In the diagram below, $\overleftrightarrow{AB} \parallel \overleftrightarrow{ED}$. Also, $\measuredangle y$ represents the entire shaded angle and makes a linear pair with $\measuredangle z$. Use this diagram to answer questions 1-4.
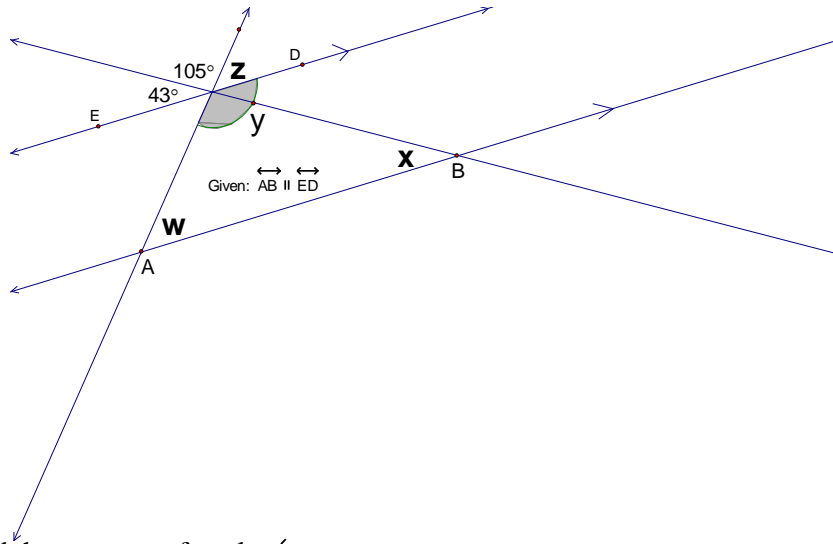


1)  Find the measure of angle $\measuredangle z$.

   A) $32°$              B) $43°$              C) $55°$              D) $105°$              E) $148°$

2)  Find the measure of angle $\measuredangle y$.

   A) $32°$              B) $43°$              C) $55°$              D) $105°$              E) $148°$

3)  Find the measure of angle $\measuredangle x$.

   A) $32°$              B) $43°$              C) $55°$              D) $105°$              E) $148°$

4)  Find the measure of angle $\measuredangle w$.

   A) $32°$              B) $43°$              C) $55°$              D) $105°$              E) $148°$

===================================================================================================

5)  In a triangle, the _____ is found at the intersection of the three altitudes.

   A)  Orthocenter          B) Circumcenter          C) Incenter              D) Centroid

6)  In a triangle, the _____ is found at the intersection of the three medians.

   A)  Orthocenter          B) Circumcenter          C) Incenter              D) Centroid

7)  In a triangle, the _____ is found at the intersection of the three angle bisectors.

   A)  Orthocenter          B) Circumcenter          C) Incenter              D) Centroid

8)  In a triangle, the _____ is found at the intersection of the three perpendicular bisectors.

   A) Orthocenter           B) Circumcenter          C) Incenter              D) Centroid

9) What is the measure of each interior angle of a regular nonagon?

    A) 60°            B) 90°           C) 108°          D) 120°          E) 140°

10) Suppose point A is located at (-2, 5), point B is located at (3, 7), and point C is located at (1, 2). Which of the following describes triangle ABC?

    A) Scalene & Acute     B) Scalene & Obtuse     C) Isosceles & Acute     D) Isosceles & Right     E) Equilateral

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11) Use the diagram below and solve for $x$:
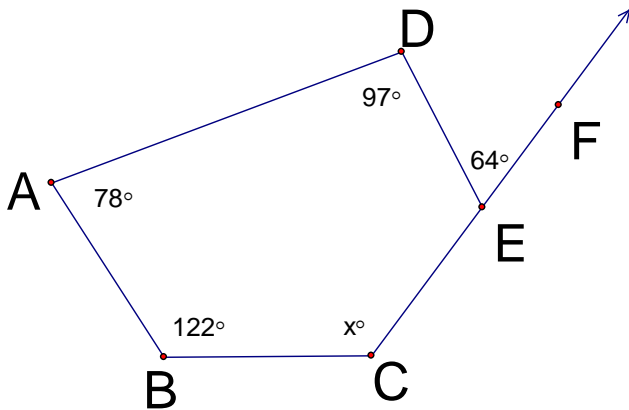


    A) 116°

    B) 122°

    C) 127°

    D) 132°

    E) 148°

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12) A trapezoid has a midsegment of length of $x + 5$ and bases of length $2x + 7$ and $8x + 1$. Find $x$.

    A) 1/8           B) 1/4           C) 1/2           D) 1           E) 2

13) Suppose you are given triangles ABC and DEF. You want to show these triangles are congruent. Which of the sets of measurements will <u>not</u> accomplish that?

    A) $\overline{AB} = \overline{DE}, \overline{AC} = \overline{DF}, \overline{BC} = \overline{EF}$
    B) $\overline{AB} = \overline{DE}, \overline{BC} = \overline{EF}, \angle ABC = \angle DEF$
    C) $\overline{AC} = \overline{DF}, \overline{BC} = \overline{EF}, \angle BCA = \angle EFD$
    D) $\overline{AC} = \overline{DF}, \overline{BC} = \overline{EF}, \angle ABC = \angle DEF$
    E) All of the above sets will establish congruent triangles.

14) If the radius of a circle is 24 cm, what is its circumference?

    A. $12\pi$ cm        B. $24\pi$ cm        C. $48\pi$ cm        D. $144\pi$ cm        E. $576\pi$ cm

15) A sector of a circle has a central angle of 40°. If the area of the sector is $9\pi$ m², what is the radius of the circle?

    A. 6 m        B. $6\sqrt{2}$ m        C. 9 m        D. 12 m        E. $144\sqrt{2}$ m

16. If a trapezoid has an area of 810 cm² and a height of 15 cm, then the midsegment has a length of?

   A. 24 cm        B. 34 cm        C. 44 cm        D. 54 cm        E. 64 cm

17. What is the Surface Area of the figure below if the height is 6cm and the diameter is 12 cm?
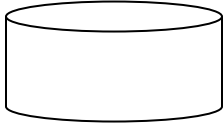


   A. $72\pi$ cm²                    B. $144\pi$ cm²                    C. $216\pi$ cm²

   D. $156\pi$ cm²                    E. none of these

18. In the right rectangular prism shown below, $AD = 9$ cm, $CD = 12$ cm, and $CG = 18$ cm. What is the length of the diagonal $BH$ in centimeters?
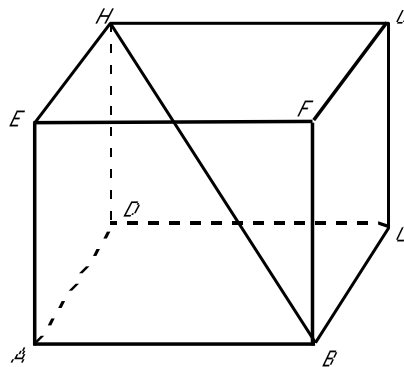


   A. 9 cm        B. $3\sqrt{61}$ cm        C. $9\sqrt{61}$ cm        D. 27 cm        E. $27\sqrt{61}$ cm
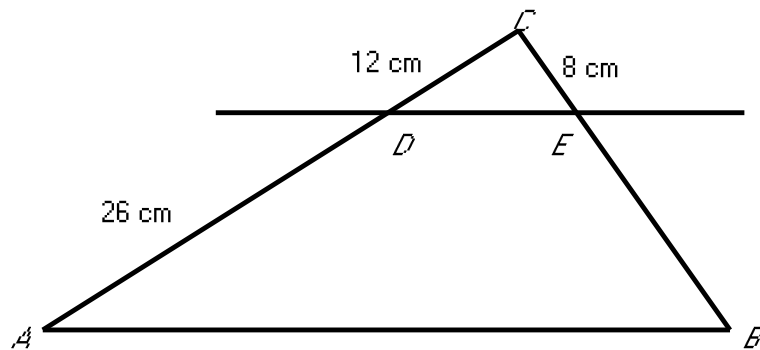
19. What is the perimeter of $\triangle ABC$ with $A$ (−10, −10), $B$ (40, −10), and $C$ (8, 14).

   A. 120        B. 360        C. 450        D. 600        E. 1200

20. A sealed rectangular container measures 6 cm by 12 cm by 15 cm. What is its surface area?

   A. 33 cm²        B. 684 cm²        C. 342 cm²        D. 1080 cm²        E. None of these

21. In the figure below, $DE \parallel AB$. What is $BE$?



   A. 14 cm        B. $17\frac{1}{3}$ cm        C. 49 cm        D. 68 cm        E. None of these

22. If a 10′ flagpole casts a 15′ shadow, how long is a shadow cast by a nearby 24′ house at the same time?

   A. 16′      B. 32′      C. 36′      D. 48′      E. None of these

23. The ratio of the area of two circles is 9:4. What is the radius of the larger if the smaller has a diameter of 16 cm?

   A. 4 cm      B. 6 cm      C. 12 cm      D. 24 cm      E. 48 cm

24. Which of the following expressions correctly represents the value of $x$ for the diagram below?

18 cm    $x$    21°
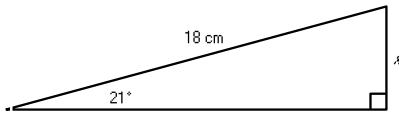
   A. $\dfrac{18}{\sin 21°}$      B. $\dfrac{18}{\cos 21°}$      C. $\dfrac{18}{\tan 21°}$      D. $18\tan(21°)$      E. $18\sin(21°)$

25. What is the area of a right triangle having side of 6 m and hypotenuse of 18 m? (round to nearest tenth)

   A. $24.3 \text{ m}^2$      B. $101.3 \text{ m}^2$      C. $203.6 \text{ m}^2$      D. $50.9 \text{m}^2$      E. None of these

26. What is the area of an equilateral triangle with a perimeter of 12 m? (round to nearest tenth)

   A. $6.3 \text{ m}^2$      B. $6.9 \text{ m}^2$      C. $7.5 \text{ m}^2$      D. $8.1 \text{m}^2$      E. None of these

27. What is the area of a regular pentagon with a perimeter of 20 m? (round to nearest tenth)

   A. $24.5 \text{ m}^2$      B. $25.5 \text{ m}^2$      C. $26.5 \text{ m}^2$      D. $27.5 \text{ m}^2$      E. None of these

28. What is the area of a regular hexagon with a perimeter of 30 m? (round to nearest integer)

   A. $65 \text{ m}^2$      B. $66 \text{ m}^2$      C. $67 \text{ m}^2$      D. $68 \text{ m}^2$      E. None of these

29. What is the area of a regular octagon with a perimeter of 56 m? (round to nearest tenth)

   A. $226.6 \text{ m}^2$      B. $231.6 \text{ m}^2$      C. $236.6 \text{ m}^2$      D. $241.6 \text{ m}^2$      E. None of these

30. Find the volume of the cone shown in the picture below: (round to nearest integer)

15 m    17 m
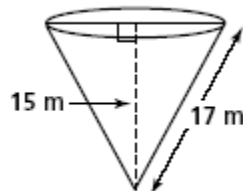
   A. $705 \text{ m}^2$      B. $805 \text{ m}^2$      C. $905 \text{ m}^2$      D. $1005 \text{ m}^2$      E. None of these

31. Find the area of the shaded region shown in the picture below:  (round to nearest tenth)
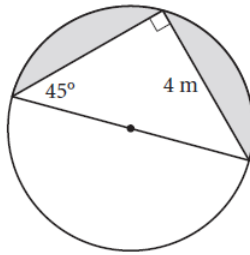


A.  4.2 m²          B.  4.4 m²          C.  4.6 m²          D.  4.8 m²          E.  None of these

For questions 32-35, use the diagram below:
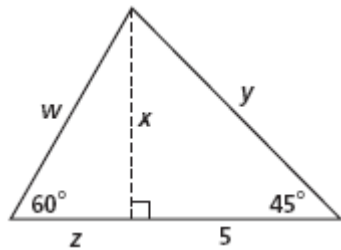


32. Find the length of side $y$.

A. $\dfrac{5\sqrt{2}}{2}$          B. $\dfrac{5\sqrt{3}}{3}$          C. $5\sqrt{2}$          D. $\dfrac{5\sqrt{3}}{2}$          E. $\dfrac{10\sqrt{3}}{3}$

33. Find the length of side $z$.

A. $\dfrac{5\sqrt{2}}{2}$          B. $\dfrac{5\sqrt{3}}{3}$          C. $5\sqrt{2}$          D. $\dfrac{5\sqrt{3}}{2}$          E. $\dfrac{10\sqrt{3}}{3}$

34. Find the length of side $w$.

A. $\dfrac{5\sqrt{2}}{2}$          B. $\dfrac{5\sqrt{3}}{3}$          C. $5\sqrt{2}$          D. $\dfrac{5\sqrt{3}}{2}$          E. $\dfrac{10\sqrt{3}}{3}$

35. Find the perimeter of the triangle.

A. $5(1+\sqrt{2}+\sqrt{3})$   B. $5\left(\sqrt{2}+\sqrt{3}\right)$   C.  10          D.  15          E. $5\left(2+\sqrt{2}+\sqrt{3}\right)$

**KCATM Geometry Team Answers - 2014**

1. A
2. E
3. B
4. A
5. A
6. D
7. C
8. B
9. E
10. C
11. C
12. B
13. D
14. C
15. C
16. D
17. B
18. B
19. A
20. B
21. B
22. C
23. D
24. E
25. D
26. B
27. D
28. A
29. C
30. D
31. C
32. C
33. B
34. E
35. A