

Preparing for College Entrance Exams

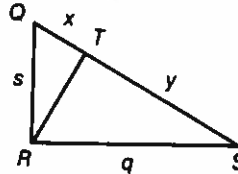
Chapter 8

Directions: Write the letter of the best answer in the space provided.

1. $\overline{QR} \perp \overline{RS}$ and $\overline{RT} \perp \overline{QS}$.

Which of the following is true?

- I. $\triangle QRT \sim \triangle QSR$
 II. $\triangle TRS \sim \triangle RQS$
 III. $\frac{x}{y} = \frac{s}{q}$



- (A) I only (B) II only (C) III only
 (D) I and II only (E) I, II, and III

2. A ladder 6 m long just reaches the top of a building and its foot makes a 76° angle with the ground. Which of the following equations could be used to calculate the height, h , of the building?

- I. $\sin 76^\circ = \frac{h}{6}$ II. $6 \cdot \cos 14^\circ = h$ III. $\cos 76^\circ = \frac{h}{6}$

- (A) I only (B) II only (C) III only
 (D) I and II only (E) I, II, and III

3. $VW = 5$, $WX = 7$, and $XY = 13$. Find VY .

- (A) $11\sqrt{2}$ (B) $9\sqrt{3}$ (C) $10\sqrt{2}$ (D) $8\sqrt{3}$

4. $QUAD$ is a parallelogram with $QX = DX = 4\sqrt{2}$ and $UA = 8$. Which of the following best describes $QUAD$? (The figure is not drawn to scale.)

- (A) parallelogram (B) rectangle
 (C) rhombus (D) square

5. $AB = AC = BC = 12$. \overline{BD} bisects $\angle ABC$ and \overline{BE} bisects $\angle DBC$. Find the length of the hypotenuse of a right triangle with an acute angle congruent to $\angle ABE$ and the opposite leg congruent to \overline{BD} .

- (A) $12\sqrt{3}$ (B) $6\sqrt{2}$ (C) $6\sqrt{6}$ (D) $6\sqrt{3}$

6. The perimeter of an isosceles right triangle is $8 + 8\sqrt{2}$. Find the length of the hypotenuse.

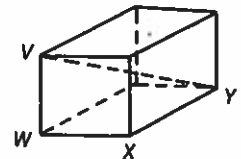
- (A) 4 (B) 8 (C) $2\sqrt{2}$ (D) $4\sqrt{2}$ (E) $8\sqrt{2}$

7. A guy wire attached to the ground at point A is 50 m long and makes an angle of 58° with the ground. Suppose it were fastened at point B , making an angle of 70° with the ground. Which of the following are needed to calculate the new length of the wire?

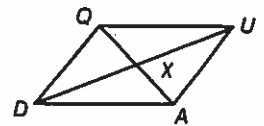
- (A) $\sin 58^\circ$, $\sin 70^\circ$ (B) $\cos 58^\circ$, $\cos 70^\circ$
 (C) $\sin 58^\circ$, $\cos 70^\circ$ (D) $\sin 70^\circ$, $\cos 58^\circ$

Answers

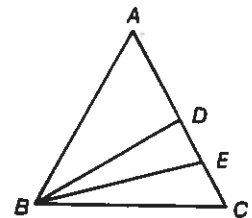
1. D
 2. D
 3. B
 4. D
 5. C
 6. B
 7. A



Question 3



Question 4



Question 5



Question 7

Preparing for College Entrance Exams

Chapter 11

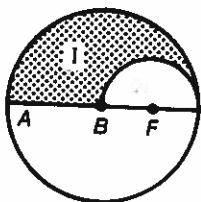
Directions: Questions 1–4 each consist of two quantities, one in Column A and one in Column B. Compare the two quantities and in the answer blank write:

- (A) if the quantity in Column A is greater.
- (B) if the quantity in Column B is greater.
- (C) if the two quantities are equal.
- (D) if the relationship cannot be determined from the information given.

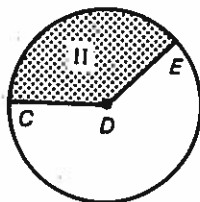
Column A

Column B

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <p>1. The area of a regular octagon of side 12</p> <p>2. The hypotenuse of an isosceles right triangle of area 8</p> <p>3. The area of a rhombus of side 6</p> <p>4.</p> | <p>The area of a regular pentagon of side 12</p> <p>The side of a square of area 8</p> <p>The area of a square of side 6</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|



$\odot B \cong \odot D$
 $m\widehat{CE} = 135$



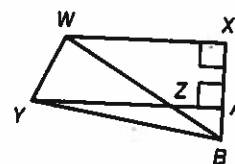
The area of region I

The area of region II

For questions 5–8, write the letter of the best answer in the space provided.

5. In the diagram, $\overline{WX} \parallel \overline{YA}$ and $XA = 2(AB)$. Find the ratio of the areas of $\triangle WYZ$ and $\triangle ZBY$.

- (A) 2:1 (B) 3:1 (C) 4:1 (D) $\sqrt{2}:1$ (E) 5:3



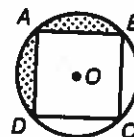
Question 5

6. A square garden enclosed by a fence with perimeter 40 m is to be expanded so it includes 300 m^2 more area but is still square. If the gardener can reuse the old fence pieces, what length of new fence must the gardener buy?

- (A) 10 m (B) 20 m (C) 40 m (D) 100 m

7. $ABCD$ is a square inscribed in $\odot O$ and $AB = 8$. Find the area of the shaded region.

- (A) $16\pi - 32\sqrt{2}$ (B) $128\pi - 64$ (C) 112π
 (D) $\frac{16\pi}{45} - 32\sqrt{2}$ (E) $16\pi - 32$



Question 7

8. \overline{XY} is a diameter of a circle and Z is a point on the circle such that $ZY = 6$. If the area of $\triangle XYZ$ is $18\sqrt{3}$, find the length of \widehat{XZ} .

- (A) $\frac{3\pi}{2}$ (B) 2π (C) 3π (D) 4π

Answers

1. A
2. A
3. D
4. C
5. A
6. C
7. E
8. D

Preparing for College Entrance Exams

Chapter 12

Directions: Questions 1–3 each consist of two quantities, one in Column A and one in Column B. Compare the two quantities and in the answer blank write:

- (A) if the quantity in Column A is greater.
 (B) if the quantity in Column B is greater.
 (C) if the two quantities are equal.
 (D) if the relationship cannot be determined from the information given.

Column A	Column B
1. Volume of a sphere with radius 4 cm	Volume of a cone with radius 6 cm and height 2 cm
2. Total area of a right triangular prism with all edges 7 m	Total area of a regular square pyramid with all edges 7 m
3. Volume of a cylinder with radius 3 in. and height 12 in.	Volume of a right rectangular prism with base edges 3 in. and height 12 in.

Write the letter of the best answer in the space provided.

4. The cone is twice the height of the cylinder. Find the ratio of the volume of the cone to the volume of the cylinder.
 (A) 2:3 (B) 3:2 (C) 4:3 (D) 2:1
5. Two similar pyramids have total areas of 32 and 50. If the smaller pyramid has volume 128, find the volume of the larger pyramid.
 (A) 200 (B) 160 (C) 250 (D) 312.5
6. A sphere and a cone have the same radius. The height of the cone is the same as its radius. Find the ratio of the volume of the sphere to the volume of the cone.
 (A) 2:1 (B) 3:1 (C) 4:1 (D) 3:2
7. John charges twice as much as Ray per square foot of painting. They are each hired to paint the surface of a cube, but the length of a side of Ray's cube is twice the length of a side of John's cube. How will their final paychecks compare?
 (A) Ray will get half as much as John.
 (B) They will get the same amount.
 (C) Ray will get twice as much as John.
 (D) Ray will get four times as much as John.
 (E) Ray will get six times as much as John.

Answers

1. A
 2. B
 3. A
 4. A
 5. C
 6. C
 7. C



Question 4

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Chapter 13

Directions: Write the letter of the best answer in the space provided.

- Which of the following best describes the triangle with vertices $R(-2, -2)$, $S(2, 2)$, and $T(2, -6)$?
 (A) scalene (B) right scalene (C) isosceles
 (D) right isosceles (E) equilateral
- Identify an equation of the circle that has as a diameter the segment joining $(9, -1)$ and $(1, 5)$.
 (A) $(x - 2)^2 + (y - 5)^2 = 85$ (B) $(x - 5)^2 + (y - 2)^2 = 25$
 (C) $(x - 2)^2 + (y - 5)^2 = 25$ (D) $(x - 5)^2 + (y - 2)^2 = 100$
- The line that passes through points $(4, 7)$ and $(1, 1)$:
 I. has slope $\frac{1}{2}$.
 II. is perpendicular to the line through $(5, 2)$ and $(1, 4)$.
 III. is parallel to the line through $(-1, 1)$ and $(0, 3)$.
 (A) I only (B) II only (C) III only
 (D) I and II only (E) II and III only
- Suppose you are asked to give a coordinate-geometry proof concerning an equilateral triangle. Which set of labels would you use for the vertices?
 (A) $(-a, 0)$, $(a, 0)$, $(0, a)$ (B) $(0, 0)$, $(a, 0)$, $(\frac{a}{2}, a)$
 (C) $(-a, 0)$, $(a, 0)$, $(0, b)$ (D) $(-a, 0)$, $(b, 0)$, $(\frac{-a+b}{2}, c)$
- For what value of k will the lines $2x + ky = 6$ and $14x - 4y = k + 3$ be perpendicular?
 (A) $\frac{4}{7}$ (B) $-\frac{4}{7}$ (C) 3 (D) 7 (E) -7
- Which of the following points is farthest from $(-3, 5)$?
 (A) $(3, 5)$ (B) $(-5, 3)$ (C) $(-3, -5)$ (D) $(-5, -3)$ (E) $(5, 3)$
- Three vertices of a square are $(2, 2)$, $(1, -1)$, and $(-2, 0)$. Find the fourth vertex.
 (A) $(1, 0)$ (B) $(-2, -2)$ (C) $(0, 1)$ (D) $(0, 2)$ (E) $(-1, 3)$
- Two vertices of a square are $(2, 3)$ and $(6, 1)$. Which of the following best describes the possible value(s) for the area of the square?
 (A) 10 (B) 13 (C) 20 (D) 10 or 20 (E) 13 or 20
- A circle has center $(2, 4)$ and passes through the point $(5, 0)$. Which of the following points is *not* on the circle?
 (A) $(6, 7)$ (B) $(7, 4)$ (C) $(4, -2)$ (D) $(-2, 1)$ (E) $(-1, 8)$

Answers

- D
- B
- F
- C
- D
- C
- F
- D
- C

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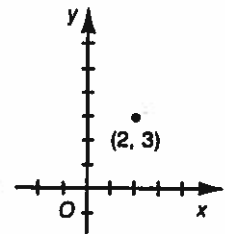
Chapter 14

Directions: Write the letter of the best answer in the space provided.

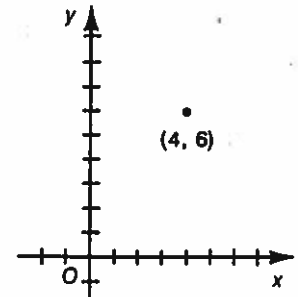
- Which of the following is *not* possible?
 - a figure with point symmetry and rotational symmetry but no line of symmetry
 - a figure with line symmetry but no point of symmetry
 - a figure with line symmetry and point symmetry but no rotational symmetry
 - a figure with no line of symmetry and no point of symmetry
- A figure is reflected first in the x -axis and then in the y -axis. Which of the following produce(s) the same result?
 - $\mathcal{R}_O, 90$
 - $\mathcal{R}_O, 180$
 - \mathcal{R}_l where l is the line $y = -x$
 - I only
 - II only
 - III only
 - I and III only
 - II and III only
- Find the image of the point $(2, 3)$ under $T \circ R_y$, where $T:(x, y) \rightarrow (x - 1, y + 3)$ and R_y is reflection in the y -axis.
 - $(-1, 6)$
 - $(-3, 6)$
 - $(1, 0)$
 - $(1, -6)$
- Which of the following composites of transformations is *not* equivalent to the identity transformation?
 - $D_X, 2 \circ D_X, \frac{1}{2}$ for any point X
 - $T \circ S$ where $T:(x, y) \rightarrow (x + 3, y - 4)$ and $S:(x, y) \rightarrow (x - 3, y + 4)$
 - $R_j \circ R_k$ where j and k are parallel lines
 - $\mathcal{R}_X, 45 \circ \mathcal{R}_X, 90 \circ \mathcal{R}_X, 225$ for any point X
- Find the image of the point $(4, 6)$ under $D_O, \frac{1}{2} \circ R_k \circ T$, where k is the line $y = x$ and $T:(x, y) \rightarrow (x + 3, y + 2)$.
 - $(11, 6)$
 - $(4, 3\frac{1}{2})$
 - $(6, 4)$
 - $(6\frac{1}{2}, 7)$
- A ball leaves $(1, 3)$, bounces off the x -axis, and lands at $(6, 9)$. How far did the ball travel?
 - $\sqrt{61}$
 - $3 + \sqrt{106}$
 - $9 + \sqrt{34}$
 - 13
- P' is the image of point P under a reflection in \overleftrightarrow{AB} . How could you locate P' ?
 - Construct a \perp to \overleftrightarrow{AB} through P' .
 - Draw $\overline{P'A}$ and $\overline{P'B}$ and construct the bisector of $\angle AP'B$.
 - Construct a line through P' parallel to \overleftrightarrow{AB} .
 - Construct the perpendicular bisector of \overline{AB} .

Answers

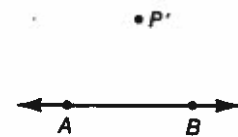
- C
- B
- B
- C
- B
- D
- A



Question 3



Question 5



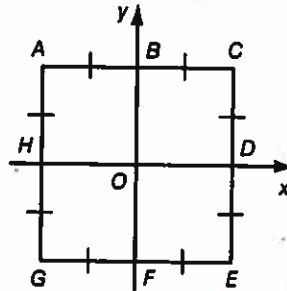
Question 7

Practice 61

Cumulative Practice, Chapters 8-14

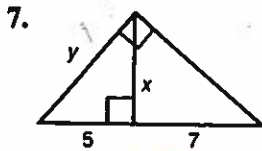
Exercises 1-5 refer to square $ACEG$.

1. $H_O: \overline{CE} \rightarrow \underline{\overline{GA}}$
2. $R_y: \overline{OC} \rightarrow \underline{\overline{OA}}$
3. $D_{F,2}: \overline{FO} \rightarrow \underline{\overline{FB}}$
4. $R_{O,90}: R_y: \overline{OE} \rightarrow \underline{\overline{OE}}$
5. $R_y \circ R_x: \overline{OA} \rightarrow \underline{\overline{OE}}$

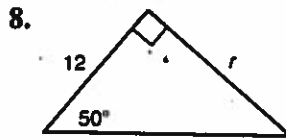


6. If $T: (x, y) \rightarrow (x - 3, y + 8)$, find the preimage of $(7, 7)$. $(10, -1)$

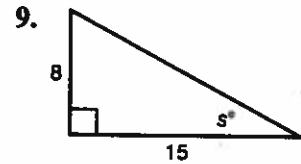
Find the indicated values. In Exercises 8 and 9, use a scientific calculator or the table on page 311 of the text. Find the values of r and s to the nearest integer.



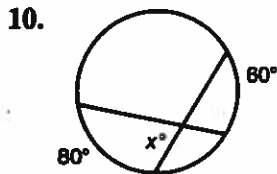
$x = \underline{\sqrt{35}}$
 $y = \underline{2\sqrt{5}}$



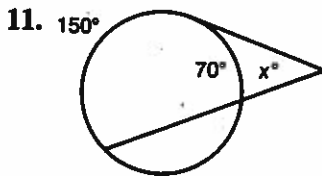
$r = \underline{14}$



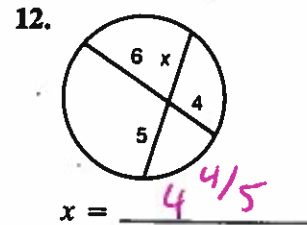
$s = \underline{28}$



$x = \underline{70}$



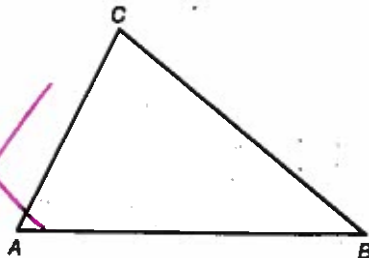
$x = \underline{40}$



$x = \underline{4\frac{4}{5}}$

13. Use coordinate geometry to prove that the midpoint of the hypotenuse of a right triangle is equidistant from the vertices. First draw a figure and choose convenient axes and coordinates.

14. Inscribe a circle in $\triangle ABC$.



(continued)

Practice 61 (continued)

Find the area of each figure.

15. A rectangle with length 12 m and width 8.5 m 102
 16. An isosceles triangle with sides 12 ft, 12 ft, and 8 ft $32\sqrt{2}$
 17. A regular hexagon with apothem 12 cm $288\sqrt{3}$
 18. An isosceles trapezoid with legs 15 and bases 8 and 32 180
 19. A circle inscribed in a square with side 12 m 36π
 20. Sector AOB of $\odot O$ with radius 10 and $m\angle AOB = 108$ 30π

Find the lateral area, total area, and volume of each solid. In Exercises 23 and 24, leave answers in terms of π .

21. A rectangular prism with height 6 cm, width 4 cm, and length 8 cm
 L.A. = 144, T.A. = 208, $V = 192$
 22. A regular square pyramid with base edge 18 and slant height 15
 L.A. = 540, T.A. = 864, $V = 1296$
 23. A cylinder with radius 8 and height 16
 L.A. = 256π , T.A. = 384π , $V = 1024\pi$
 24. A cone with radius 12 and height 9
 L.A. = 180π , T.A. = 324π , $V = 432\pi$
 25. Find, in terms of π , the area and volume of a sphere with radius 15 cm.
 $A = 900\pi$, $V = 4500\pi$
 26. The scale factor of two similar pyramids is 3:5. The smaller pyramid has volume 18 m^3 . Find the volume of the larger pyramid. $83\frac{1}{3}$

Find each vector sum.

27. $(-7, -3) + (2, 13)$ $(-5, 10)$ 28. $3(2, 11) + 2(9, -6)$ $(24, 21)$

Given $C(0, -3)$ and $D(6, 5)$, find each of the following.

29. The distance from C to D . 10
 30. The coordinates of the midpoint of \overline{CD} $(3, 1)$
 31. The slope of \overline{CD} $\frac{4}{3}$
 32. An equation of the circle with center C and radius CD $x^2 + (y+3)^2 = 100$
 33. An equation of the line through $(5, -1)$ and perpendicular to \overline{CD} $3x + 4y = 11$

Cumulative Review, Chapters 7-8 Part 1

Complete.

1. In simplest form, $\frac{4x^2}{12xy^2} = \frac{x}{3y^2}$.

2. In simplest form, $\frac{y+4}{8y+32} = \frac{1}{8}$.

3. If $\frac{x}{6} = \frac{16}{24}$, then $x = 4$.

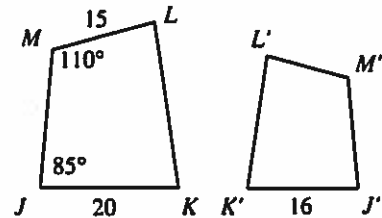
4. If $\frac{a}{7} = \frac{5}{9}$, then $\frac{a+7}{7} = \frac{14}{9}$.

In Exercises 5-7 quad. JKLM ~ quad. J'K'L'M'.

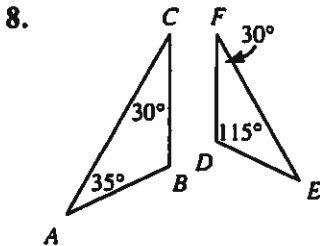
5. Find $M'L'$. 12

6. Find $m\angle J'$. 85

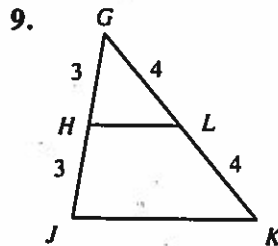
7. What is the scale factor of quad. JKLM to quad. J'K'L'M'? 5:4



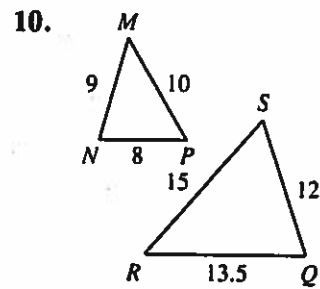
Name two similar triangles. Also name the theorem or postulate that justifies your answer.



$\triangle ABC \sim \triangle EDF$
AA ~

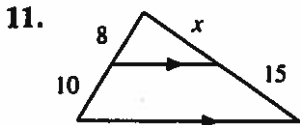


$\triangle GHL \sim \triangle GJK$
SAS ~

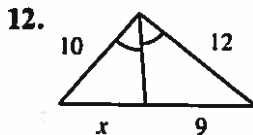


$\triangle MNP \sim \triangle RQS$
SSS ~

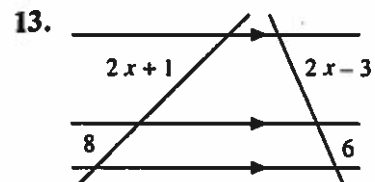
Find the value of x.



$x = 12$



$x = 7.5$



$x = 7.5$

Simplify.

14. $\sqrt{80}$ $4\sqrt{5}$

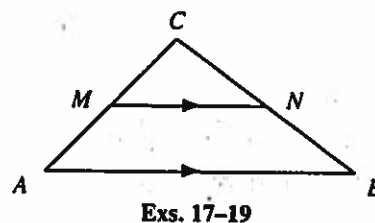
15. $\frac{4}{\sqrt{8}}$ $\sqrt{2}$

16. $3\sqrt{75}$ $15\sqrt{3}$

Cumulative Review, Chapters 7-8 Part 2

In Exercises 17-19 $\overline{MN} \parallel \overline{AB}$.

17. If $CM = 4$, $MA = 8$, and $CN = 10$, then $NB = \underline{20}$.
18. If $CN = 5$, $CM = 4$, and $BN = 7$, then $AC = \underline{9.6}$.
19. If $AC = 10$, $BC = 12$, and $NB = 8$, then $MA = \underline{6\frac{2}{3}}$.

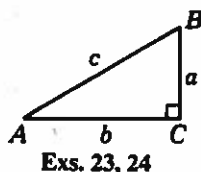


Find the geometric mean between the two numbers.

20. 4 and 16 8 21. 2 and 50 10 22. 5 and 32 4√10

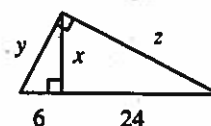
In Exercises 23 and 24 ABC is a right triangle.

23. If $a = 9$ and $b = 12$, then $c = \underline{15}$.
24. If $a = 8$ and $c = 17$, then $b = \underline{15}$.



The diagram shows a right triangle with the altitude drawn to the hypotenuse.

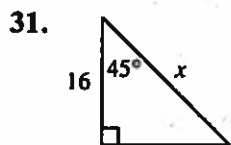
25. $x = \underline{12}$ 26. $y = \underline{6\sqrt{5}}$ 27. $z = \underline{12\sqrt{5}}$



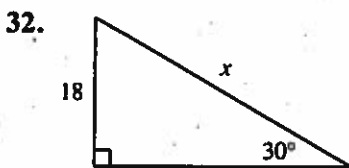
Tell whether a triangle with sides of the given lengths is acute, right, or obtuse.

28. 12, 16, 20 RT 29. 4, $4\sqrt{2}$, 6 Acute 30. 7, 8, 12 Obtuse

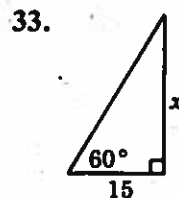
Find the value of x .



$x = \underline{10\sqrt{2}}$

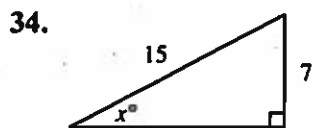


$x = \underline{36}$

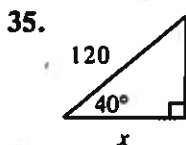


$x = \underline{15\sqrt{3}}$

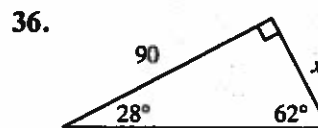
Find the value of x correct to the nearest integer. Use a scientific calculator or the table on page 311 of the text.



$x \approx \underline{28}$



$x \approx \underline{92}$



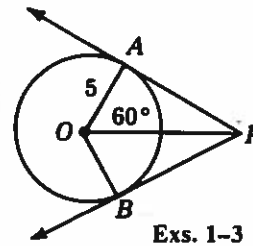
$x \approx \underline{48}$

Cumulative Review, Chapters 9-10

Part 1

In Exercises 1-3, \vec{PA} and \vec{PB} are tangent to $\odot O$ at A and B .

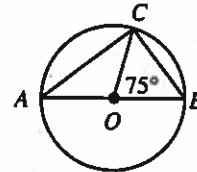
1. $OP = \underline{10}$
2. $BP = \underline{5\sqrt{3}}$
3. $m\angle APB = \underline{60}$



Exs. 1-3

In Exercises 4-7, $m\angle COB = 75$. Find the measure of each arc.

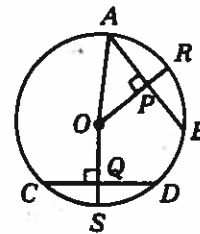
4. $m\widehat{CB} = \underline{75}$
5. $m\widehat{ACB} = \underline{180}$
6. $m\widehat{AC} = \underline{105}$
7. $m\widehat{ABC} = \underline{255}$



Exs. 4-7

In Exercises 8-12, $\widehat{AB} \cong \widehat{CD}$.

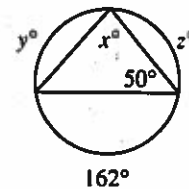
8. If $OP = 12$, then $OQ = \underline{12}$.
9. If $AB = 24$, then $AP = \underline{12}$.
10. If $m\widehat{AB} = 88$, then $m\widehat{CD} = \underline{88}$.
11. If $m\widehat{CD} = 86$, then $m\widehat{RB} = \underline{43}$.
12. If $OP = 12$ and $BA = 24$, then $OA = \underline{12\sqrt{2}}$.



Exs. 8-12

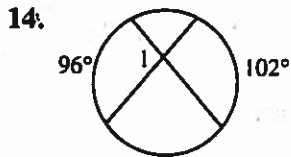
13. Find the values of x , y , and z .

$x = \underline{81}$, $y = \underline{100}$, $z = \underline{98}$

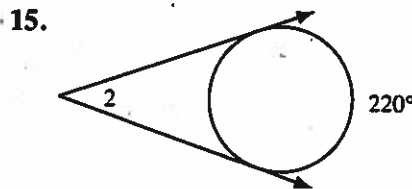


Ex. 13

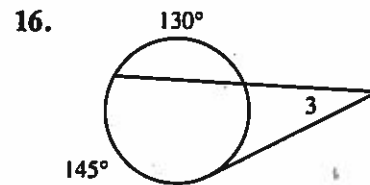
Chords, secants, and tangents are shown. Find the measure of each numbered angle. In Exercise 19, O is the center of the circle.



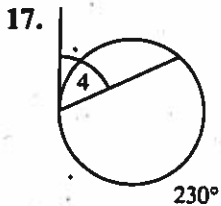
$m\angle 1 = \underline{99}$



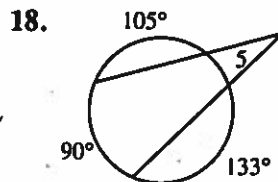
$m\angle 2 = \underline{40}$



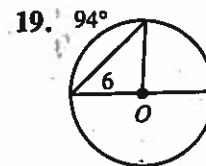
$m\angle 3 = \underline{30}$



$m\angle 4 = \underline{65}$



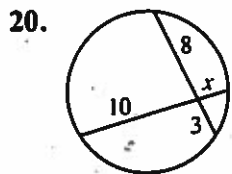
$m\angle 5 = \underline{29}$



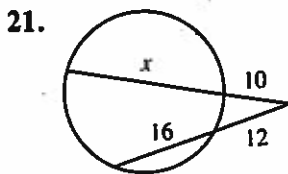
$m\angle 6 = \underline{43}$

Cumulative Review, Chapters 9-10 Part 2

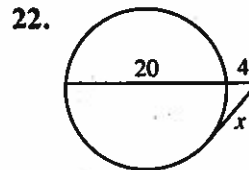
Chords, secants, and tangents are shown. Find the value of x .



$x = \underline{2.4}$



$x = \underline{23.6}$



$x = \underline{4\sqrt{6}}$

Complete.

23. The locus of points in space whose distance from point A is 5 cm or less is a sphere w/ center A + $r=5$

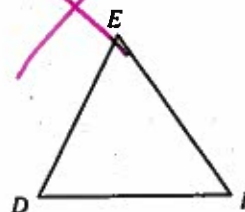
24. Given $\triangle ABC$, the locus of points in the plane of $\triangle ABC$ equidistant from A , B , and C is _____

25. The locus of points in space equidistant from two points C and D is _____

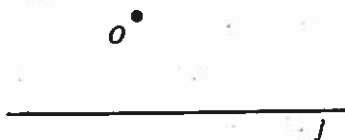
26. Given segments of lengths a , b , and c , construct a segment of length x so that the four segments are in proportion.



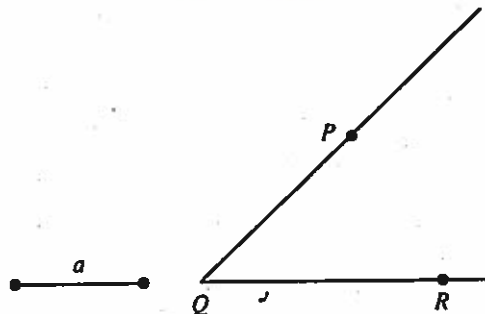
27. Circumscribe a circle about $\triangle DEF$.



28. Construct $\odot O$ tangent to line j .



29. Construct the locus of points equidistant from \overrightarrow{QP} and \overrightarrow{QR} and a units from P .



Cumulative Review, Chapters 11–12 Part 1

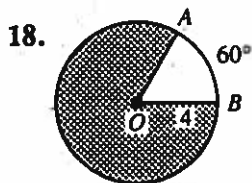
In Exercises 1–14 find the area of the figure described.

1. A square with side 10 100
2. A square with diagonal 14 98
3. A rectangle with length 9 and width 6 54
4. A rectangle with length 24 and diagonal 26 240
5. A parallelogram with base 12 and height 7 84
6. A parallelogram with sides 10 and 16 and a 30° angle 80
7. A triangle with base 14 and height 11 77
8. An equilateral triangle with side 15 $\frac{255\sqrt{3}}{4}$
9. A regular hexagon with apothem $\sqrt{3}$ $6\sqrt{3}$
10. A rhombus with diagonals 14 and 12 84
11. An isosceles trapezoid with legs 6 and bases 10 and 18 28.5
12. A regular polygon with s sides of length 6 and apothem a $3as$
13. A circle with radius 10 cm 100π
14. A circle with circumference 16π cm 64π

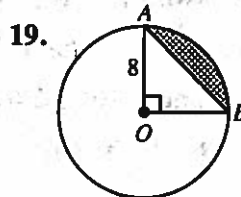
In Exercises 15–17 find the indicated ratio for the given polygons.

15. The scale factor of two similar triangles with areas 16 and 81 4:9
16. The perimeters of two similar polygons with areas 25 and 121 5:11
17. The areas of two similar hexagons with scale factor 8:9 $64:81$

In Exercises 18 and 19 find (a) the length of \overline{AB} of $\odot O$, (b) the area of sector AOB , and (c) the area of the shaded region.

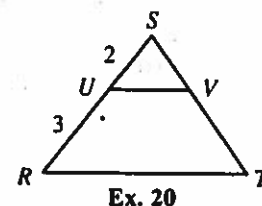


- a. $\frac{4\pi}{3}$
- b. $\frac{8\pi}{3}$
- c. $\frac{40\pi}{3}$



- a. 4π
- b. 16π
- c. $16\pi - 32$

Cumulative Review, Chapters 11-12 Part 2



20. A point P is selected at random from the interior of $\triangle RST$.
Find the probability that P is inside $\triangle SUV$. $\frac{4}{25}$
21. Two similar polygons have scale factor $2 : 7$. If the area of the smaller polygon is 16 cm^2 , find the area of the larger polygon. 196
22. A right pentagonal prism has height 12 and base edges 1.3, 2.4, 6.3, 3.2, and 4.1. Find the lateral area. 207.6
23. Find the lateral area, total area, and volume of a cone with radius 21 and slant height 29.
L.A. = 609π , T.A. = 1050π , $V =$ 2940π
24. Find the volume and total area of a rectangular solid with length 6 cm, width 4 cm, and height 2 cm.
 $V =$ 48 , T.A. = 88
25. Find the volume and lateral area of a regular square pyramid with base edge 6 cm and slant height 9 cm.
 $V =$ $72\sqrt{2}$, L.A. = 108
26. Find the volume and lateral area of a cylinder with radius 3 cm and height 10 cm.
 $V =$ 90π , L.A. = 60π
27. Find the volume and area of a sphere with radius 11 cm.
 $V =$ $\frac{5324\pi}{3}$, $A =$ 484π
28. Find the area of the circle formed when a plane passes 4 cm from the center of a sphere with radius 5 cm. 9π
29. Find the total area of a cube with volume 125 cm^3 . 150
30. Two similar cones have volumes 27π and 64π . Find the ratio of:
a. the radii $3:4$ b. the heights $3:4$ c. the lateral areas $9:16$
31. Two similar cylinders have lateral areas 16 cm^2 and 25 cm^2 .
Find the ratio of their volumes. $64:125$
32. The volumes of two similar solids are 216 cm^3 and 64 cm^3 .
Find the ratio of their total areas. $9:4$
33. Two similar prisms have heights 18 m and 24 m. If the volume of the smaller prism is 54 m^3 , find the volume of the larger prism. 128

Cumulative Review, Chapters 13-14 Part 1

1. Find the distance between the points (5, 3) and (2, 1). $\sqrt{13}$

2. Find the center and radius of the circle $(x + 1)^2 + (y - 3)^2 = 25$.

Center $(-1, 3)$ Radius 5

3. Write an equation of the circle with center (2, 5) and radius 3.

$(x-2)^2 + (y-5)^2 = 9$

Find the slope of the line described.

4. the line through (-1, -2) and (3, 6) 2

5. a line parallel to the line through (1, 3) and (4, -1) $-\frac{4}{3}$

6. a line perpendicular to the line $y = 2x + 4$ $-\frac{1}{2}$

Given $A(4, -2)$ and $B(-1, -3)$, complete each of the following.

7. $\overline{AB} = \underline{(-5, -1)}$ and $|\overline{AB}| = \underline{\sqrt{26}}$

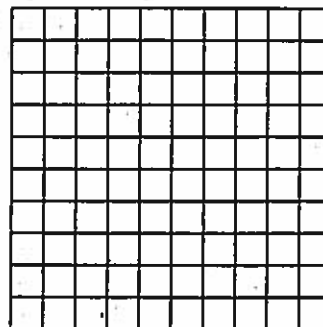
8. The vectors (4, -2) and (-3, -6) are perpendicular vectors.

Complete.

9. The midpoint of the segment joining the points (6, 3) and (4, -2) is $(5, \frac{1}{2})$

10. If $M(3, -6)$ is the midpoint of \overline{XY} and $X = (1, -2)$, then $Y = \underline{(5, -10)}$

11. Graph the lines $2x - y = 5$ and $x - 3y = 5$ and label their intersection. Use the grid at the right.



Ex. 11

Write an equation of the line described.

12. line with slope $-\frac{2}{3}$ and y -intercept 5 $y = -\frac{2}{3}x + 5$

13. line through (-1, 3) and (2, 4) $y = \frac{1}{3}x + \frac{10}{3}$

14. line through (-2, 4) with slope $\frac{1}{2}$ $y = \frac{1}{2}x + 5$

15. line parallel to the y -axis through (-5, -3) $x = -5$

16. line through the origin and parallel to the line $4x - y = 8$ $y = 4x$

17. If three vertices of a rectangle are (-5, 1), (3, 1) and (3, -2), then the fourth vertex is $(-5, -2)$

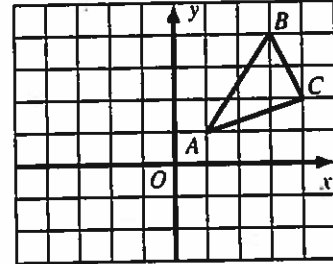
18. Use coordinate geometry to prove that $ABCD$ with vertices $A(2, 4)$, $B(1, 1)$, $C(3, -2)$ and $D(4, 1)$ is a parallelogram.

Cumulative Review, Chapters 13-14 Part 2

In Exercises 19-23 use the translation $T: (x, y) \rightarrow (x + 2, y + 3)$ and the points $A(3, 2)$ and $B(-1, -3)$.

19. Find A' . (5, 5) 20. Find B' . (1, 0)
 21. Find AB and $A'B'$. $AB = \sqrt{41}$ $A'B' = \sqrt{41}$
 22. Does T appear to be an isometry? yes
 23. Find the preimage of $(1, 4)$. (-1, 1)

24. A glide reflection is described below. Give the coordinates of
 (a) $\triangle A'B'C'$, the image of $\triangle ABC$ under the glide and
 (b) $\triangle A''B''C''$, the image of $\triangle A'B'C'$ under the reflection.



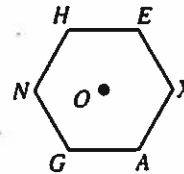
Glide: All points move down 3 units.
 Reflection: All points are reflected in the y -axis.
 $A(1, 1), B(3, 4), C(4, 2)$

- a. $A' = (1, -2)$ $B' = (3, 1)$ $C' = (4, -1)$
 b. $A'' = (-1, -2)$ $B'' = (-3, 1)$ $C'' = (-4, -1)$

25. State another name for each rotation.

- a. $R_{O, 45}$ $R_{O, 315}$ b. $R_{O, -60}$ $R_{O, 300}$

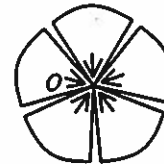
26. O is the center of regular hexagon $HEXAGN$. A rotation R maps all points 60° about O . Find the image of H under:



- a. R N b. R^2 G
 c. R^{-1} E d. $R \circ R^{-1}$ I

27. Give the inverse of $D_{O, -\frac{1}{2}}$. $D_{O, 2}$

28. Consider the flower shown as a plane figure.



- a. How many symmetry lines does the figure have? 5
 b. Does the figure have a symmetry point? no
 c. List all rotational symmetries between 0° and 360° . _____

29. A dilation with the origin, O , as center maps the given point to the image point named. Find the scale factor of the dilation. State whether the dilation is an expansion or contraction.

- a. $(9, -3) \rightarrow (3, -1)$ $\frac{1}{3}$, contr. b. $(-2, 1) \rightarrow (8, -4)$ -4 , exp.

30. $S: (x, y) \rightarrow (x - 1, y + 2)$, $T: (x, y) \rightarrow (x + 2, y - 4)$ and $A = (2, 1)$.

- a. $S \circ T: A \rightarrow (3, -1)$ b. $T \circ S: A \rightarrow (3, -1)$
 c. $S^{-1}: (x, y) \rightarrow (x+1, y-2)$ d. $T^{-1}: (x, y) \rightarrow (x-2, y+4)$