

Figures are not drawn to scale

Answer "E. NOTA" means "none of the above."

5. Triangle ABC is equilateral. $AB = 4x - y$, $BC = 2x + 3y$, $AC = 7$. Find $x + y$.

1. The measures of the angles of a triangle are $2x$, $3x - 5$, and $5x + 10$. The triangle is
- A. acute
 - B. obtuse
 - C. right
 - D. isosceles
 - E. NOTA

- A. 3
- B. 5
- C. 7
- D. 9
- E. NOTA

6. Find the area of a triangle with sides having lengths of 14, 25, and 25.

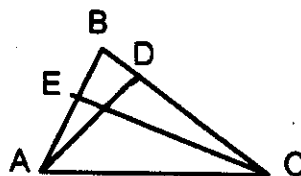
- A. 64
- B. 168
- C. 175
- D. 336
- E. NOTA

2. In regular octagon ABCDEFGH, find $m\angle ACG$.

- A. 135
- B. 90
- C. 45
- D. $\frac{45}{2}$
- E. NOTA

7. In $\triangle ABC$, \overline{AD} and \overline{CE} are altitudes. Given that $m\angle B = 45$, $AC = 17$, and $AE = 8$, find AD .

- A. 4
- B. $11\sqrt{2}$
- C. $\frac{23\sqrt{2}}{2}$
- D. $15\sqrt{2}$
- E. NOTA



3. Two vertical angles have measures of $x^2 - 21$ and $-4x$. Find the measure of the supplement of one of the vertical angles.

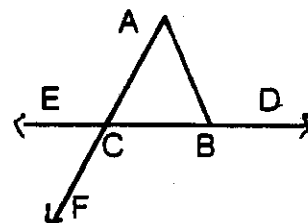
- A. 28
- B. 62
- C. 152
- D. 180
- E. NOTA

4. Find the perimeter of trapezoid ABCD with $\overline{DC} \parallel \overline{AB}$ and \overline{AB} as the longer base, $m\angle A = 30$, $m\angle B = 60$, $CD = 6$, and $AD = 6$.

- A. $18 + 6\sqrt{3}$
- B. $18 + 5\sqrt{3}$
- C. $12 + 6\sqrt{3}$
- D. $12 + 5\sqrt{3}$
- E. NOTA

8. \overline{AB} and \overline{AC} are legs of isosceles triangle ABC. $m\angle ECF = 2x + 12$, $m\angle ABD = 5x$. Find $m\angle ABC$.

- A. 20
- B. 24
- C. 60
- D. 120
- E. NOTA



9. In the measure of the angles of a triangle are in the ratio 3:3:4, what is the measure of the smallest exterior angle of the triangle?

A. 54
B. 72
C. 108
D. 120
E. NOTA

10. In $\triangle RST$, U is a point on \overline{RT} and X is a point on \overline{TS} , such that $\overline{UX} \parallel \overline{RS}$, $m\angle XSU = m\angle USR$, $m\angle T = 100$, $m\angle R = 50$. Find $m\angle XUS$.

A. 15
B. 20
C. 30
D. 35
E. NOTA

11. Jon traveled 5 miles east, 19 miles north, 12 miles east, 21 miles north, and 8 miles west. What is the shortest distance back to his starting point?

A. $\sqrt{39}$
B. 16
C. 40
D. 41
E. NOTA

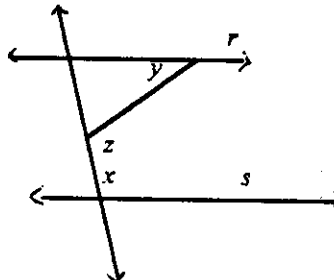
12. Find the distance from the midpoint of \overline{AB} to point C if the coordinates are as given: $A(5,4)$, $B(1,2)$, $C(-1,2)$.

A. $\sqrt{5}$
B. $\sqrt{10}$
C. $\sqrt{17}$
D. $\sqrt{53}$
E. NOTA

13. A square is inscribed in a circle. The area of the square is 64. Find the circumference of the circle.

A. $8\pi\sqrt{2}$
B. 16π
C. 32π
D. 64π
E. NOTA

14. In the figure, $r \parallel s$. If $x = 100^\circ$ and $y = 47^\circ$, find z .



A. 53
B. 100
C. 127
D. 133
E. NOTA

15. In $\triangle ABC$, D is on \overline{AB} and E is on \overline{AC} so that $\overline{DE} \parallel \overline{BC}$. If $AC = 16$, $AD = 3$, $AB = 8$, $BC = 12$, find the perimeter of $CEDB$.

A. 27
B. 30
C. 33
D. 36
E. NOTA

16. In $\triangle RST$, \overline{SQ} is a median, $SQ = TQ$ and $m\angle QSR = 36$. Find $m\angle RST$.

A. 36
B. 54
C. 72
D. 108
E. NOTA

17. One base of a trapezoid is $3x + 5$ and the other is $7x - 10$. The median has a length of 55. Find the length of the longer base.
- A. 32
 - B. 39.5
 - C. 70.5
 - D. 110
 - E. NOTA
18. If one side of one square is the diagonal of a second square, what is the ratio of the area of the first square to the area of the second square?
- A. $2:\sqrt{2}$
 - B. 2:1
 - C. 3:1
 - D. 4:1
 - E. NOTA
19. In $\triangle ABC$, D is the midpoint of \overline{AB} and E is the midpoint of \overline{AC} . If $DE = 3x - 8$ and $BC = 4x - 4$, find DE.
- A. 4
 - B. 6
 - C. 10
 - D. 12
 - E. NOTA
20. $\triangle ABC$ is similar to $\triangle XYZ$. $AB = 3x - 2$, $BC = 2$, $XY = 4x + 1$ and $YZ = 3$. Find XY.
- A. 22
 - B. 24
 - C. 32
 - D. 33
 - E. NOTA
21. The sum of the interior angles of a regular polygon is 1260. How many diagonals does this polygon have?
- A. 14
 - B. 27
 - C. 28
 - D. 54
 - E. NOTA
22. In a triangle, the lengths of the sides are 8, 11, and 17. Find the length of the altitude to the shortest side.
- A. $\frac{3}{2}\sqrt{35}$
 - B. 11
 - C. $6\sqrt{35}$
 - D. $15\sqrt{133}$
 - E. NOTA
23. In isosceles trapezoid ABCD, $\overline{AB} \parallel \overline{CD}$. \overline{AB} is the upper base. If $AB = 6$, $DC = 22$, and the altitude is 8, find $m\angle DAB - m\angle D$.
- A. 60
 - B. 100
 - C. 120
 - D. cannot be determined
 - E. NOTA
24. In right triangle ABC with right angle at B, \overline{AD} is a bisector of $\angle A$. If $AB = 9$ and $AC = 15$, find AD.
- A. $\frac{9}{2}\sqrt{5}$
 - B. 12
 - C. $\frac{9}{2}$
 - D. $\frac{3}{2}\sqrt{61}$
 - E. NOTA

25. The measure of one angle of a parallelogram is 30 more than twice the measure of the next consecutive angle. Find the complement of the smaller angle of the parallelogram.
- A. 15
 - B. 30
 - C. 40
 - D. 75
 - E. NOTA
26. In an isosceles triangle, the sum of the lengths of the legs is 3 times the length of the base. If the perimeter is 16, find the area of the triangle.
- A. $8\sqrt{2}$
 - B. 12
 - C. 16
 - D. 24
 - E. NOTA
27. Two angles are complementary and their measures are in a ratio of 5:13. Find the measure of the supplement of the smaller angle.
- A. 175
 - B. 155
 - C. 115
 - D. 5
 - E. NOTA
28. The triangle whose vertices are the points $(x,0)$, $(-x,0)$, and $(0,y)$ is equilateral if
- A. $x = y$
 - B. $y = \frac{x}{2}$
 - C. $y = x\sqrt{3}$
 - D. $x = \frac{y}{2}$
 - E. NOTA
29. Point P divides \overline{AB} into two segments so that $AP:PB = 3:5$. Find AP if $AB = 40$.
- A. 15
 - B. 25
 - C. $\frac{80}{3}$
 - D. $\frac{200}{3}$
 - E. NOTA
30. Find the area of a rectangle if the length of a diagonal is 26 and the length of one side is 10.
- A. 24
 - B. 120
 - C. 130
 - D. 240
 - E. NOTA