

# Preparing for College Entrance Exams

## Chapter 7

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

**Answers**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

1. The ratio of the measures of two supplementary angles is 7:8. Which proportion(s) could you use to find the measures of the angles?

I.  $\frac{x}{y} = \frac{7}{8}$

II.  $\frac{x}{y} = \frac{8}{7}$

III.  $\frac{x}{180-x} = \frac{7}{8}$

IV.  $\frac{x}{180-x} = \frac{8}{7}$

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

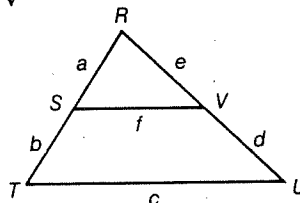
2.  $S$  and  $V$  are the midpoints of  $\overline{RT}$  and  $\overline{RU}$ , respectively. Which of the following is not true?

(A)  $\frac{c}{f} = \frac{b}{a}$

(B)  $\frac{d}{e} = \frac{b}{a}$

(C)  $\frac{c}{e+d} = \frac{f}{e}$

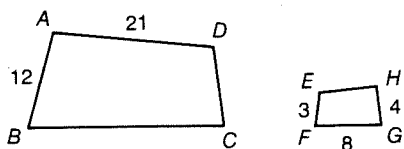
(D)  $\frac{f}{a} = \frac{c}{a+b}$



Question 2

3. Quad.  $ABCD \sim$  quad.  $HGFE$ . Find the perimeter of  $ABCD$ .

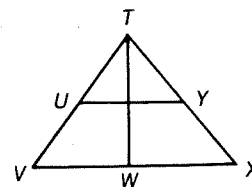
- (A) 88                      (B) 22                      (C) 66                      (D) 31



Question 3

4. In the triangle shown,  $\overline{UY} \parallel \overline{VX}$ , and  $\overline{TW}$  is the perpendicular bisector of both  $\overline{UY}$  and  $\overline{VX}$ . How many pairs of similar triangles are shown in the figure?

- (A) 3                      (B) 4                      (C) 5                      (D) 6                      (E) 7



Question 4

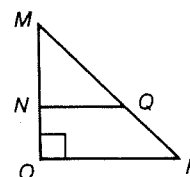
5. Any two equilateral triangles are similar. Which of the following can be used to prove such similarity?

- I. AA Similarity Postulate  
 II. SSS Similarity Theorem  
 III. SAS Similarity Theorem

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

6. In right  $\triangle MOP$ ,  $\overline{NQ} \perp \overline{MO}$ .  $MN = 9$ ,  $NO = 7$ , and  $MP = 20$ . Find  $MQ$ .

- (A) 11.25                      (B) 8.75                      (C) 7.5                      (D) 9.25                      (E) 10.75



Question 6

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

## Preparing for College Entrance Exams

### Chapter 8

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

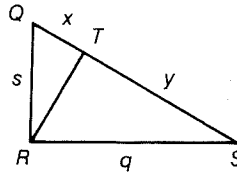
1.  $\overline{QR} \perp \overline{RS}$  and  $\overline{RT} \perp \overline{QS}$ .

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  $76^\circ$  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.

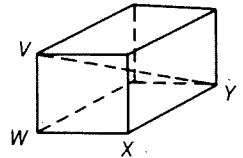
- (A) 4                      (B) 8                      (C)  $2\sqrt{2}$                   (D)  $4\sqrt{2}$                   (E)  $8\sqrt{2}$

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

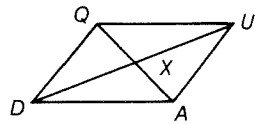
- (A)  $\sin 58^\circ$ ,  $\sin 70^\circ$               (B)  $\cos 58^\circ$ ,  $\cos 70^\circ$   
(C)  $\sin 58^\circ$ ,  $\cos 70^\circ$               (D)  $\sin 70^\circ$ ,  $\cos 58^\circ$

### Answers

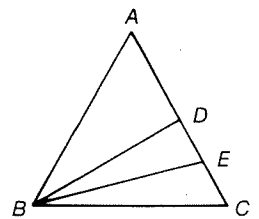
1. \_\_\_\_\_
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3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_



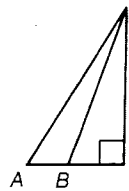
Question 3



Question 4



Question 5



Question 7

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

# Preparing for College Entrance Exams

## Chapter 9

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

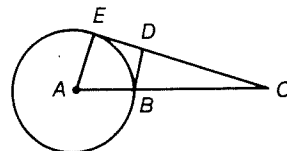
- What is the greatest possible distance between two points on a circle whose circumference is 62.8 cm?  
(A) 10 cm      (B) 20 cm      (C) 31.4 cm      (D) 100 cm
- Around which of the following polygons can you always circumscribe a circle?  
I. triangle                                      II. parallelogram  
III. rhombus                                      IV. rectangle  
(A) I only                                      (B) I and II only                                      (C) II and III only  
(D) I and IV only                                      (E) I, II, and IV only
- A square is circumscribed about a circle. Find the radius of the circle in terms of the length  $x$  of a side of the square.  
(A)  $\frac{x}{2}$                                       (B)  $x$                                       (C)  $2x$                                       (D)  $x\sqrt{2}$

- $\overline{BD} \perp \overline{EC}$ ,  $\overline{EC}$  is tangent to  $\odot A$ ,  $BC = 10$ , and  $BD = 3.75$ . Find the radius of  $\odot A$ .  
(A) 7.5                                      (B) 6                                      (C) 11.25  
(D) cannot be determined from the information given

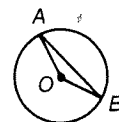
- $m\angle OAB = 25$ . Find  $m\widehat{AB}$ . (The figure is not drawn to scale.)  
(A) 155                                      (B) 130                                      (C) 80                                      (D) 100
- The diameter of a bicycle wheel is  $\frac{81}{\pi}$  in. Estimate the number of revolutions the wheel will make in traveling 27 yd. (1 yd = 36 in.)  
(A) 9                                      (B) 12                                      (C) 14                                      (D) 15                                      (E) 17
- $\overline{VS}$  bisects  $\overline{WT}$  and  $W$  is the midpoint of  $\overline{RT}$ .  $RS = 16$ ,  $VU = 2$ , and  $US = 3$ . Find the value of  $y$ , the length of the portion of  $\overline{RS}$  that lies within the circle. (The figure is not drawn to scale.)  
(A) 4                                      (B) 5                                      (C) 13                                      (D) 21
- What is the diameter of the largest circular tabletop that can be passed through a doorway 7 ft by 3 ft?  
(A) 3 ft      (B) 7 ft      (C) 7.6 ft      (D) 8.1 ft      (E) 21 ft
- Find the measure of  $\widehat{AB}$ . (The figure is not drawn to scale.)  
(A) 34                                      (B) 26                                      (C) 86                                      (D) 76

### Answers

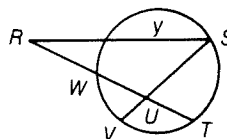
- \_\_\_\_\_
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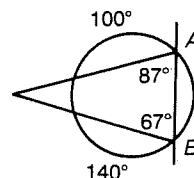
Question 4



Question 5



Question 7



Question 9

1. B      2. D      3. A      4. B      5. B      6. B      7. C      8. C      9. C

# Preparing for College Entrance Exams

## Chapter 11

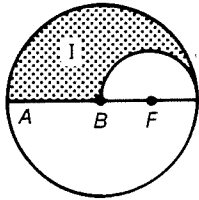
**Directions:** Questions 1–4 each consist of two quantities, one in Column A and one in Column B. Compare the two quantities and in the answer blank write:

- (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.

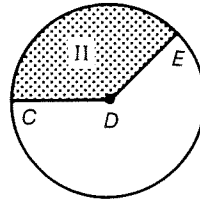
**Column A**

**Column B**

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



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



The area of region I

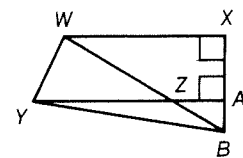
The area of region II

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

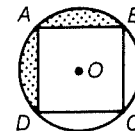
5. In the diagram,  $\overline{WX} \parallel \overline{YA}$  and  $XA = 2(AB)$ . Find the ratio of the areas of  $\triangle WYZ$  and  $\triangle ZBY$ .  
 (A) 2:1      (B) 3:1      (C) 4:1      (D)  $\sqrt{2}:1$       (E) 5:3
6. A square garden enclosed by a fence with perimeter 40 m is to be expanded so it includes  $300 \text{ m}^2$  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)  $112\pi$   
 (D)  $\frac{16\pi}{45} - 32\sqrt{2}$       (E)  $16\pi - 32$
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  $\overline{XZ}$ .  
 (A)  $\frac{3\pi}{2}$       (B)  $2\pi$       (C)  $3\pi$       (D)  $4\pi$

**Answers**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_



Question 5



Question 7

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

- Volume of a sphere with radius 4 cm
- Total area of a right triangular prism with all edges 7 m
- Volume of a cylinder with radius 3 in. and height 12 in.

#### Column B

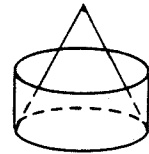
- Volume of a cone with radius 6 cm and height 2 cm
- Total area of a regular square pyramid with all edges 7 m
- Volume of a right rectangular prism with base edges 3 in. and height 12 in.

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

- 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
- 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
- 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
- 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

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



Question 4

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

# Preparing for College Entrance Exams

## Chapter 13

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

1. 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
2. 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)  $(x - 5)^2 + (y - 2)^2 = 100$
3. 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
4. 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)  $(-a, 0)$ ,  $(b, 0)$ ,  $(\frac{-a+b}{2}, c)$
5. 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
6. Which of the following points is farthest from  $(-3, 5)$ ?  
 (A)  $(3, 5)$                       (B)  $(-5, 3)$                       (C)  $(-3, -5)$                       (D)  $(-5, -3)$                       (E)  $(5, 3)$
7. 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)  $(-1, 3)$
8. 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
9. 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	
1.	_____
2.	_____
3.	_____
4.	_____
5.	_____
6.	_____
7.	_____
8.	_____
9.	_____

1. D    2. B    3. E    4. C    5. D    6. C    7. E    8. D    9. C