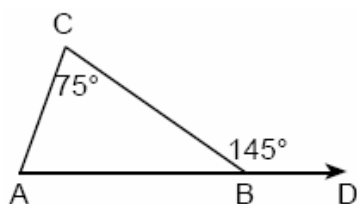


CHAPTER 2-1

INTERIOR AND EXTERIOR ANGLES OF TRIANGLES

1. 069912a, P.I. G.G.32

In the accompanying diagram of $\triangle ABC$, \overline{AB} is extended to D , exterior angle CBD measures 145° , and $m\angle C = 75^\circ$.

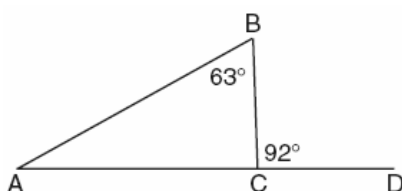


What is $m\angle CAB$?

- [A] 110 [B] 220 [C] 35 [D] 70

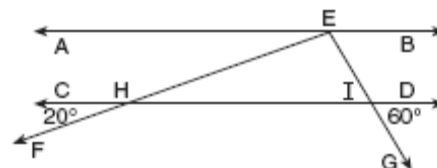
2. 080121a, P.I. G.G.32

Triangle ABC , with side \overline{AC} extended to D , is shown in the accompanying diagram. If $m\angle ABC = 63$ and $m\angle BCD = 92$, what is $m\angle BAC$?



3. 060606a, P.I. G.G.36

In the accompanying diagram, $\overline{AB} \parallel \overline{CD}$. From point E on \overline{AB} , transversals \overline{EF} and \overline{EG} are drawn, intersecting \overline{CD} at H and I , respectively.

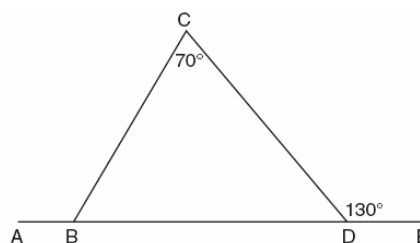


If $m\angle CHF = 20$ and $m\angle DIG = 60$, what is $m\angle HEI$?

- [A] 100 [B] 80 [C] 60 [D] 120

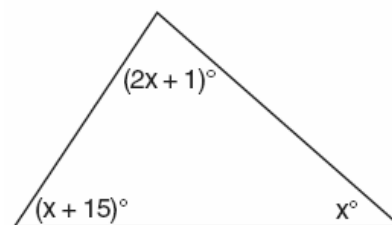
4. 060431a, P.I. G.G.32

In the accompanying diagram of $\triangle BCD$, $m\angle C = 70$, $m\angle CDE = 130$, and side \overline{BD} is extended to A and to E . Find $m\angle CBA$.



5. 080216a, P.I. G.G.30

What is the measure of the largest angle in the accompanying triangle?



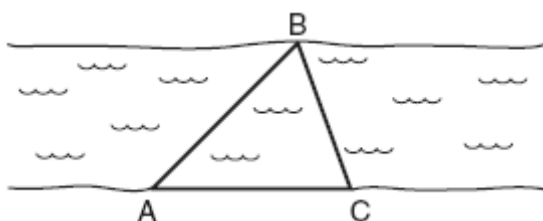
- [A] 41 [B] 83 [C] 56 [D] 46.5

6. 010538a, P.I. G.G.30

In $\triangle ABC$, the measure of $\angle B$ is 21 less than four times the measure of $\angle A$, and the measure of $\angle C$ is 1 more than five times the measure of $\angle A$. Find the measure, in degrees, of *each* angle of $\triangle ABC$.

7. 060629a, P.I. G.G.34

On the banks of a river, surveyors marked locations A , B , and C . The measure of $\angle ACB = 70^\circ$ and the measure of $\angle ABC = 65^\circ$.

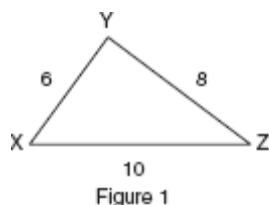


Which expression shows the relationship between the lengths of the sides of this triangle?

- [A] $BC < AC < AB$ [B] $BC < AB < AC$
[C] $AB < BC < AC$ [D] $AC < AB < BC$

8. 010119a, P.I. G.G.30, G.G.48

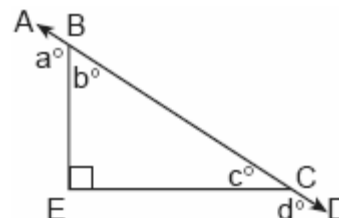
In which of the accompanying figures are segments XY and YZ perpendicular?



- [A] both figure 1 and figure 2
[B] neither figure 1 nor figure 2
[C] figure 1, only [D] figure 2 only

9. 010216a, P.I. G.G.36

In the accompanying diagram, \overline{ABCD} is a straight line, and angle E in triangle BEC is a right angle.



What does $a^\circ + d^\circ$ equal?

- [A] 135° [B] 270°
[C] 160° [D] 180°

SPECIAL TRIANGLES

10. 060417a

Which phrase does *not* describe a triangle?

- [A] obtuse right [B] isosceles right
[C] acute scalene
[D] equilateral equiangular

11. 010102a

In right triangle ABC , $m\angle C = 3y - 10$, $m\angle B = y + 40$, and $m\angle A = 90$. What type of right triangle is triangle ABC ?

- [A] scalene [B] obtuse
[C] isosceles [D] equilateral

12. 010722a

If the measures of the angles of a triangle are represented by $2x$, $3x - 15$, and $7x + 15$, the triangle is

- [A] a right triangle
[B] an equiangular triangle
[C] an acute triangle
[D] an isosceles triangle

13. 010810a

If the measures, in degrees, of the three angles of a triangle are x , $x + 10$, and $2x - 6$, the triangle must be

- [A] equilateral [B] isosceles
[C] right [D] scalene

CHAPTER 2-2

INTERIOR AND EXTERIOR ANGLES OF OTHER POLYGONS

14. 080428a, P.I. G.G.36

What is the sum, in degrees, of the measures of the interior angles of a stop sign, which is in the shape of an octagon?

- [A] 1,440 [B] 360
[C] 1,080 [D] 1,880

15. 080109a, P.I. G.G.36

The sum of the measures of the interior angles of an octagon is

- [A] $1,080^\circ$ [B] 540°
[C] 360° [D] 180°

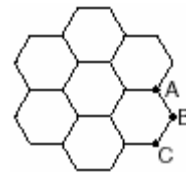
16. 010514a, P.I. G.G.36

What is the sum, in degrees, of the measures of the interior angles of a pentagon?

- [A] 180 [B] 540 [C] 360 [D] 900

17. 060516a, P.I. G.G.37

The accompanying figure represents a section of bathroom floor tiles shaped like regular hexagons.



What is the measure of angle ABC ?

- [A] 150° [B] 90°
[C] 60° [D] 120°

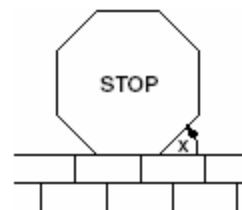
18. 060213a, P.I. G.G.37

What is the measure, in degrees, of each exterior angle of a regular hexagon?

- [A] 45 [B] 120 [C] 135 [D] 60

19. 080507a, P.I. G.G.37

A stop sign in the shape of a regular octagon is resting on a brick wall, as shown in the accompanying diagram.

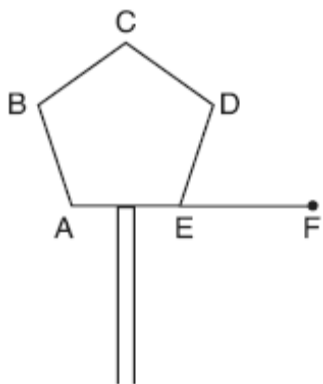


What is the measure of angle x ?

- [A] 45° [B] 120° [C] 135° [D] 60°

20. 060718a, P.I. G.G.37

One piece of the birdhouse that Natalie is building is shaped like a regular pentagon, as shown in the accompanying diagram.



If side AE is extended to point F , what is the measure of exterior angle DEF ?

- [A] 36° [B] 72° [C] 144° [D] 108°

21. 060423a, P.I. G.G.37

Melissa is walking around the outside of a building that is in the shape of a regular polygon. She determines that the measure of one exterior angle of the building is 60° . How many sides does the building have?

- [A] 12 [B] 6 [C] 9 [D] 3

23. 060106a, P.I. G.G.38

Which statement is *not* always true about a parallelogram?

- [A] The opposite angles are congruent.
[B] The opposite sides are parallel.
[C] The diagonals are congruent.
[D] The opposite sides are congruent.

24. 010721a, P.I. G.G.39

A set of five quadrilaterals consists of a square, a rhombus, a rectangle, an isosceles trapezoid, and a parallelogram. Lu selects one of these figures at random. What is the probability that both pairs of the figure's opposite sides are parallel?

- [A] $\frac{4}{5}$ [B] $\frac{2}{5}$ [C] $\frac{3}{4}$ [D] 1

25. 080517a, P.I. G.G.39

In a certain quadrilateral, two opposite sides are parallel, and the other two opposite sides are *not* congruent. This quadrilateral could be a

- [A] square [B] trapezoid
[C] parallelogram [D] rhombus

26. 010025a, P.I. G.G.39

Al says, "If $ABCD$ is a parallelogram, then $ABCD$ is a rectangle." Sketch a quadrilateral $ABCD$ that shows that Al's statement is not always true. Your sketch must show the length of each side and the measure of each angle for the quadrilateral you draw.

CHAPTER 2-4

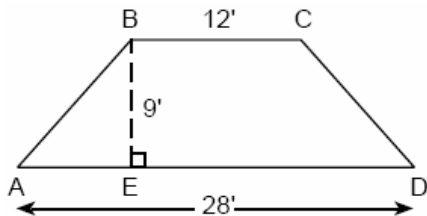
SPECIAL QUADRILATERALS

22. 010404a

Which statement about quadrilaterals is true?

- [A] All quadrilaterals have four right angles.
[B] All quadrilaterals have four sides.
[C] All quadrilaterals are parallelograms.
[D] All quadrilaterals have equal sides.

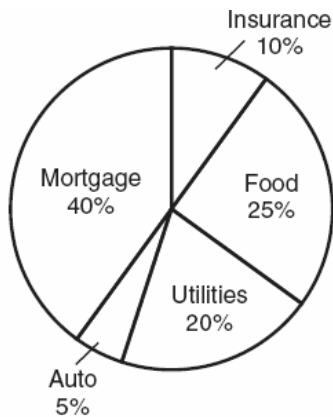
27. 069933a, P.I. G.G.40
- The cross section of an attic is in the shape of an isosceles trapezoid, as shown in the accompanying figure. If the height of the attic is 9 feet, $BC = 12$ feet, and $AD = 28$ feet, find the length of \overline{AB} to the nearest foot.



CHAPTER 2-5

CIRCLE GRAPHS

28. 060422a, P.I. 7.S.6
- The accompanying circle graph shows how the Marino family spends its income each month.



What is the measure, in degrees, of the central angle that represents the percentage of income spent on food?

- [A] 360 [B] 50 [C] 90 [D] 25

29. 010611a, P.I. 7.S.6
- The accompanying circle graph shows how Shannon earned \$600 during her summer vacation.

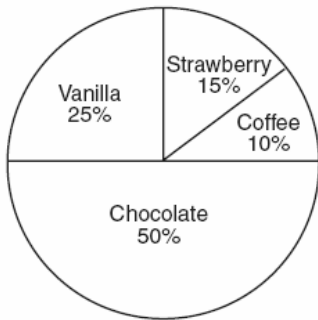


What is the measure of the central angle of the section labeled "Chores"?

- [A] 90° [B] 120° [C] 30° [D] 60°

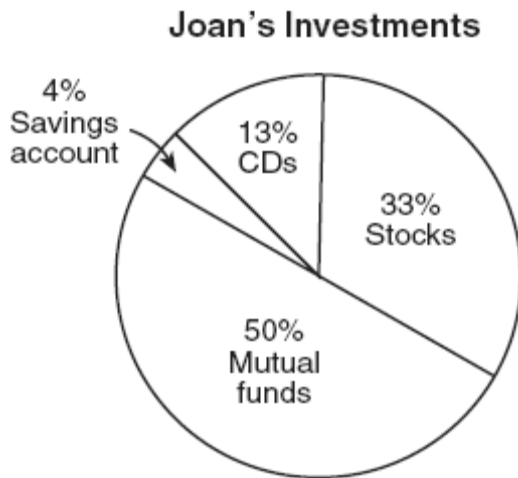
30. 010325a, P.I. 7.S.6
- Mr. Smith's class voted on their favorite ice cream flavors, and the results are shown in the accompanying diagram. If there are 20 students in Mr. Smith's class, how many students chose coffee ice cream as their favorite flavor?

Favorite Ice Cream Flavors



31. 080702a, P.I. 7.S.6

The accompanying circle graph shows how Joan invested her money.

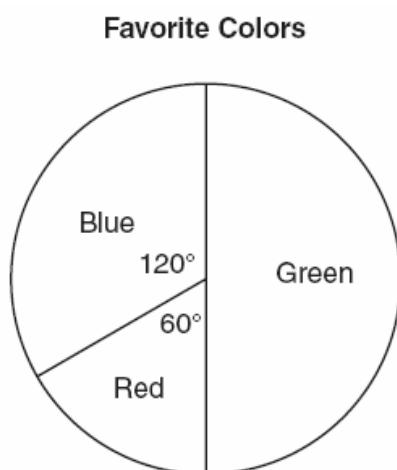


If she invested a total of \$12,000, how much money did she invest in CDs?

- [A] \$92,308 [B] \$9,230
[C] \$1,560 [D] \$15,600

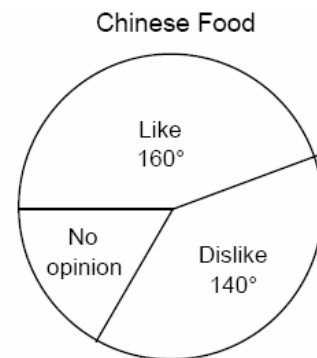
32. 080435a, P.I. 7.S.6

The accompanying circle graph shows the favorite colors of the 300 students in the ninth grade. How many students chose red as their favorite color?



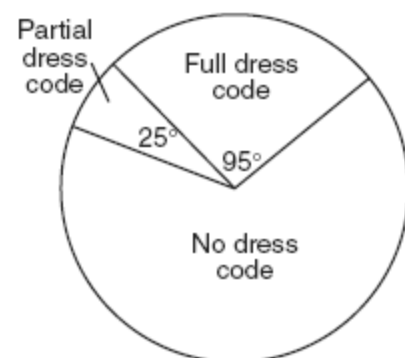
33. 089924a, P.I. 7.S.6

In a recent poll, 600 people were asked whether they liked Chinese food. A circle graph was constructed to show the results. The central angles for two of the three sectors are shown in the accompanying diagram. How many people had no opinion?



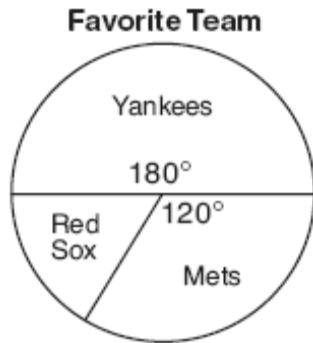
34. 080534a, P.I. 7.S.6

Nine hundred students were asked whether they thought their school should have a dress code. A circle graph was constructed to show the results. The central angles for two of the three sectors are shown in the accompanying diagram. What is the number of students who felt that the school should have no dress code?



35. 060715a, P.I. 7.S.6

In a recent poll in Syracuse, New York, 3,000 people were asked to pick their favorite baseball team. The accompanying circle graph shows the results of that poll.

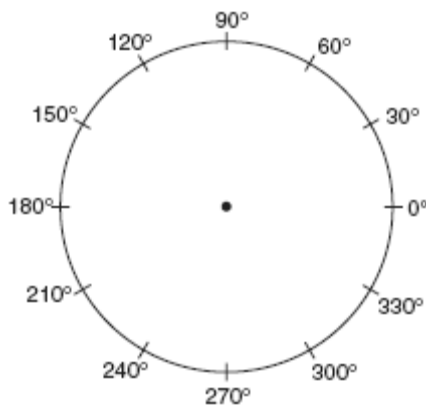


How many of the people polled picked the Red Sox as their favorite team?

[A] 300 [B] 500 [C] 1,800 [D] 1,200

36. 060538a, P.I. 7.S.2

In a class of 24 students, 10 have brown hair, 8 have black hair, 4 have blond hair, and 2 have red hair. On the accompanying diagram, construct a circle graph to show the students' hair color.



[1] D

[2] 29, and appropriate work is shown, such as $92 - 63 = 29$.

[1] The correct application of the exterior angle theorem is shown, but one or more computational errors are made.

or [1] The correct application of supplementary angles and the sum of the angles of a triangle are shown, but one or more computational errors are made.

or [1] $m\angle BCA$ is calculated incorrectly, but the sum of the angles in a triangle is used appropriately.

or [1] 29, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[2] incorrect procedure.

[3] A

[2] 120, and appropriate work is shown, such as $m\angle CDB = 180 - 130 = 150$ and $m\angle CBA = 70 + 50 = 120$ or correctly labeled angles in a diagram.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] $m\angle CBD = 60$ is found, but no further correct work is shown.

or [1] 120, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[4] incorrect procedure.

[5] B

[4] $m\angle A = 20$, $m\angle B = 59$, and $m\angle C = 101$, and appropriate work is shown.

[3] Appropriate work is shown, but one computational error is made.

or [3] A correct equation is written and solved, and the correct measures for the angles are found, but they are not labeled or are labeled incorrectly.

[2] Appropriate work is shown, but two or more computational errors are made.

or [2] Appropriate work is shown, but one conceptual error is made.

or [2] A correct equation is written and solved for x , but the measures of the angles are not found.

or [2] An incorrect equation of equal difficulty is solved appropriately, and the three angles are found.

[1] Appropriate work is shown, but one conceptual error and one computational error are made.

or [1] A correct equation is written, but no further correct work is shown.

or [1] $m\angle A = 20$, $m\angle B = 59$, and $m\angle C = 101$, but no work is shown.

[0] $m\angle A = 20$ or $m\angle B = 59$ or $m\angle C = 101$, but no work is shown.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[6] obviously incorrect procedure.

[7] A

[8] A

[9] B

[10] A

[11] A

[12] D

[13] D

[14] C

[15] A

[16] B

[17] D

[18] D

[19] A

[20] B

[21] B

[22] B

[23] C

[24] A

[25] B

[2] The student draws a parallelogram, which is not a rectangle, with four sides and four angles labeled, such as angles of 60, 120, 60, and 120 and sides of 4, 6, 4, and 6.

[1] A parallelogram or rhombus, not a square, is drawn, which does not have measures for all lengths or angles.

[0] Angles and/or lengths are not appropriate for a parallelogram.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[26] obviously incorrect procedure.

[4] 12 and an appropriate method is shown, such as $(AB)^2 = 9^2 + 8^2$.

[3] An incorrect length is found for AE, but then it is used to correctly complete the problem.

or [3] An appropriate method is shown, but one computational mistake is made.

or [3] An appropriate method is shown, but the answer is not given to the nearest foot, such as $\sqrt{145}$.

[2] AE = 8 and one computational mistake is made using the Pythagorean theorem.

or [2] An incorrect length is found for AE, but then it is used to complete the problem correctly, but the answer is not rounded.

[1] AE = 8 is found, but the Pythagorean theorem is not used.

or [1] 12 and no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[27] incorrect procedure.

[28] C

[29] D

[2] 2, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown to find the number of students for any flavor other than coffee.

or [1] 2, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[30] incorrect procedure.

[31] C

[2] 50, and appropriate work is shown, such as using a proportion.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] An incorrect fractional part is determined, but an appropriate number of students is found.

or [1] 50, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[32] incorrect procedure.

[2] 100 and an appropriate method is shown, such as $360 - 300 = 60$ degrees, which is $\frac{1}{6}$

of the circle so $\frac{1}{6}$ of 600 is 100.

[1] 100 and no explanation is given.

or [1] An incorrect degree measure is used to develop a fraction by which to multiply 600, obtaining an appropriate answer.

or [1] A correct degree measure is used to develop $\frac{1}{6}$.

or [1] 60 degrees is used, but an incorrect number of people is found.

[0] Only 60 degrees is found.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[33] obviously incorrect procedure.

[2] 600, and appropriate work is shown, such

as $\frac{240}{360} \cdot 900 = 600$.

[1] Appropriate work is shown, but one computational error is made or the answer is expressed as a fraction.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] The central angle of 240° is found, but the number of students is not calculated.

or [1] An incorrect equation of equal difficulty is solved appropriately.

or [1] A correct equation is written, but no further correct work is shown.

or [1] 600, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[34] incorrect procedure.

[35] B

[4] A correct circle graph is drawn and labeled, and appropriate work is shown, such as using proportions. [A correct graph will show 150° for brown, 120° for black, 60° for blond, and 30° for red.]

[3] Appropriate work is shown, but one computational error is made, but an appropriate graph is drawn.

or [3] Appropriate work is shown, but one graphing error is made.

or [3] Appropriate work is shown and a correct graph is drawn, but the sectors are not labeled or are labeled incorrectly.

[2] Appropriate work is shown, but two or more computational errors are made, but an appropriate graph is drawn.

or [2] Appropriate work is shown, but one conceptual error is made.

or [2] Correct numbers of degrees or correct proportional values are found, but two or more graphing errors are made.

or [2] Correct numbers of degrees or correct proportional values are found, but no graph is drawn.

or [2] A correct circle graph is drawn and labeled, but no work is shown.

[1] Appropriate work is shown and a graph is drawn, but two or more computational errors and two or more graphing errors are made.

or [1] At least two numbers of degrees or proportional values are found correctly, but no graph or an incorrect graph is drawn.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[36] incorrect procedure.
