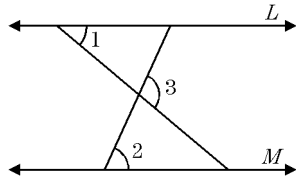


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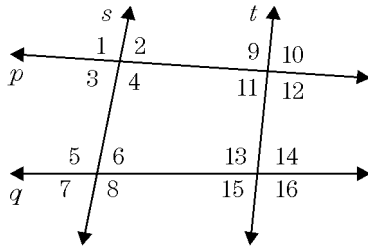
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1. If lines L and M in the figure are parallel, $\angle 3 = 105^\circ$ and $\angle 1 = 40^\circ$, then the measure of $\angle 2$ is:

- A. 35° B. 65°
 C. 75° D. 140°
 E. 115°



2. If $p \parallel q$, choose the statement that is *not* necessarily true.



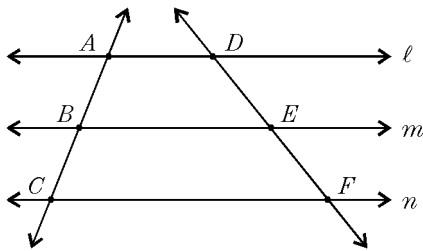
- A. $m\angle 11 + m\angle 13 = 180^\circ$
 B. $\angle 11$ and $\angle 10$ are supplementary
 C. $m\angle 1 + m\angle 3 = m\angle 13 + m\angle 14$
 D. $m\angle 4 = m\angle 13$
 E. $m\angle 13 = m\angle 16$

3. Refer to the previous diagram.

Find the value of x in figure if $m\angle 3 = 3x + 40$, $m\angle 5 = 5x$ and $p \parallel q$.

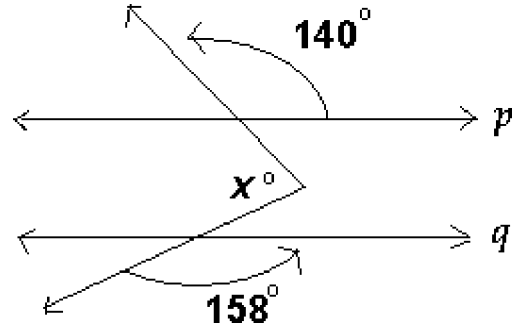
- A. 100 B. 20 C. $17\frac{1}{2}$ D. 80
 E. none of these

4. For the figure shown, ℓ is parallel to m and m is parallel to n . If $AB = 3$, $AC = 5$, and $DE = 8$, then $EF =$ _____?



- A. $\frac{15}{8}$ B. $\frac{40}{3}$ C. $\frac{24}{3}$ D. $\frac{24}{5}$ E. $\frac{16}{3}$

5. Assume $p \parallel q$ in the figure shown. Then x equals:



- A. 18
 B. 22
 C. 40
 D. 62
 E. It cannot be determined from the information given

6. George, lost in the dessert, starts at point A travels 4 km north, then turns and continues 3 km east, then turns southwest and continues $\sqrt{8}$ km and ends at point B . How far is point A from point B ?

- A. 3 km B. $(5 - \sqrt{8})$ km C. $\sqrt{13}$ km
 D. $\sqrt{17}$ km E. $\sqrt{5}$ km

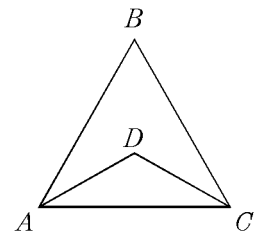
7. If a line segment \overline{AB} is bisected at C by \overline{CD} , and \overline{CD} is congruent to \overline{AC} , then which of the following is always true?

- I. $\triangle ADB$ is a right triangle
 II. $\triangle ACD$ is a right triangle
 III. $\triangle ADB$ is isosceles

- A. I only B. II only C. III only
 D. I and II only E. none of these

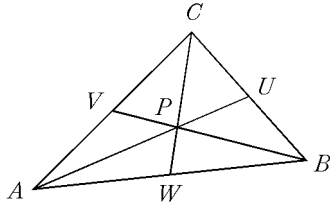
8. \overline{AD} and \overline{CD} are angle bisectors of the base angles of isosceles $\triangle ABC$. If $m\angle B = 80$, find the $m\angle ADC$.

- A. 65 B. 80
 C. 100 D. 130
 E. none of these

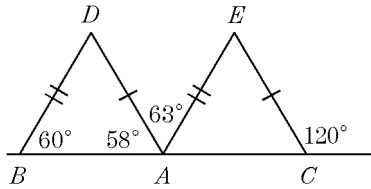


9. \overline{AU} , \overline{BV} , and \overline{CW} are the medians of $\triangle ABC$. If $AP = 2x^2$ and $PW = 4x$, then the value of x is:

- A. $\frac{4}{3}$ B. $\frac{3}{4}$
 C. 1 D. 4
 E. 2

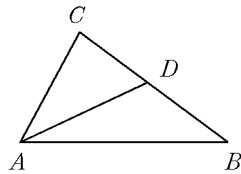


10. Given the figure shown, which of the following is true?



- A. $AB < AC$ B. $AB = BD$ C. $AB > AC$
 D. $AC = CE$ E. $AB = AC$
11. In triangle ABC , $AC = CD$ and the measure of $\angle CAB$ minus the measure of $\angle ABC = 40^\circ$. Then the measure of $\angle BAD$, in degrees, is:

- A. 30 B. $22\frac{1}{2}$
 C. 15 D. 20
 E. 10



12. The number of distinct lines or line segments representing the altitudes, medians and interior angle bisectors of a triangle that is isosceles, but not equilateral is:

- A. 7 B. 9 C. 3 D. 5 E. 6

13. The point of concurrency of the medians of a triangle is called the:

- A. center B. centroid C. orthocenter
 D. incenter E. circumcenter

14. The perpendicular bisectors of the sides of a triangle meet at a point called the:

- A. center B. centroid C. orthocenter
 D. incenter E. circumcenter

15. If a base angle of an isosceles triangle measures $37\frac{1}{2}^\circ$, then the measure of the vertex angle is:

- A. 75° B. 105° C. 120° D. 150°
 E. none of these

16. Given $A(1, -2)$, $B(5, 1)$, and $C(-2, 2)$, find the equation of the angle bisector at A .

- A. $5x - y = 7$ B. $7x - y = 2$
 C. $7y - x = 2$ D. $y = x + 3$
 E. none of the above

17. A parallelogram with one angle of measure 120° has sides of length 50 feet and 80 feet. Find the length of the shorter diagonal.

- A. 65 ft B. 70 ft C. 60 ft D. 68 ft
 E. none of these

18. Which one of the following statements is false?

- A. All squares are rectangles.
 B. Some rhombi are squares.
 C. All parallelograms are rectangles.
 D. Some parallelograms are squares.
 E. Some rectangles are rhombi.

19. Each angle of a rectangle is trisected. Let A, B, C, D be the points of intersection of the pairs of trisectors adjacent to the same side. Then quadrilateral $ABCD$ is:

- A. a square
 B. a parallelogram with unequal sides
 C. a quadrilateral with no special properties
 D. a rectangle
 E. a rhombus

20. How far is the point $(6, -1)$ from the line $3x - y = 4$?

- A. $3\sqrt{6}$ B. $\sqrt{\frac{5465}{4}}$ C. 45 D. $\frac{3\sqrt{10}}{2}$
 E. none of these

21. Find the slope of the line passing through $(2, -1)$ and $(2, 0)$.

- A. 1 B. 0 C. -1 D. $-\frac{1}{4}$
 E. none of these

22. Find the radius of the circle which passes through (2, 4) and is tangent to both the x -axis and the y -axis and has a radius greater than 3.

A. 10 B. 8 C. 7 D. 5
E. none of these

23. Find the slope of the line passing through (2, -1) and parallel to $2x + 5y = 6$.

A. 3 B. $-\frac{2}{5}$ C. $\frac{5}{2}$ D. $-\frac{5}{2}$
E. none of these

24. The vertices of a quadrilateral are (-3, 0), (0, -2), (7, 0) and (0, 8). The area of the figure is:

A. 30sq units B. 90sq units C. 50sq units
D. 40sq units E. none of these

25. If $ABCD$ is a quadrilateral inscribed in a circle with $\angle ABC \cong \angle BCD$, then $ABCD$ cannot be:

A. a parallelogram
B. an isosceles trapezoid
C. a rhombus
D. a quadrilateral with no parallel sides
E. any of these

26. Suppose the ends of a 1 mile long straight railroad rail are squeezed together by one foot. Suppose the rail bows up as an arc in a circle. How high is the highest point of the arc?

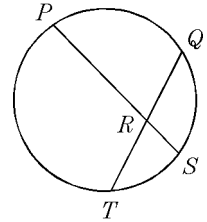
A. less than a foot
B. between a foot and 30 feet
C. between 30 and 60 feet
D. between 60 and 200 feet
E. more than 200 feet

27. Given square $ABCD$ with sides 8 inches. A circle is drawn through vertices A and D , tangent to side BC . The radius of the circle is:

A. 4 inches B. $4\sqrt{2}$ inches C. 5 inches
D. $5\sqrt{2}$ inches E. 6 inches

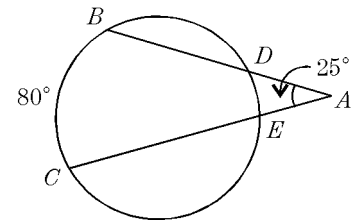
28. In the circle shown $m\widehat{PQ} = 112^\circ$, $m\widehat{QS} = 54^\circ$, $m\widehat{ST} = 88^\circ$, then $m\angle PRT$ is:

A. 54° B. 106° C. 89°
D. 92° E. 80°



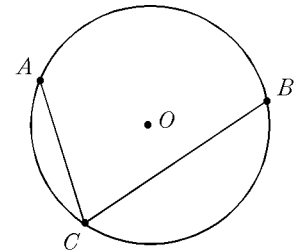
29. \overline{AB} and \overline{AC} are secants to the given circle. The measure of arc DE is:

A. $27\frac{1}{2}^\circ$
B. 15°
C. $52\frac{1}{2}^\circ$
D. 30°
E. 45°



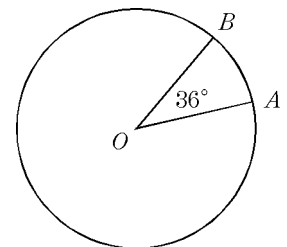
30. Let A , B , and C be points on a circle O . If the measure of arc AC not containing B is 96° and the measure of arc BC not containing A is 128° , then what is $m\angle ACB$?

A. 68° B. 48°
C. 64° D. 136°
E. 112°



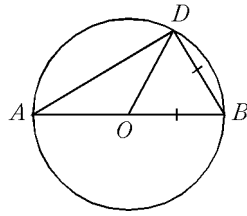
31. If point O is the center of the circle as pictured, and the length of segment OA is 8 inches, then how long is the arc from A to B ?

A. 0.8 inches
B. 1.6 inches
C. 0.8π inches
D. 6.4π inches
E. 1.6π inches



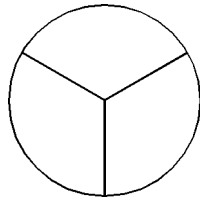
32. \overline{AB} is the diameter of the circle with center O and radius 10, and $DB = OB$. The perimeter of $\triangle ADO$ is how much greater than the perimeter of $\triangle DOB$?

- A. $\sqrt{3}$
 B. $30(1 - \sqrt{3})$
 C. $10(\sqrt{3} - 1)$
 D. $-\sqrt{3}$
 E. 10



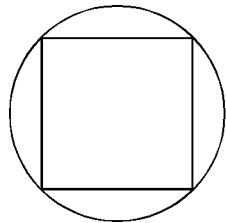
33. A circle is divided into three equal sectors by three radii, as shown in the diagram. What is the ratio of the perimeter of one such sector to the circumference of the circle?

- A. 1:3 B. $(\pi + 6):3\pi$
 C. $(\pi + 3):3\pi$ D. 1:2
 E. $1:(2 + \pi)$



34. The area of the square in the diagram shown is 306.25 cm^2 . What is the approximate area of the outer circle?

- A. 241 cm^2
 B. 481 cm^2
 C. 962 cm^2
 D. 1924 cm^2
 E. none of these

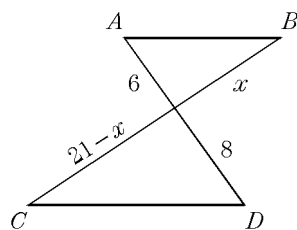


35. If four times the reciprocal of the circumference of a circle equals the diameter of the circle, then the area of the circle is:

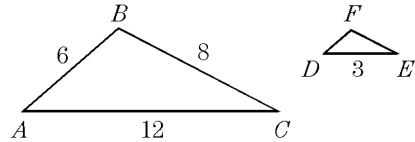
- A. $\frac{1}{\pi^2}$ B. $\frac{1}{\pi}$ C. 1 D. π E. π^2

36. \overline{AB} is parallel to \overline{CD} . The value of x is:

- A. 6 B. 7 C. 8
 D. 9 E. 10



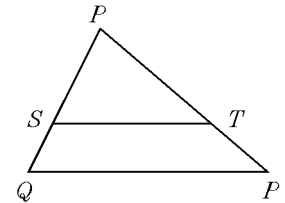
37. Triangle ABC is similar to triangle DEF as sketched. The perimeter of triangle DEF is:



- A. 6.5 B. 9 C. 6 D. 7.5
 E. none of these

38. In the figure $\overline{ST} \parallel \overline{QR}$, then:

- A. $\frac{QR}{ST} = \frac{PR}{PQ}$
 B. $\frac{PQ}{PS} = \frac{PR}{TR}$
 C. $\frac{PS}{SQ} = \frac{PT}{TR}$
 D. $\frac{SQ}{PT} = \frac{PS}{TR}$

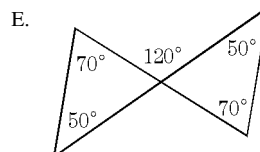
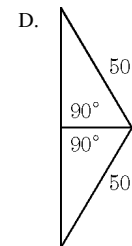
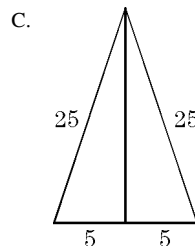
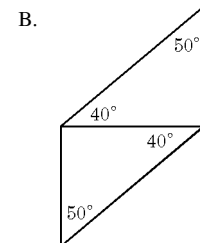
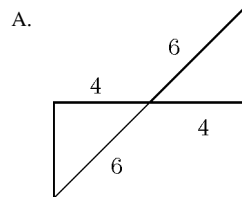


- E. none of these

39. Two similar rectangles have widths in the ratio of 3:5. The ratios of the area of these rectangles is:

- A. 3:5 B. 4:15 C. 9:25 D. 16:49
 E. cannot be determined

40. Which of one of the following pairs of triangles are not necessarily congruent?



- | | | | |
|---------|---|---------|---|
| 1. | | 20. | |
| Answer: | B | Answer: | D |
| 2. | | 21. | |
| Answer: | D | Answer: | B |
| 3. | | 22. | |
| Answer: | B | Answer: | A |
| 4. | | 23. | |
| Answer: | E | Answer: | B |
| 5. | | 24. | |
| Answer: | D | Answer: | C |
| 6. | | 25. | |
| Answer: | E | Answer: | D |
| 7. | | 26. | |
| Answer: | A | Answer: | C |
| 8. | | 27. | |
| Answer: | D | Answer: | C |
| 9. | | 28. | |
| Answer: | D | Answer: | E |
| 10. | | 29. | |
| Answer: | C | Answer: | A |
| 11. | | 30. | |
| Answer: | D | Answer: | A |
| 12. | | 31. | |
| Answer: | A | Answer: | E |
| 13. | | 32. | |
| Answer: | B | Answer: | C |
| 14. | | 33. | |
| Answer: | E | Answer: | C |
| 15. | | 34. | |
| Answer: | B | Answer: | B |
| 16. | | 35. | |
| Answer: | E | Answer: | C |
| 17. | | 36. | |
| Answer: | B | Answer: | D |
| 18. | | 37. | |
| Answer: | C | Answer: | A |
| 19. | | 38. | |
| Answer: | E | Answer: | C |
| | | 39. | |
| | | Answer: | C |
| | | 40. | |
| | | Answer: | E |