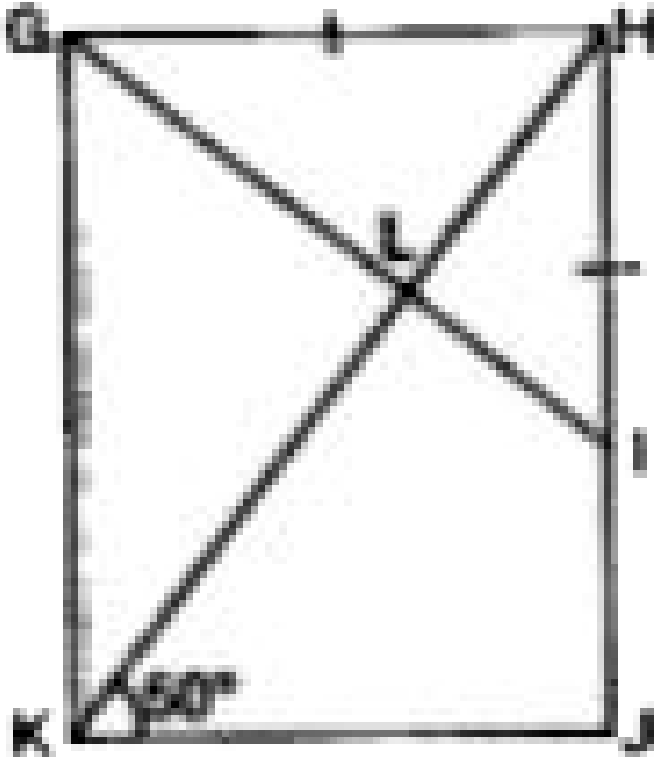

A. $18°$

B. $10°$

C. $20°$

D. $12°$

Answer: C

8. GHJK is a rectangle. GH = HI and $\angle HKJ = 50°$. HLK and GLI are straight lines. Find $\angle GLK$.

A. $100°$

B. $130°$

C. $95°$

D. $135°$

Answer: C

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9. ABCD is a rhombus in which altitude from point D to the side AB

bisects AB. The angles of the rhombus are :

A. $150°, 30°, 150°, 30°$

B. $135°, 45°, 135°, 45°$

C. $116\frac{1}{3}°, 63\frac{2}{3}°, 116\frac{1}{3}°, 62\frac{2}{3}°$

D. $120°, 60°, 120°, 60°$

Answer: D

10. Given an equilateral triangle ABC, D, E and F are the mid-points of the sides AB, BC and AC respectively, then the quadrilateral BEFD is exactly a

    A. square

    B. rectangle

    C. parallelogram

    D. rhombus

Answer: D