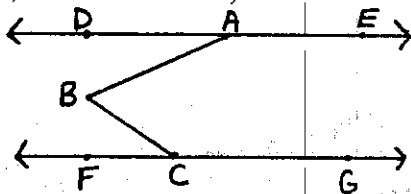


PCHS  
Geometry Individual Test  
March 13, 1999

Note: NOTA means "none of the above".

1. If  $\overline{DE} \parallel \overline{FG}$ ,  $m\angle DAB = 42^\circ$ , and  $m\angle BCG = 102^\circ$ , find  $m\angle ABC$ .

- A]  $36^\circ$
- B]  $60^\circ$
- C]  $120^\circ$
- D]  $144^\circ$
- E] NOTA



2. An isosceles trapezoid has bases 7 and 15. If the legs of the trapezoid measure 5 each, find the area of the trapezoid.

- A] 33
- B] 44
- C] 55
- D] 525
- E] NOTA

3. A clock on the wall of Mrs. Moore's Geometry class reads 1:48. Find the smaller angle made by the hands of the clock.

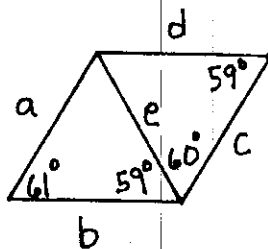
- A]  $102^\circ$
- B]  $126^\circ$
- C]  $158^\circ$
- D]  $243^\circ$
- E] NOTA

4. A circle with a radius of 2 rolls completely around the outside of a square with a side of 4. Find the length of the path made by the center of the circle

- A]  $8 + 4\pi$
- B] 24
- C]  $16 + 4\pi$
- D]  $32 + 4\pi$
- E] NOTA

5. Which is the longest side?

- A] e
- B] b
- C] c
- D] d
- E] NOTA



6. Two trains leave at the same time. Train A leaves Atlantis traveling at 50 mph. Train B leaves Roanoke traveling at 60 mph. After traveling for 2 hours they meet at a 90 degree angle. What is the shortest distance between the two towns?

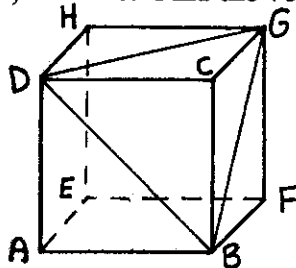
- A] 78 miles
- B]  $20\sqrt{61}$  miles
- C]  $61\sqrt{3}$  miles
- D] 24400 miles
- E] NOTA

7. Find the shortest distance from the point (1, 2) to the line containing points (3, -5) and (-3, 3).

- A] 2
- B]  $2\sqrt{2}$
- C] 5/9
- D] 13/5
- E] NOTA

8. In the cube shown,  $AB = 6$ . Find the volume of tetrahedron DGBC.

- A] 36
- B] 42
- C] 48
- D] 54
- E] NOTA

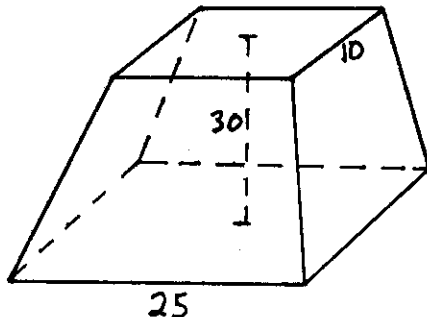


9. The supplement of an angle is 32 degrees more than twice its complement. What is the sum of the complement and the supplement of the angle?

- A]  $32^\circ$
- B]  $80^\circ$
- C]  $148^\circ$
- D]  $206^\circ$
- E] NOTA

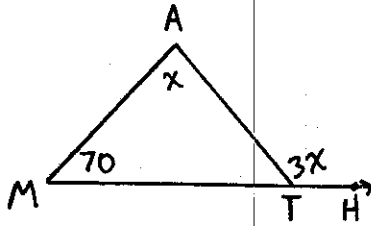
10. Pharaoh Binny-Ka was the less famous brother of King Tut; for his burial chamber he designed a regular rectangular pyramid without a point (later to be known as the frustrum of a pyramid). Help poor Binny-Ka find the volume of his ingenious tomb by using the following dimensions: height = 30m, edge of big base = 25m, edge of small base = 10m

- A] 3625
- B] 7250
- C] 9750
- D] 10875
- E] NOTA



11. Find the measure of exterior angle ATH if  $m\angle AMT = 70^\circ$ ,  $m\angle MAT = x$ , and  $m\angle ATH = 3x$ .

- A]  $35^\circ$
- B]  $45^\circ$
- C]  $105^\circ$
- D]  $120^\circ$
- E] NOTA



12. GIVEN: "If Sparky is a good dog, then he will get a bone." Find the converse of the statement.

- A] If Sparky is not a good dog, then he will not get a bone.
- B] If Sparky doesn't get a bone, then he was not a good dog.
- C] Sparky wasn't a good dog, therefore he didn't get a bone.
- D] If Sparky gets a bone, then he was a good dog.
- E] NOTA

13. How many segments can be drawn between twelve points, no three of which are collinear?

- A] 64
- B] 66
- C] 132
- D] 165
- E] NOTA

14. Who wrote the series of books titled The Elements?

- A] Euclid
- B] Archimedes
- C] Euler
- D] Pythagoras
- E] NOTA

15. A regular tetrahedron has lateral edges of length 6. What is its volume?

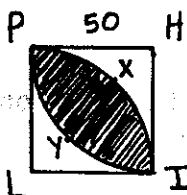
- A] 27
- B] 36
- C]  $27\sqrt{3}$
- D] 216
- E] NOTA

16. Becky lives in Topeka. Kara lives in The Emerald City. At 1:00 p.m. they left their respective town and walked in opposite directions (their paths are collinear). Kara walked twice as fast as Becky. By 3:00 p.m. they were 69 km apart. If instead they had walked toward each other they would have been 15 km apart at 2:00 p.m. without having crossed paths yet. How far apart are the towns?

- A] 30 km
- B] 33 km
- C] 36 km
- D] 42 km
- E] NOTA

17. In square PHIL with side 50, arcs PXI and PYI are formed by circles of radii 50 centered at H and L. Find the area of the shaded region.

- A]  $625\pi - 1250$
- B] 1425
- C]  $1250\pi - 2500$
- D]  $2500 - 1250\pi$
- E] NOTA



18. The diagonals of a rhombus are 12 and 16. Find the numerical sum of the area and the perimeter.

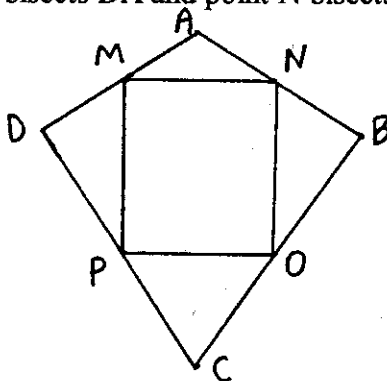
- A] 96
- B] 124
- C] 136
- D] 176
- E] NOTA

19. The radii of two right cylinders are in the ratio of 1:5 and the height of each cylinder is twice the value of its radius. If the volume of the larger cylinder is  $6750\pi$ , what is the height of the smaller cylinder?

- A] 4
- B] 6
- C] 10
- D] 25
- E] NOTA

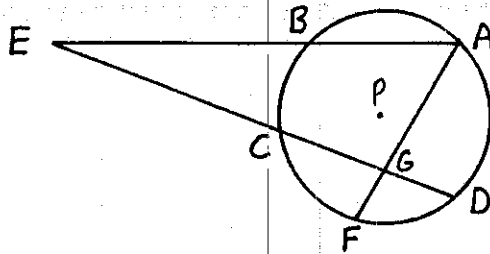
20. Given kite ABCD with  $AD = 2$ ,  $DC = 2\sqrt{3}$ , right angles at D and B, and an inscribed rectangle MNOP, (point M bisects DA and point N bisects AB) find the area of triangle CPO.

- A]  $2\sqrt{3}$
- B]  $\frac{3\sqrt{3}}{4}$
- C]  $\frac{2\sqrt{3}}{4}$
- D]  $3\sqrt{3}$
- E] NOTA



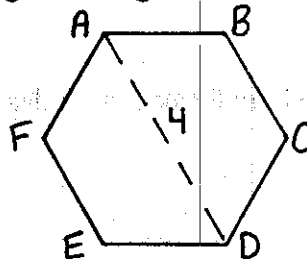
21. In the figure below,  $\overline{EA}$  and  $\overline{ED}$  are secant segments of circle P. Chord  $\overline{AF}$  intersects  $\overline{ED}$  at point G. If  $EB = 5$ ,  $BA = 7$ ,  $EC = 4$ ,  $GD = 3$ , and  $AG = 6$ , find GF.

- A] 4
- B] 8
- C] 12
- D] 16
- E] NOTA



22. Find the area of regular hexagon ABCDEF.  $AD = 4$ .

- A]  $6\sqrt{3}$
- B] 12
- C]  $8\sqrt{3}$
- D]  $12\sqrt{3}$
- E] NOTA



23. A point is selected at random inside an equilateral triangle. From this point perpendiculars are dropped to each side. The sum of these perpendiculars is . . .

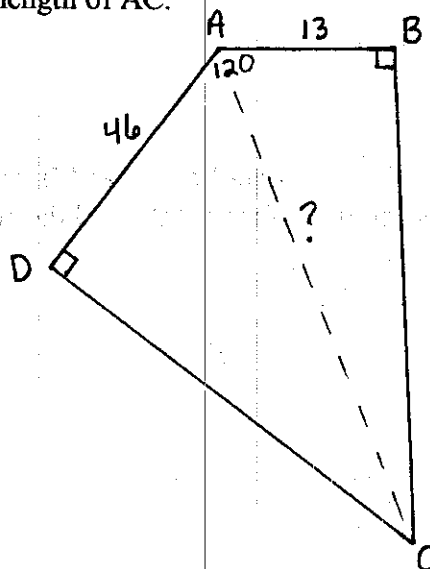
- A] least when the point is the center of gravity of the triangle.
- B] one half the sum of the sides of the triangle
- C] equal to the altitude of the triangle
- D] in a 2:3 ratio with the perimeter
- E] NOTA

24. The perimeter of an isosceles right triangle is 12. How long is its hypotenuse?

- A]  $12 - 6\sqrt{2}$
- B]  $12\sqrt{2} - 12$
- C]  $6\sqrt{2}$
- D]  $12\sqrt{2} - 4$
- E] NOTA

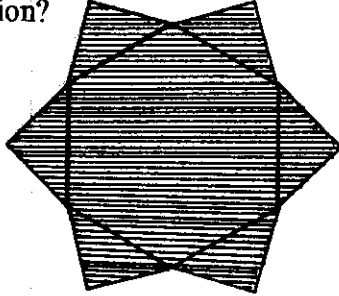
25. In quadrilateral ABCD, it is given that  $m\angle A = 120^\circ$ ,  $\angle B$  and  $\angle D$  are right angles,  $AB = 13$  and  $AD = 46$ , find the length of  $\overline{AC}$ .

- A] 23
- B]  $24\sqrt{3}$
- C] 62
- D]  $46\sqrt{3}$
- E] NOTA



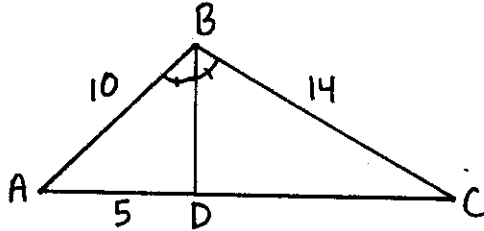
26. On each side of a regular hexagon an isosceles right triangle is drawn to where the hypotenuse equals the length of a side of the hexagon. If the perimeter of the hexagon is 48, what is the area of the shaded region?

- A)  $64\sqrt{3}$
- B)  $96 + 32\sqrt{3}$
- C) 192
- D)  $192 + 32\sqrt{3}$
- E) NOTA



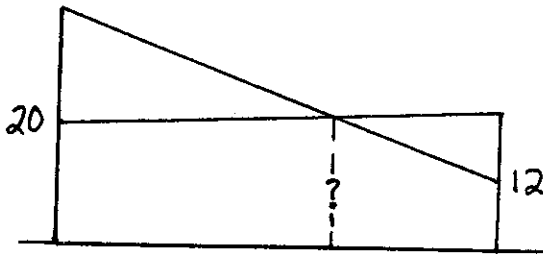
27. If  $\angle B$  is bisected by  $\overline{BD}$ ,  $AB = 10$ ,  $BC = 14$ , and  $AD = 5$ , find the length of  $\overline{BD}$ .

- A)  $\sqrt{105}$
- B)  $4\sqrt{12}$
- C) 35
- D)  $5\sqrt{3}$
- E) NOTA



28. Clothes lines are connected to the midpoints & to the tops of two poles. The lines cross at one point. Using the given diagram, find the distance from the ground to the point of intersection. One pole is 20 ft high, the other is 12 ft high. (Assume that the poles are perpendicular with the ground).

- A) 9.75 ft
- B) 10 ft
- C) 11 ft
- D) 11.25 ft
- E) NOTA



29. Name the "point of balance" found in any triangle.

- A) incenter
- B) orthocenter
- C) circumcenter
- D) centroid
- E) NOTA

30. Two chords,  $\overline{AB}$  and  $\overline{CD}$ , intersect at point E inside circle P such that  $m\angle AED = 52^\circ$ . If  $m\widehat{AD} = 69$ , What is  $m\widehat{BC}$ ?

- A)  $38^\circ$
- B)  $52^\circ$
- C)  $60.5^\circ$
- D)  $86.5^\circ$
- E) NOTA

