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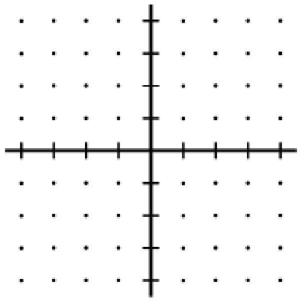
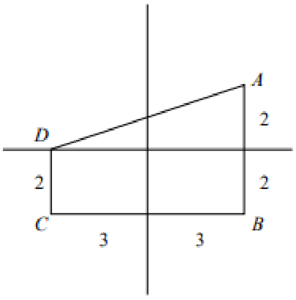
2001 Q11

11. Points A, B, C and D have these coordinates: $A(3,2)$, $B(3,-2)$, $C(-3,-2)$ and $D(-3,0)$. The area of quadrilateral $ABCD$ is

(A) 12 (B) 15 (C) 18 (D) 21 (E) 24



11. (C) The lower part is a 6×2 rectangle with area 12. The upper part is a triangle with base 6 and altitude 2 with area 6. The total area is $12 + 6 = 18$.



OR

Trapezoid $ABCD$ has bases 2 and 4 with altitude 6. Using the formula:

$$A = \frac{h(b_1 + b_2)}{2}, \text{ the area is } \frac{6(2+4)}{2} = 18.$$

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1985 Q12

12. A square and a triangle have equal perimeters. The lengths of the three sides of the triangle are 6.2 cm, 8.3 cm and 9.5 cm. The area of the square is

A) 24 cm^2 B) 36 cm^2 C) 48 cm^2 D) 64 cm^2 E) 144 cm^2

12. (B) The perimeter of the triangle and the square is $6.2 + 8.3 + 9.5 = 24$ cm. Thus the length of the side of the square is 6 cm and the area is 36 cm^2.

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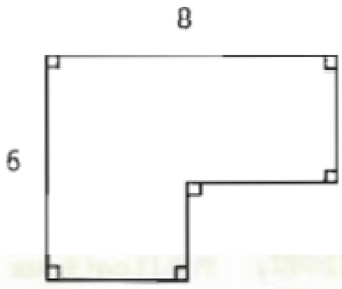
1986 Q13

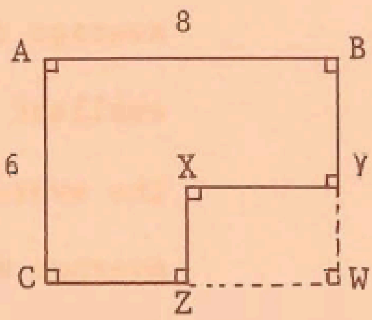
13. The perimeter of the polygon shown is

A) 14 B) 20 C) 28 D) 48

E) cannot be determined from the information given



13. (C) Since XY = ZW and XZ = YW, the perimeter of polygon ABYXZC is equal to the perimeter of rectangle ABWC, or $2(8 + 6) = 28$. Note that the solution to the problem does not depend on the position of the point X inside the rectangle.



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1988 Q13

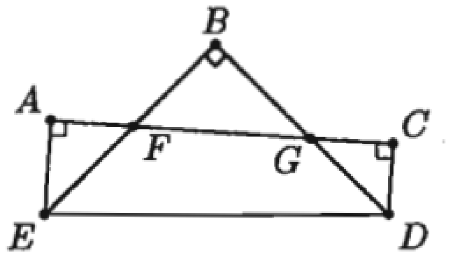
13. If rose bushes are spaced about 1 foot apart, approximately how many bushes are needed to surround a circular patio whose radius is 12 feet?

A) 12 B) 38 C) 48 D) 75 E) 450

13. D The circumference of the circular patio is $2\pi(12) \approx (2)(3.14)(12) \approx 75$ feet, thus it would take about 75 bushes to surround the patio.

1995 Q13

13. In the figure, $\angle A$, $\angle B$ and $\angle C$ are right angles. If $\angle AEB = 40°$ and $\angle BED = \angle BDE$, then $\angle CDE =$



(A) 75° (B) 80° (C) 85°
(D) 90° (E) 95°

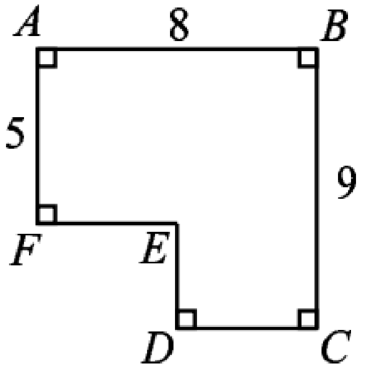
13. (E) In $\triangle BDE$, $\angle BED + \angle BDE + \angle B = 180°$. Since $\angle BED = \angle BDE$ and $\angle B = 90°$, it follows that $\angle BED = \angle BDE = 45°$. In $\triangle AEF$, $\angle A + \angle AEF + \angle AFE = 180°$. Since $\angle A = 90°$ and $\angle AEF = 40°$, it follows that $\angle AFE = 50°$. Consequently $\angle BFG = 50°$ in $\triangle BFG$ and, since $\angle B = 90°$, it follows that $\angle BGF = 40°$. Consequently $\angle CGD = 40°$ in $\triangle CDG$, and since $\angle C = 90°$, it follows that $\angle CDG = 50°$. Thus $\angle CDE = 50° + 45° = 95°$.

OR

As in the first solution, $\angle BED = \angle BDE = 45°$. Then $\angle AED = 40° + 45° = 85°$. Since the four angles of a quadrilateral sum to 360°, we have $\angle A + \angle C + \angle AED + \angle CDE = 360°$. Thus $\angle CDE = 360° - 90° - 90° - 85° = 95°$.

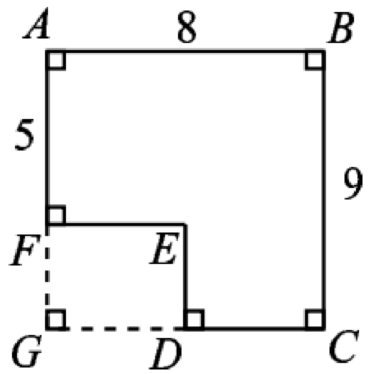
2005 Q13

13. The area of polygon $ABCDEF$ is 52 with $AB = 8$, $BC = 9$ and $FA = 5$. What is $DE + EF$?



(A) 7 **(B)** 8 **(C)** 9 **(D)** 10 **(E)** 11

13. **(C)**

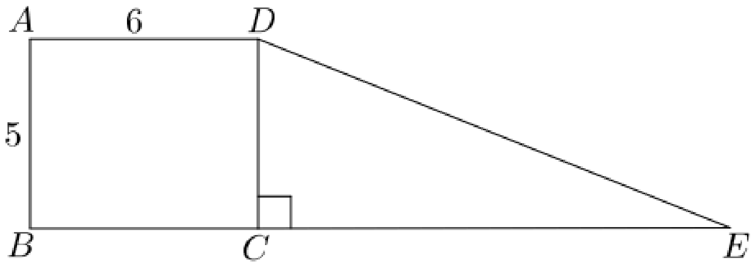


Rectangle $ABCG$ has area $8 \times 9 = 72$, so rectangle $FEDG$ has area $72 - 52 = 20$. The length of $\overline{FG}$ equals $DE = 9 - 5 = 4$, so the length of $\overline{EF}$ is $\frac{20}{4} = 5$. Therefore, $DE + EF = 4 + 5 = 9$.

2014 Q14

14. Rectangle $ABCD$ and right triangle DCE have the same area. They are joined to form a trapezoid, as shown. What is DE?

(A) 12 **(B)** 13 **(C)** 14 **(D)** 15 **(E)** 16



14. **Answer (B):** The area of rectangle $ABCD$ is $5 \cdot 6 = 30$. The area of triangle DCE is also 30, which is half of the product $CD \cdot CE$, so that product is 60. Because $CD = AB = 5$, CE must equal $\frac{60}{5} = 12$, and by the Pythagorean Theorem, $DE = \sqrt{CD^2 + CE^2} = \sqrt{5^2 + 12^2} = \sqrt{169} = 13$.

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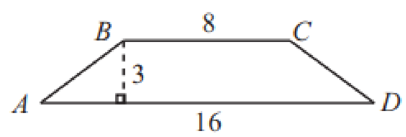
1999 Q14

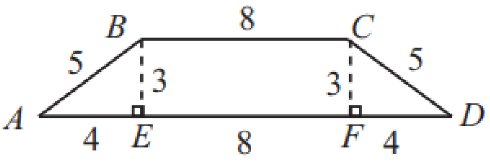
14. In trapezoid $ABCD$, the side AB and CD are equal. The perimeter of $ABCD$ is



(A) 27 **(B)** 30 **(C)** 32

(D) 34 **(E)** 48

14. **Answer (D):** When the figure is divided, as shown the unknown sides are the hypotenuses of right triangles with legs of 3 and 4. Using the Pythagorean Theorem yields $AB = CD = 5$. The total perimeter is $16 + 5 + 8 + 5 = 34$.



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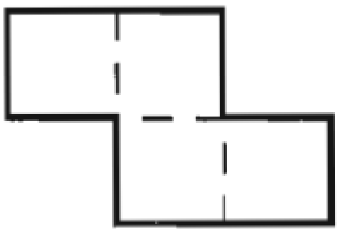
1990 Q15

15. The area of this figure is 100 cm^2. Its perimeter is

A) 20 cm B) 25 cm C) 30 cm

D) 40 cm E) 50 cm



[figure consists of four identical squares]

15. E The total area of the four squares is 100 cm^2, so the area of each square is 25 cm^2. Thus the side of each square is 5 cm and the perimeter of the figure is 10(5 cm) = 50 cm.

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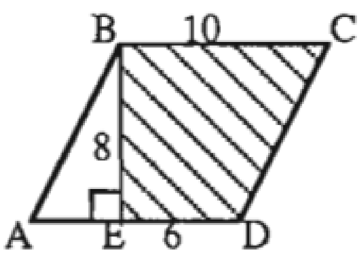
1989 Q15

15. The area of the shaded region BEDC in parallelogram ABCD is

A) 24 B) 48 C) 60 D) 64 E) 80



15. D The shaded area is the difference of the area of the parallelogram and the area of the unshaded triangle. The area of the parallelogram is $10 \times 8 = 80$. The base of the triangle is $10 - 6 = 4$ and its height is 8, so its area is $\frac{1}{2} \times 4 \times 8 = 16$. Thus the shaded area is $80 - 16 = 64$.

OR

The shaded region is a trapezoid with bases 10 and 6, and height 8. Its area is $\frac{1}{2}(8)(10+6) = 64$.

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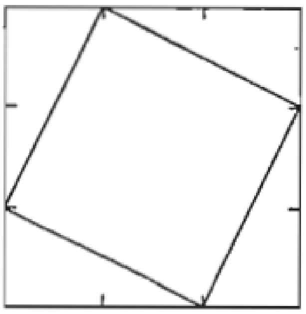
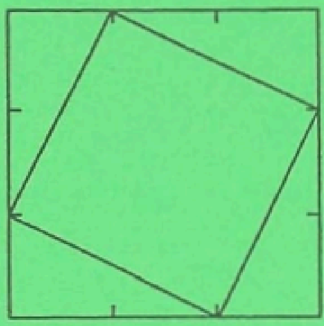
1997 Q15

15. Each side of the large square in the figure is trisected (divided into three equal parts). The corners of an inscribed square are at these trisection points, as shown. The ratio of the area of the inscribed square to the area of the large square is



(A) $\frac{\sqrt{3}}{3}$ (B) $\frac{5}{9}$ (C) $\frac{2}{3}$ (D) $\frac{\sqrt{5}}{3}$ (E) $\frac{7}{9}$

15. **(B)** Taking the side of the large square to be 3 inches gives an area of 9 square inches. Each of the four right triangles has an area of $\frac{1}{2}$ (2) (1) = 1 sq. inch. The area of the inscribed square is the area of the large square minus the area of the four right triangles, that is, 9 - 4 (1) = 5 sq. inches. The desired ratio is $\frac{5}{9}$.



OR