

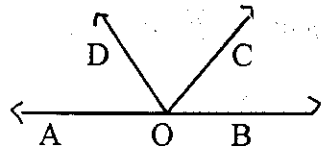
FAMAT Geometry Regional Individual Test
January 2004

For all questions, answer E. "NOTA", means none of these answers is correct.

Diagrams are not necessarily drawn to scale.

1. In the diagram, \overline{AB} contains point O and $m\angle BOC = 20^\circ$, $m\angle DOC$ is 6 degrees more than $m\angle AOD$, find $m\angle DOC$.

- A. 77
- B. 83
- C. 85
- D. 88
- E. NOTA



2. In triangle ABC , D is a point on \overline{AC} and E is a point on \overline{BC} such that $\overline{DE} \parallel \overline{AB}$. If $AD = 4, DC = 6, BC = 15$, find BE .

- A. 5
- B. 6
- C. $7\frac{1}{2}$
- D. 9
- E. NOTA

3. Given point P above plane T . How many lines may be passed through point P parallel to plane T ?

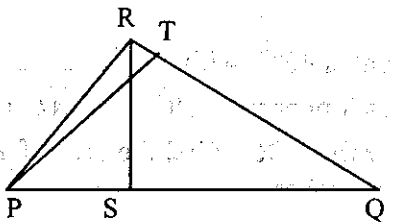
- A. 0
- B. 1
- C. 2
- D. infinite
- E. NOTA

4. In $\triangle PQR$, \overline{PT} and \overline{SR} are altitudes.

$PR = 13, PS = 5, m\angle Q = 45^\circ$.

Find the length of PT .

- A. $6\sqrt{2}$
- B. 12
- C. $\frac{17}{2}\sqrt{2}$
- D. 17
- E. NOTA



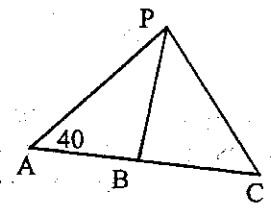
5. If the hour hand of an accurate watch is $\frac{2}{5}$ of the way from 3 to 4, what is the time?

- A. 3:17
- B. 3:20
- C. 3:24
- D. 3:32
- E. NOTA

6. In the diagram with $m\angle PAB = 40^\circ$, find $m\angle APB$ if I. $m\angle BPC = 75^\circ$
II. $m\angle PBC = 60^\circ$

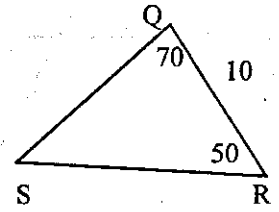
The problem above can be solved using

- A. only I
- B. only II
- C. I or II
- D. Both I and II, but neither alone
- E. E. NOTA



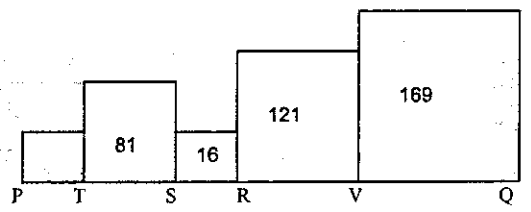
7. In the diagram, with regard to $\triangle SQR$ with measures as given, which of the following is true?

- A. \overline{QS} is longer than 10
- B. \overline{RS} is shorter than \overline{QS}
- C. \overline{QR} is the longest side
- D. \overline{RS} is more than 10
- E. NOTA



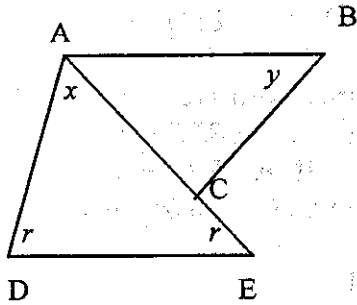
8. In the diagram, the numbers in the squares represent the areas of each square. If $PQ = 42$, find the length of \overline{PT} .

- A. 4
- B. 5
- C. 9
- D. 25
- E. NOTA



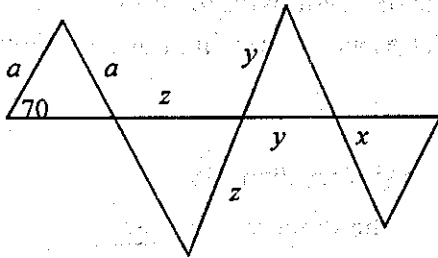
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9. In the diagram with measures of angles indicated, $\overline{AB} \parallel \overline{DE}$, $AD = AE$, and $\angle ACB$ is a right angle. Express y in terms of x .



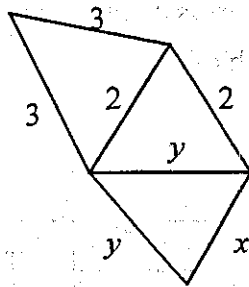
- A. $y = \frac{x}{2}$
 B. $y = 2x$
 C. $y = \frac{360 + x}{2}$
 D. $y = x$
 E. NOTA

10. In the diagram with congruent sides and measures as given, determine the value of the angle labeled x . All other variables are lengths of sides



- A. 140
 B. 110
 C. 70
 D. 40
 E. NOTA

11. In the diagram, the triangles with side lengths as given are all similar to each other. What is the value of side labeled x ?



- A. $\frac{4}{3}$ B. $\frac{3}{4}$
 C. $\frac{8}{9}$ D. $\frac{9}{8}$
 E. NOTA

12. In $\triangle ABC$, \overline{BD} bisects $\angle ABC$ intersecting \overline{AC} at point D . The perimeter of $\triangle ABC = 60$. If $AD = 12, DC = 16$, find the length of \overline{AB} .

- A. $13\frac{5}{7}$ B. 15 C. 18
 D. $18\frac{2}{7}$ E. NOTA

13. The set of all points in a plane equidistant from points A and B , which are also in the plane, is best described by which of the following?

- A. perpendicular bisector of \overline{AB}
 B. bisector of $\angle AOB$
 C. line segment from A to B
 D. line through A and B
 E. NOTA

14. Point P divides \overline{AB} into two segments so that $AP:PB = 3:5$. Find the length of \overline{AP} if $AB = 40$.

- A. 15
 B. $\frac{80}{3}$
 C. 25
 D. $\frac{200}{3}$
 E. NOTA

15. In trapezoid $ABCD$ with \overline{AB} the upper base and diagonals intersecting at E , $AE = 30, BE = 24$, and $CE = 40$. Find the length of \overline{DE} .

- A. 32 B. 46 C. 54
 D. 50 E. NOTA

16. How many sides does a regular polygon have if the difference between the sum of the interior angles and the sum of the exterior angles, one at each vertex, is 60 times the number of sides of the polygon?

- A. 5 B. 6 C. 7
 D. 8 E. NOTA

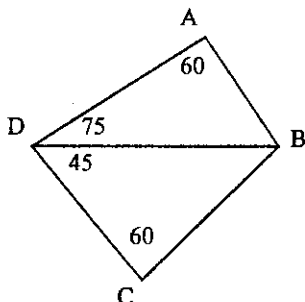
17. In right $\triangle ABC$ with right angle at C , \overline{BC} is 7 inches longer than \overline{AC} , and \overline{AB} is 1 inch longer than \overline{BC} . Find the area of $\triangle ABC$ in square inches.

- A. 15 B. 30 C. 34
 D. 40 E. NOTA

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18. In the diagram with measures as given, which statement(s) must be true?

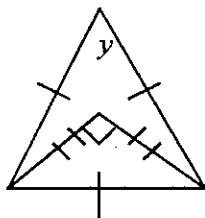
- I. $\triangle ABD \cong \triangle CBD$
- II. \overline{AB} is the longest side of $\triangle ABD$
- III. $DC > AD$



- A. I, II, and III
- B. B. II only
- C. I and II only
- D. II and III only
- E. NOTA

19. In the diagram, two triangles have a common side. Find the measure of the angle labeled y .

- A. 15
- B. 30
- C. 45
- D. 60
- E. NOTA

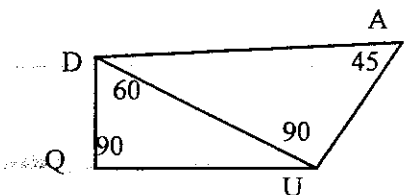


20. If each interior angle of a regular polygon is 177° , how many diagonals does the polygon have?

- A. 6990
- B. 7020
- C. 7050
- D. 7080
- E. NOTA

21. Using the diagram as marked and $QD = \sqrt{2}$, find the exact perimeter of quadrilateral QUAD.

- A. $4\sqrt{2}$
- B. $8 + \sqrt{2} + \sqrt{6}$
- C. $4 + \sqrt{6} + 3\sqrt{2}$
- D. 24
- E. NOTA



22. Five lines are drawn in a plane. No two are parallel, and no three meet in a single point. Into how many regions do they divide the plane?

- A. 10
- B. 12
- C. 16
- D. 32
- E. NOTA

23. In $\triangle HIO$ with $OH = IO$, if \overline{OH} is three times as long as \overline{HI} , and the perimeter of $\triangle HIO$ is 42, find the length of \overline{OI} .

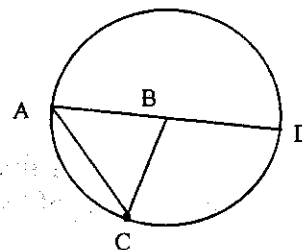
- A. 6
- B. 12
- C. 18
- D. 42
- E. NOTA

24. $\triangle ABC \sim \triangle DEF$, $AC = 3x + 2$, $DF = 9x + 6$, and the perimeter of $\triangle DEF = 23$. Find the perimeter of $\triangle ABC$.

- A. $3\frac{1}{3}$
- B. $7\frac{2}{3}$
- C. $11\frac{1}{2}$
- D. 69
- E. NOTA

25. In the diagram, given circle B with $AB = AC$, \overline{AD} a diameter. Points A and C are on the circle. Find $m\angle CBD$.

- A. 30
- B. 60
- C. 90
- D. 120
- E. NOTA



26. In a right triangle, the legs are 9 and 40. Find the length of the median to the hypotenuse.

- A. 7
- B. $6\sqrt{10}$
- C. $20\frac{1}{2}$
- D. $24\frac{1}{2}$
- E. NOTA

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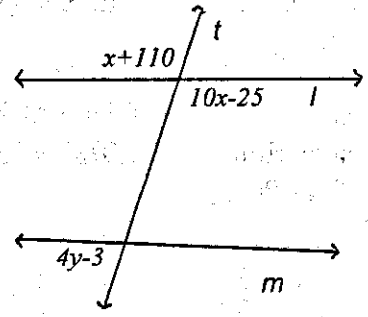
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27. In $\triangle ABC$, $m\angle A = 5x + 12$, $m\angle B = 4x - 4$, and $m\angle C = 3x + 40$. Find the measure of an exterior angle of $\angle A$.

- A. 11
- B. 67
- C. 113
- D. 180
- E. NOTA

28. In the diagram, with angle measures as given, t is a transversal for lines l and m . Find the value of y that will make $l \parallel m$.

- A. 15
- B. 32
- C. 37
- D. not enough information
- E. NOTA



29. Quadrilateral ABCD is a parallelogram, $m\angle A = x - 40$, $m\angle B = x + 40$, $m\angle D = y$. Find the measure of $\angle C$.

- A. 50
- B. 90
- C. 130
- D. 140
- E. NOTA

30. An equilateral triangle has an altitude with length 4. Find the perimeter of the triangle.

- A. 12
- B. $8\sqrt{3}$
- C. 24
- D. $24\sqrt{3}$
- E. NOTA