

Read the directions below carefully.

**BEFORE THE TEST...**

- Take 10 minutes to review your notes.
- Get a calculator and blank sheets of paper for your calculations.

**KEEP IN MIND...**

- There are 35 questions on the test.
- You may use a calculator throughout the exam.
- Write your answers clearly in the space given. Do your work on separate paper.
- There is no time limit, but you must complete the test in ONE sitting.
- Do NOT look at the other pages of the workbook while taking the exam. Consider carefully cutting the pages of the exam out of the workbook and removing the workbook from your desk.

**AFTER THE TEST...**

- Grade yourself and record your score on your grading sheets.
- Calculate your final grade for the course. See your grading sheets for the details.



When you are ready,  
begin the test.

## REFERENCE

You may reference these formulas at any time while taking the exam.

Rectangle  $A = bh$

Parallelogram  $A = bh$

Triangle  $A = \frac{1}{2}bh$

Rhombus/Kite  $A = \frac{1}{2}d_1d_2$

Trapezoid  $A = \frac{1}{2}h(b_1 + b_2)$

Regular  $n$ -gon  $P = ns$

$$A = \frac{1}{2}sa \cdot n = \frac{1}{2}aP$$

Circle  $C = 2\pi r$

$$A = \pi r^2$$

### Key

$A$  = area

$P$  = perimeter

$C$  = circumference

$b$  = base

$h$  = height

$d$  = diagonal

$n$  = number of sides

$s$  = side length

$a$  = apothem

$r$  = radius

Prism  $SA = 2B + Ph$   $V = Bh$

Cylinder  $SA = 2\pi r^2 + 2\pi rh$   $V = \pi r^2 h$

Pyramid  $SA = B + \frac{1}{2}Pl$   $V = \frac{1}{3}Bh$

Cone  $SA = \pi r^2 + \pi rl$   $V = \frac{1}{3}\pi r^2 h$

Sphere  $SA = 4\pi r^2$   $V = \frac{4}{3}\pi r^3$

### Key

$SA$  = surface area

$V$  = volume

$B$  = base area

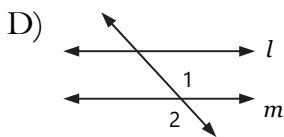
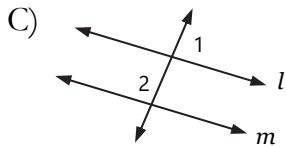
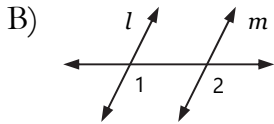
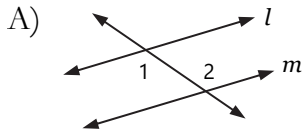
$P$  = base perimeter

$h$  = height

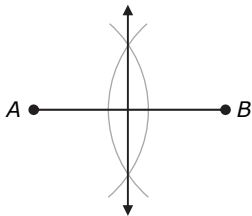
$r$  = radius

$l$  = slant height

1. In which diagram can you conclude that line  $l$  parallel to line  $m$  given  $\angle 1 \cong \angle 2$ ? Select all that apply.



2. Which construction is shown in the diagram?



- A) angle bisector  
 B) congruent segment  
 C) perpendicular bisector  
 D) perpendicular line through a point

3. If  $x + 4 = 10$ , then  $x = 6$ .

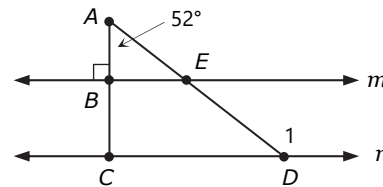
Which property justifies this statement?

- A) Addition property of equality  
 B) Subtraction property of equality  
 C) Substitution property of equality  
 D) Transitive property of equality

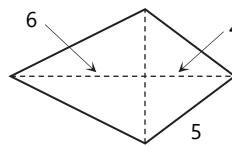
4. Which conjecture is not always true? Select all that apply.

- A) If  $ac = bc$ , then  $a = b$ .  
 B) All isosceles triangles are similar.  
 C) The sum of two even numbers is even.  
 D) Any three side lengths can form a triangle.  
 E) Two intersecting lines form two pairs of vertical angles.

5. Find the measure of  $\angle 1$  if  $m \parallel n$ .

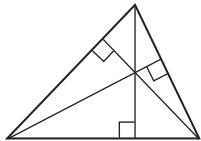


6. Find the area of the kite.



7. On a coordinate plane, a point is in Quadrant 4. The point is reflected over the  $x$ -axis, rotated  $90^\circ$  counterclockwise about the origin, then dilated about the origin by a scale factor of 2. In which quadrant does the resulting image lie?

8. Which point of concurrency is shown?

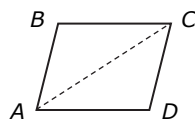


- A) circumcenter      B) incenter  
C) centroid          D) orthocenter

9. Complete the proof that opposite sides of a parallelogram are congruent. Give reasons for Steps 3 through 5.

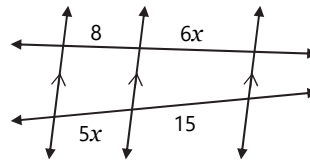
Given:  $\square ABCD$

Prove:  $\overline{AB} \cong \overline{CD}$ ,  
 $\overline{BC} \cong \overline{DA}$



STATEMENTS	REASONS
1. $\square ABCD$	1. Given
2. $\overline{BA} \parallel \overline{CD}$ , $\overline{BC} \parallel \overline{AD}$	2. Definition of parallelogram
3. $\angle BAC \cong \angle DCA$ $\angle BCA \cong \angle DAC$	3.
4. $\overline{AC} \cong \overline{CA}$	4.
5. $\triangle ABC \cong \triangle CDA$	5.
6. $\overline{AB} \cong \overline{CD}$ , $\overline{BC} \cong \overline{DA}$	6. CPCTC

10. Three parallel lines are cut by two transversals. Find the value of  $x$ .



11. If  $\angle 1$  measures less than  $90^\circ$ , then  $\angle 1$  is not a right angle.

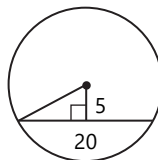
What is the first step to prove this statement using indirect proof?

- A) Assume that  $\angle 1$  is not less than  $90^\circ$ .  
B) Assume that  $\angle 1$  is an acute angle.  
C) Assume that  $\angle 1$  is a right angle.  
D) Assume that  $\angle 1$  is an obtuse angle.

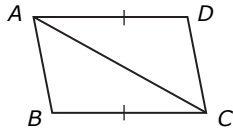
12. Which quadrilateral has perpendicular diagonals? Select all that apply.

- A) parallelogram      B) rhombus  
C) rectangle          D) square  
E) trapezoid          F) kite

13. A 20-inch chord is 5 inches from the center of a circle. Find the radius of the circle. Give your answer in simplest radical form.

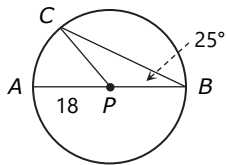


14. Which additional information would prove  $\triangle ABC \cong \triangle CDA$  by SAS?



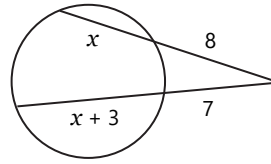
- A)  $\overline{AB} \cong \overline{CD}$   
 B)  $\angle B \cong \angle D$   
 C)  $\angle BAC \cong \angle DCA$   
 D)  $\angle BCA \cong \angle DAC$

15. In circle  $P$ ,  $AP = 18$  and  $m\angle ABC = 25^\circ$ . Find the area of sector  $APC$ . Leave  $\pi$  in your answer.

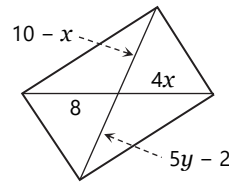


16. A right triangle has acute angles measuring  $x^\circ$  and  $y^\circ$ . If  $\sin x^\circ = 5/13$ , what is the value of  $\cos y^\circ$ ?
17. A circle has equation  $(x - 1)^2 + (y - 4)^2 = 5$ . Determine if  $(-1, 2)$  is inside, outside, or on the circle.
18. A line is parallel to  $y = 4x + 1$  and passes through  $(-1, 1)$ . Write an equation of the line in slope-intercept form.

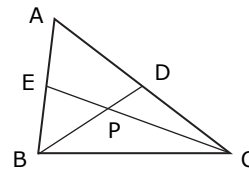
19. Two secants intersect outside a circle. Find the value of  $x$ .



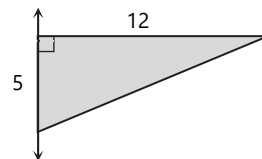
20. What values of  $x$  and  $y$  would make this quadrilateral a parallelogram?



21. In  $\triangle ABC$ ,  $\overline{BD}$  and  $\overline{CE}$  are medians intersecting at  $P$ . Find  $BD$  if  $BP = 8$ .



22. The shaded figure is rotated around the line. What is the volume of the solid formed by this rotation? Leave  $\pi$  in your answer.



23. Three sides of a triangle are shown. Which triangle is an acute triangle?

- A) 3, 4, 5                      B) 4, 5, 6  
C) 5, 12, 13                  D) 8, 12, 15

24. Which solid can have a circle as a cross section? Select all that apply.

- A) cube                      B) square pyramid  
C) cone                      D) triangular prism  
E) sphere                    F) cylinder

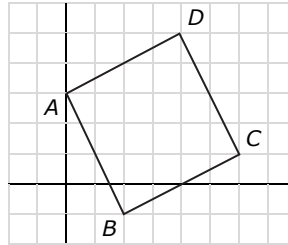
25.  $\overline{AB}$  is a directed line segment from  $A(-2, 0)$  to  $B(8, 5)$ . Find the coordinates of point  $P$  that partitions  $\overline{AB}$  in the ratio 3:2.

26. A circle with equation  $(x - 2)^2 + (y + 7)^2 = 25$  is reflected across the  $x$ -axis. Write the equation of the resulting circle in standard form (center-radius form).

27. A die is rolled twice. What is the probability that the sum is not 3?

28. A group of 10 members elects a president, a vice-president, and a treasurer. How many different ways are possible?

29. Which name best describes this quadrilateral?



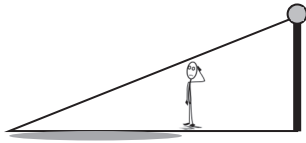
- A) square                      B) rhombus  
C) rectangle                  D) parallelogram

30. A city is painting the surface of a spherical water tank with radius 15 feet. A can of paint covers 180 square feet. How many cans of paint will be needed? Use  $22/7$  as an approximation for  $\pi$ . Round all calculations to the nearest whole number.

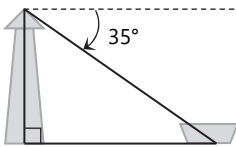
31. The population density of a country is 979 people per square mile. The area of the country is 11,787 square miles. What is the population of the country to the nearest thousand?

32. In a group of 50 students, 30 play soccer, 22 play baseball, and 14 play both. What is the probability that a randomly selected student plays neither? Give your answer as a simplest fraction.

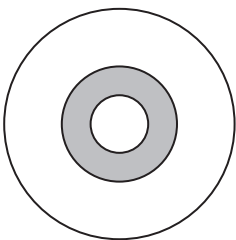
33. Elijah discovers that, when he stands 10 ft from a street lamp, his shadow is 15 ft long. Elijah is 6 ft tall. How tall is the street lamp?



34. A lighthouse is 60 ft above sea level. The angle of depression from the top of the lighthouse to a boat is  $35^\circ$ . How far is the boat from the lighthouse? Round your answer to the nearest tenth.



35. A dartboard is made up of three concentric circles with radii 3, 6, and 12 inches. A dart is thrown and lands on the dartboard. What is the probability that the dart lands in the shaded region? Give your answer as a fraction in simplest form.



**STOP**

This is the end of the test.  
Review your answers before grading.