

Geometry Individual Test

January Regional competition 2005

The abbreviation NOTA denotes "None of These Answers" is correct. Diagrams may not be drawn to scale.

1. The degree measures of the angles of a triangle are represented by $2x$, $3x$, and $4x$. Find the number of degrees in the smallest exterior angle of the triangle.

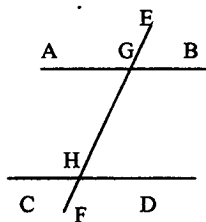
A. 20 B. 40
C. 80 D. 100
E. NOTA

2. $\triangle ABC \sim \triangle RST$. The lengths of the sides of $\triangle ABC$ are 14, 11, and 4. The longest side of $\triangle RST$ is 28. Find the perimeter of $\triangle RST$.

A. 29 B. 33
C. 58 D. cannot be determined
E. NOTA

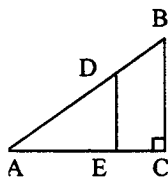
3. In the diagram, $\overline{AB} \parallel \overline{CD}$ and \overline{EF} intersects \overline{AB} at point G and \overline{CD} at point H . If $m\angle AGH = 3x - 10$ and $m\angle GHD = 80$, find the value of $2x$.

A. 30
B. 60
C. 75
D. 90
E. NOTA



4. In right triangle ABC with right angle at C , $\overline{DE} \perp \overline{AC}$ at point E . $BC = 8$, $AC = 6$, $DE : BC = 1 : 2$. Find the perimeter of trapezoid $ECBD$.

A. 12
B. 18
C. 20
D. cannot be determined
E. NOTA



5. In parallelogram $ABCD$, $m\angle A = 3x - 1$ and $m\angle B = 2x + 11$. Find $m\angle C$.

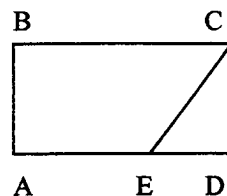
A. 34 B. 79
C. 95 D. 101
E. NOTA

6. In $\triangle ABC$, $m\angle A$ is twice $m\angle B$ and $m\angle C$ is six more than the sum of $m\angle A$ and $m\angle B$. Find $m\angle B$.

A. 29 B. 41
C. 58 D. 93
E. NOTA

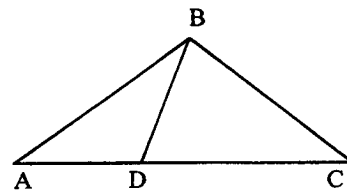
7. In rectangle $ABCD$ with $AB = 8$, $BC = 18$, and $AE : ED = 2 : 1$. Find the length of \overline{EC} .

A. $2\sqrt{7}$
B. $8\frac{1}{2}$
C. 10
D. 14
E. NOTA



8. In the diagram, $\triangle ABC$, $m\angle A = 20$, $m\angle ABD = 40$, $m\angle C = 30$. Find the measure of $\angle DBC$.

A. 50
B. 70
C. 90
D. 110
E. NOTA



9. The diagonal of a rectangle is 17 and the length is 8. Find the area of the rectangle.

A. 46 B. 50
C. 120 D. 136
E. NOTA

10. If a circle with radius 10 has its radius decreased by 2, by what percent is its area decreased?

A. 20 B. 25
C. 36 D. 40
E. NOTA

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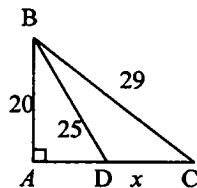
11. ABCD is a parallelogram; on \overline{AB} a point E is taken so that $AE = \frac{1}{4}AB$. F is the midpoint of \overline{DC} . \overline{EF} cuts \overline{BD} at P. Find the ratio of DP:BP.

- A. 1:3 B. 1:4
C. 2:5 D. 2:3
E. NOTA

12. The supplement of an angle is 78° less than twice the supplement of the complement of the angle. Find the measure of the angle.
- A. 26 B. 30
C. 64 D. 154
E. NOTA

13. Find the length of \overline{DC} in right triangle ABC with $AB=20, BD=25, BC=29$.

- A. 6
B. 15
C. 21
D. 36
E. NOTA



14. Given isosceles triangle FAM with $FM=FA$. If \overline{FM} is three times as long as \overline{MA} and the perimeter of $\triangle FAM$ is 42, find the length of \overline{FA} .

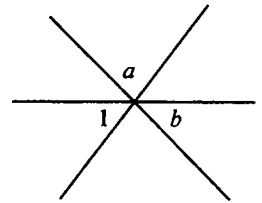
- A. 6 B. 8.4
C. 12 D. 18
E. NOTA

15. The sides of a triangle are in the ratio of 3:6:8. Which of the following words describes the triangle?

- A. obtuse B. right
C. acute D. isosceles
E. NOTA

16. Using the diagram with measures of angles as indicated, give the measure of $\angle 1$ in terms of a and b .

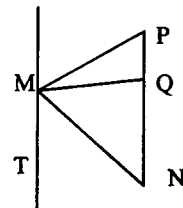
- A. $a + b$
B. $180 - a - b$
C. $180 - a + b$
D. $90 - (a + b)$
E. NOTA



17. Answer each of the following statements with A(always), S(sometimes), or N(never).
- I. An equilateral triangle is -?- acute.
II. An isosceles triangle is -?- scalene.
III. A scalene triangle is -?- right.
- A. A-N-S B. A-S-N
C. S-N-S D. A-N-N
E. NOTA

18. In isosceles triangle MNP, $MN=MP$, $NQ=2PQ$, and $\overline{MT} \parallel \overline{NP}$. If $m\angle MPN = 50$, find $m\angle TMP$.

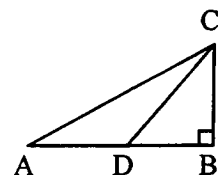
- A. 50
B. 80
C. 100
D. 130
E. NOTA



19. Quadrilateral ABCD is a trapezoid with $\overline{AB} \parallel \overline{DC}$, $m\angle D = 30$, $\overline{BC} \perp \overline{DC}$, $AB = \sqrt{192}$, $BC = 6$. Find the length of \overline{DC} .
- A. $14\sqrt{3}$ B. $10\sqrt{3}$
C. $12\sqrt{3}$ D. $6\sqrt{6}$
E. NOTA

20. In right triangle ABC shown below, point D on \overline{AB} is 4 units from A, $m\angle CDB = 60$ and $m\angle CAB = 30$. What is the length of \overline{CB} ?

- A. 3
B. $2\sqrt{3}$
C. $\sqrt{14}$
D. $3\sqrt{2}$
E. NOTA

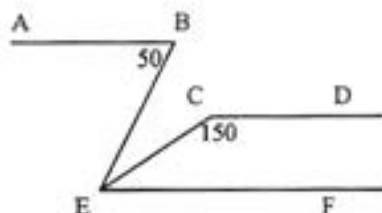


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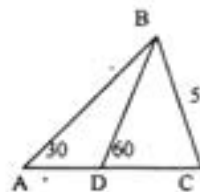
21. In the diagram, $\overline{AB} \parallel \overline{CD} \parallel \overline{EF}$, $m\angle B = 50$, $m\angle ECD = 150$. Find $m\angle BEC$.

- A. 20
B. 30
C. 50
D. cannot be determined
E. NOTA



22. In the diagram, $m\angle A = 30$, $m\angle BDC = 60$, $m\angle ABC = 90$, $BC = 5$. Find the exact perimeter of $\triangle ADB$.

- A. 15
B. $10 + 5\sqrt{3}$
C. $10 + 10\sqrt{3}$
D. $15 + 5\sqrt{3}$
E. NOTA



23. Chris travels 6 miles north, 5 miles east, then 3 miles north. How far is Chris from his original starting point?

- Round to the nearest 10th
A. 9.7 B. 10.0
C. 10.3 D. 11.1
E. NOTA

24. A rectangle's perimeter P is 1.5 times the area A. If one dimension has length 4, find the area A.

- A. 1.5 B. 4
C. 8 D. 12
E. NOTA

25. Two 3-4-5 triangles are combined to form a parallelogram. Which of the following statements MUST be true?

- A. The parallelogram is a rectangle.
B. The area of the parallelogram is 12 square units.
C. The perimeter of the parallelogram is 14 units long.
D. One of the sides of the parallelogram is 4 units long.
E. NOTA

26. What is the measure of an angle between two adjacent sides of a regular 13 sided polygon?

- A. $\frac{180}{13}$ B. $\frac{360}{13}$
C. $\frac{1980}{13}$ D. $\frac{2340}{13}$
E. NOTA

27. A bicycle has a 60 cm diameter wheel. If you ride in a 120 km race, approximately how many revolutions does the wheel have to make to complete the race?

- A. 42 B. 636
C. 6366 D. 63662
E. NOTA

28. \overline{SU} bisects $\angle RST$. If $m\angle RSU = 2x + 10$ and $m\angle TSU = 8x - 14$, what is $m\angle TSU$?

- A. 4 B. 8
C. 12 D. 18
E. NOTA

29. In $\triangle ABC$, D is a point on \overline{AB} and E is a point on \overline{AC} such that $\overline{DE} \parallel \overline{BC}$. If $AE=12$, $CE=5$, $DE=4$, find the length of \overline{CB} .

- A. $\frac{5}{3}$ B. $\frac{48}{17}$
C. $\frac{17}{3}$ D. 15
E. NOTA

30. A right triangle has hypotenuse of length z and lengths of legs are x and y. What is the length of the altitude from the right angle to the hypotenuse in terms of x, y, and z?

- A. $\frac{xz}{y}$ B. $\frac{1}{2}xy$
C. $\frac{yz}{x}$ D. $\frac{xy}{z}$
E. NOTA