

TMTA Geometry Test 2008

1. The perimeter of an equilateral triangle is 30 inches. The area in square inches is

a)  $\frac{25}{2}\sqrt{3}$    b)  $25\sqrt{3}$    c)  $\frac{50}{2}\sqrt{3}$    d)  $25\sqrt{2}$    e)  $\frac{25}{\sqrt{3}}$

2. Which of the following pairs of angles are complementary?

a)  $13^\circ, 77^\circ$

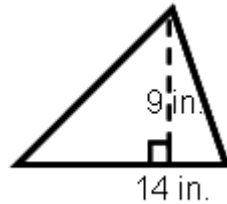
b)  $180^\circ, 90^\circ$

c)  $63^\circ, 17^\circ$

d)  $118^\circ 25', 61^\circ 35'$

e)  $45^\circ, 60^\circ$

3. Find the area of the triangle in the diagram below.



a)  $23 \text{ in}^2$

b)  $63 \text{ in}^2$

c)  $81 \text{ in}^2$

d)  $126 \text{ in}^2$

e)  $196 \text{ in}^2$

4. Find the exact circumference of a circle with diameter 12 in.

a)  $37.7 \text{ in}$

b)  $113.09 \text{ in}$

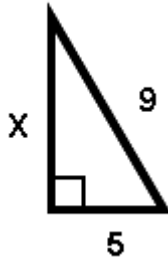
c)  $144\pi \text{ in}$

d)  $36\pi \text{ in}$

e)  $12\pi \text{ in}$

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5. Find the value of X on the diagram below.

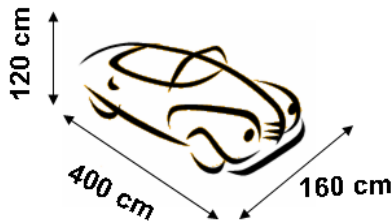


- a)  $14\sqrt{2}$    b)  $2\sqrt{14}$    c)  $\sqrt{106}$    d)  $\sqrt{28}$    e)  $5\sqrt{3}$

6. An equilateral triangle and a regular octagon have sides equal in length. What is the ratio of their perimeters?

- a)  $\frac{1}{8}$    b)  $\frac{1}{4}$    c)  $\frac{3}{8}$    d)  $\frac{1}{2}$    e)  $\frac{5}{8}$

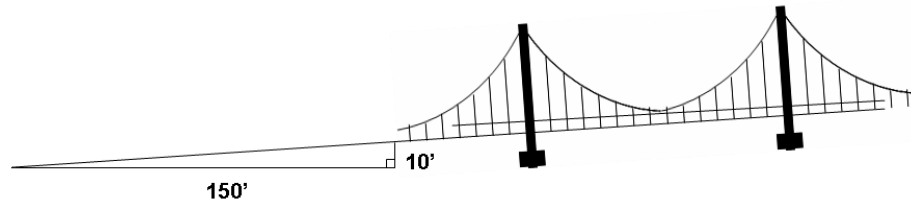
7. A computer-generated model of a car is to be sculpted into clay. The dimensions of the car are 400 cm long by 160 cm wide by 120 cm high. If the ratio of the dimensions of the model to the dimensions of the car is to be 1 to 4, what should be the dimensions of the model?



- a) 1600 cm by 640 cm by 480 cm  
b) 200 cm by 80 cm by 60 cm  
c) 100 cm by 40 cm by 30 cm  
d) 800 cm by 320 cm by 240 cm  
e) 50 cm by 40 cm by 30 cm

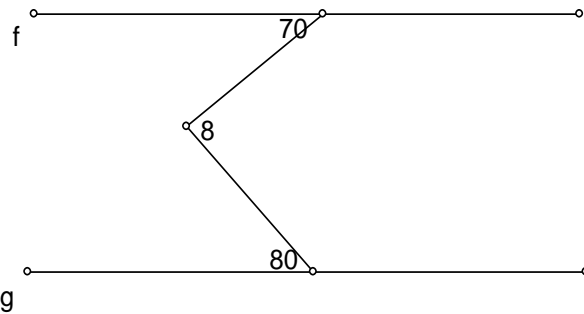
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8. An approach ramp is being planned to lead to a suspension bridge. Given the dimensions in the figure, at what angle from the horizontal should the ramp be sloped?



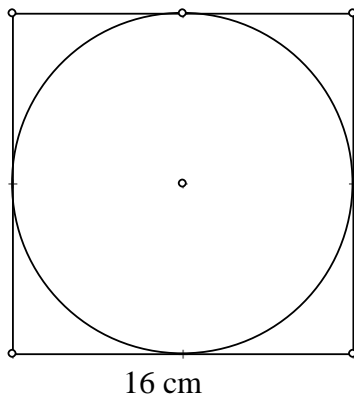
- a)  $\sim 0.07^\circ$     b)  $\sim 3.4^\circ$     c)  $\sim 3.6^\circ$     d)  $\sim 3.8^\circ$     e)  $\sim 4.2^\circ$

9. If  $f \parallel g$ , then find  $m\angle 8$ . Measurements are in degrees.



- a)  $90^\circ$     b)  $120^\circ$     c)  $100^\circ$     d)  $150^\circ$     e)  $75^\circ$

10. What is the area, in square centimeters, outside the circle but inside the square?



- a)  $256 - 8\pi$     b)  $256 - 16\pi$     c)  $256 - 32\pi$     d)  $256 - 64\pi$     e)  $256 - 128\pi$

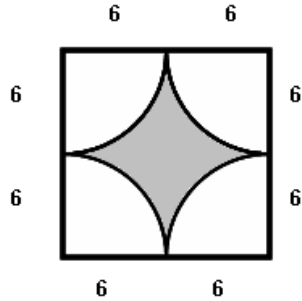
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11. If the three sides of a triangle are 9cm, 12cm, x cm.  
What can you conclude about the value of x?
- a)  $x > 13$  b)  $9 < x < 12$  c)  $x = 15$  d)  $3 < x < 21$  e)  $x < 15$
12. A model rocket shot up to a point 20 m above the ground, hitting a smokestack, and then dropped straight down to a point 11 m from its launch site. Find to the nearest meter, the total distance traveled from launch to touchdown.
- a) 51 m b) 43 m c) 31 m d) 40 m e) 54 m
13. What is the difference between the sum of the interior angles and the sum of the exterior angles for a nonagon?
- a)  $540^\circ$  b)  $360^\circ$  c)  $900^\circ$  d)  $1080^\circ$  e)  $1800^\circ$
14. Which statement is incorrect for parallel lines cut by a transversal?
- a) Alternate exterior angles are congruent.  
b) Corresponding angles are congruent.  
c) Same side exterior angles are complimentary.  
d) The measure of alternate interior angles is equal.  
e) The measure of same side interior angles is supplementary.
15. Which statement is false for some parallelograms?
- a) Opposite sides are parallel.  
b) Opposite angles are congruent.  
c) Diagonals bisect each other.  
d) Diagonals are congruent.  
e) Opposite sides are congruent.

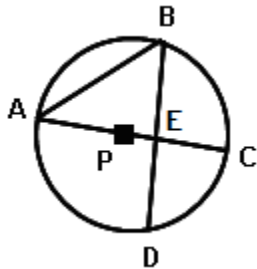
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16. Which of the following statements is incorrect?  
 a) All squares are rhombi.  
 b) All rhombi are parallelograms.  
 c) All squares are parallelograms.  
 d) All rhombi are rectangles.  
 e) All squares are rectangles.
17. In isosceles  $\triangle XYZ$ , angle X is 60% greater than angle Y, one of the two base angles Y and Z of equal measure. What is the measure of angle Z?  
 a)  $20^\circ$       b)  $40^\circ$       c)  $50^\circ$       d)  $80^\circ$       e)  $100^\circ$

18. What is the area of the shaded region below?



- a)  $48 - 6\pi$     b)  $144 - 6\pi$     c)  $144 - 36\pi$     d)  $48 - 36\pi$     e)  $144 - 12\pi$
19. The measure of an exterior angle of a regular polygon is  $30^\circ$ . How many diagonals can be drawn in the polygon?  
 a) 35    b) 54    c) 27    d) 20    e) 12
20. Given a circle with center  $P$ ,  $m\angle BAC = 30^\circ$  and arc  $CD = 50^\circ$ , find  $m\angle BEC$ .



- a)  $65^\circ$     b)  $130^\circ$     c)  $85^\circ$     d)  $95^\circ$     e)  $60^\circ$

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21. Triangle ABC has a right angle at A. AD is the interior altitude and  $BD = 8$  and  $CD = 4$ . Find AD.

a)  $2\sqrt{3}$  b)  $4\sqrt{2}$  c) 12 d)  $4\sqrt{3}$  e) 32

22. A lawn sprinkler sprays water over a radius of 25 feet. The sprinkler is set to turn through an angle of  $100^\circ$ , calculate the approximate area that will be watered by the sprinkler.

a)  $347 \text{ ft}^2$  b)  $218 \text{ ft}^2$  c)  $545 \text{ ft}^2$  d)  $1091 \text{ ft}^2$  e)  $3125 \text{ ft}^2$

23. Given rectangle ABCD, with diagonals AC and BD which intersect at point E, find  $m\angle BCE$ , if  $m\angle AEB = x^\circ$  and  $m\angle CEB = 2x^\circ$ .

a)  $30^\circ$  b)  $75^\circ$  c)  $45^\circ$  d)  $36^\circ$  e)  $72^\circ$

24. The distance between a point and its image after the translation  $(a, b) \rightarrow (a + 7, b - 5)$  is:

a) 7 b) 5 c) 12 d)  $\sqrt{74}$  e)  $\sqrt{24}$

25. What is the area of a triangle whose vertices are  $(-4, -3)$ ,  $(8, 7)$ , and  $(8, -3)$ ?

a) 40 sq units b) 8 sq units c) 66 sq units d) 52.5 sq units e) 60 sq units

26. If  $\triangle ABC \sim \triangle FED$ , which of the following proportions is not true for this pair of similar triangles?

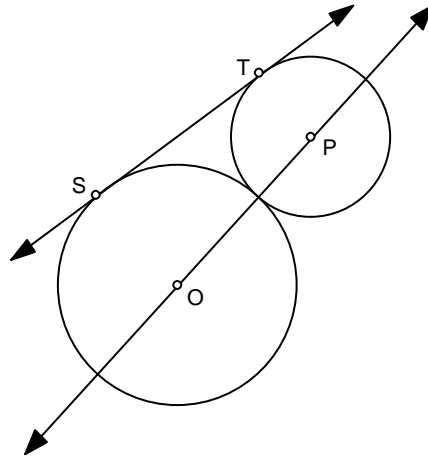
a)  $\frac{AB}{FE} = \frac{AC}{FD}$  b)  $\frac{AB}{FE} = \frac{BC}{ED}$  c)  $\frac{CB}{DE} = \frac{CA}{DF}$  d)  $\frac{DE}{CB} = \frac{FD}{AC}$  e)  $\frac{AB}{ED} = \frac{CB}{DE}$

27. Two similar cubes have corresponding edges whose ratio is 3:7. If the length of a side of the smaller cube is 5, what is the volume of the larger cube?

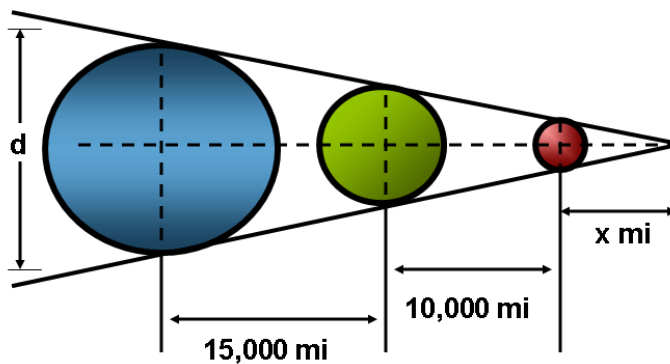
- a)  $\frac{3375}{27}$    b)  $\frac{42875}{27}$    c)  $\frac{8000}{27}$    d)  $\frac{9261}{125}$    e)  $\frac{1728}{125}$

28. In the diagram,  $\odot O$  has radius 9 and circle P has radius 5.  $\odot O$  and  $\odot P$  are externally tangent. Find the length of their common external tangent,  $\overline{ST}$ .

- a.  $3\sqrt{19}$   
 b. 70  
 c.  $6\sqrt{5}$   
 d. 126  
 e.  $\sqrt{115}$



29. Three planets are aligned as shown. The diameter of the smallest planet is 3000 miles and the diameter of the middle planet is 8000 miles. Given the dimensions in the figure, what is the diameter of the largest planet?



- a) 15,000 mi.   b) 15,500 mi.   c) 16,000 mi.   d) 16,5000 mi.   e) 17,000 mi.

30. At a steel mill a thick slab of steel 1 m by 1 m by 15 cm will be rolled into a long strip 1 m wide and .5 cm thick. How long will the rolled strip be?

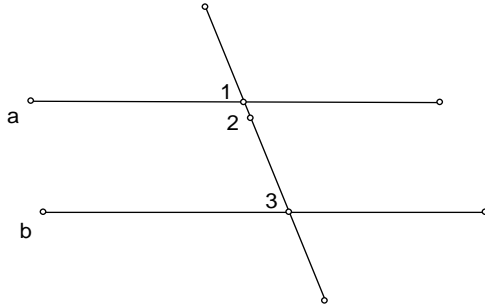


- a) 15m   b) 30m   c) 45 m   d) 60 m   e) 75 m
31. Which of the following sets of points represent a parallelogram?
- a) P(-2,8), Q(2,8), R(2,2), S(-3,2)  
 b) A(4,6), B(7,2), C(4,-2), D(1,1)  
 c) K(4,7), L(9,6), M(6,3), N(1,4)  
 d) F(0,4), G(3,5), H(2,1), I(-1,-1)  
 e) T(1,2), U(2,8), V(4,8), W(3,3)
32. What is the area of a regular hexagon when the apothem measures 4 cm.?
- a)  $\frac{9\sqrt{3}}{2} \text{ cm}^2$    b)  $9\sqrt{3} \text{ cm}^2$    c)  $32\sqrt{3} \text{ cm}^2$    d)  $54\sqrt{3} \text{ cm}^2$    e)  $72 \text{ cm}^2$
33. Inscribe an equilateral triangle inside a regular hexagon with the vertices of the triangle on the vertices of the hexagon. What is the area of the triangle if the length of a side of the hexagon is 4?
- a)  $4\sqrt{3}$    b)  $8\sqrt{3}$    c)  $6\sqrt{2}$    d)  $12\sqrt{3}$    e)  $9\sqrt{2}$
34. Find the volume of a cylinder when its radius is 3 m and the lateral area is  $15\pi \text{ m}^2$ .
- a)  $25\pi \text{ m}^3$    b)  $45\pi \text{ m}^3$    c)  $\frac{33}{2} \pi \text{ m}^3$    d)  $\frac{15}{2} \pi \text{ m}^3$    e)  $\frac{45}{2} \pi \text{ m}^3$



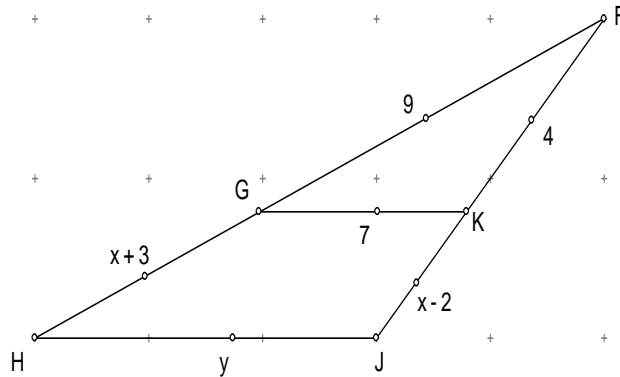
35. Given that  $a \parallel b$ ,

$\angle 1 = (x + 3y)^\circ$ ,  $\angle 2 = (2x + 30)^\circ$ , and  $\angle 3 = (5y + 20)^\circ$ , find  $m\angle 1$ .



- a)  $80^\circ$  b)  $130^\circ$  c)  $70^\circ$  d)  $110^\circ$  e)  $90^\circ$
36. Given that you have right triangle ABC, with AC the hypotenuse. The altitude BD to the hypotenuse creates segments AD and DC. If  $AD = 4$  and  $DC = 7$ , what is perimeter of triangle ABC?
- a)  $\approx 26.0$  b)  $\approx 21.1$  c)  $\approx 26.4$  d)  $\approx 15.9$  e)  $\approx 23.3$
37. Find, to the nearest tenth, the distance between two circles if their radii are 1 and 4 and the length of a common external tangent is 7.5.
- a) 2.6 b) 3.1 c) 1.9 d) 2.4 e) 2.9

38. Given:  $\overleftrightarrow{GK} \parallel \overleftrightarrow{HJ}$ , with lengths as shown. Find the perimeter of  $\triangle HJF$



- a) 40 b) 38 c) 35 d) 49 e) 50
39. The medians of a right triangle that are drawn from the vertices of the acute angles have lengths of  $2\sqrt{13}$  and  $\sqrt{73}$ . Find the length of the hypotenuse.
- a) 12 b) 10 c) 8 d) 14 e) 17
40. A regular decagon with a perimeter of 24 is inscribed in a circle. To the nearest tenth, how far from the center to each side of the decagon?
- a) 7.4 b) 3.7 c) 5.5 d) 6.4 e) 3.2

TMTA 2008 Geometry Test-----ANSWER KEY

- |     |   |     |   |
|-----|---|-----|---|
| 1.  | b | 21. | b |
| 2.  | a | 22. | c |
| 3.  | b | 23. | a |
| 4.  | e | 24. | d |
| 5.  | b | 25. | e |
| 6.  | c | 26. | e |
| 7.  | c | 27. | b |
| 8.  | d | 28. | d |
| 9.  | d | 29. | b |
| 10. | d | 30. | b |
| 11. | d | 31. | c |
| 12. | b | 32. | c |
| 13. | c | 33. | d |
| 14. | c | 34. | e |
| 15. | d | 35. | c |
| 16. | d | 36. | c |
| 17. | b | 37. | b |
| 18. | c | 38. | a |
| 19. | b | 39. | b |
| 20. | d | 40. | b |