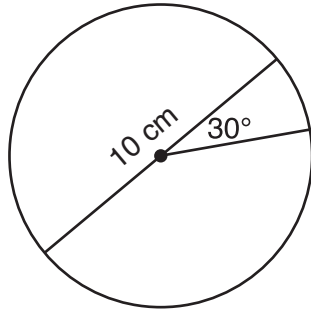


Use this space for computations.

- 18 A circle with a diameter of 10 cm and a central angle of  $30^\circ$  is drawn below.



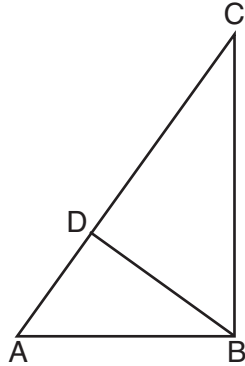
What is the area, to the *nearest tenth of a square centimeter*, of the sector formed by the  $30^\circ$  angle?

- (1) 5.2                                      (3) 13.1  
(2) 6.5                                      (4) 26.2
- 19 A child's tent can be modeled as a pyramid with a square base whose sides measure 60 inches and whose height measures 84 inches. What is the volume of the tent, to the *nearest cubic foot*?

- (1) 35                                      (3) 82  
(2) 58                                      (4) 175

Use this space for  
computations.

- 20 In the accompanying diagram of right triangle  $ABC$ , altitude  $\overline{BD}$  is drawn to hypotenuse  $\overline{AC}$ .



Which statement must always be true?

- (1)  $\frac{AD}{AB} = \frac{BC}{AC}$                       (3)  $\frac{BD}{BC} = \frac{AB}{AD}$   
(2)  $\frac{AD}{AB} = \frac{AB}{AC}$                       (4)  $\frac{AB}{BC} = \frac{BD}{AC}$
- 21 An equation of circle  $O$  is  $x^2 + y^2 + 4x - 8y = -16$ . The statement that best describes circle  $O$  is the
- (1) center is  $(2, -4)$  and is tangent to the  $x$ -axis  
(2) center is  $(2, -4)$  and is tangent to the  $y$ -axis  
(3) center is  $(-2, 4)$  and is tangent to the  $x$ -axis  
(4) center is  $(-2, 4)$  and is tangent to the  $y$ -axis

- 22 In  $\triangle ABC$ ,  $\overline{BD}$  is the perpendicular bisector of  $\overline{ADC}$ . Based upon this information, which statements below can be proven?

- I.  $\overline{BD}$  is a median.  
II.  $\overline{BD}$  bisects  $\angle ABC$ .  
III.  $\triangle ABC$  is isosceles.
- (1) I and II, only                      (3) II and III, only  
(2) I and III, only                      (4) I, II, and III

**Use this space for  
computations.**

**23** Triangle  $RJM$  has an area of 6 and a perimeter of 12. If the triangle is dilated by a scale factor of 3 centered at the origin, what are the area and perimeter of its image, triangle  $R'J'M'$ ?

- (1) area of 9 and perimeter of 15
- (2) area of 18 and perimeter of 36
- (3) area of 54 and perimeter of 36
- (4) area of 54 and perimeter of 108

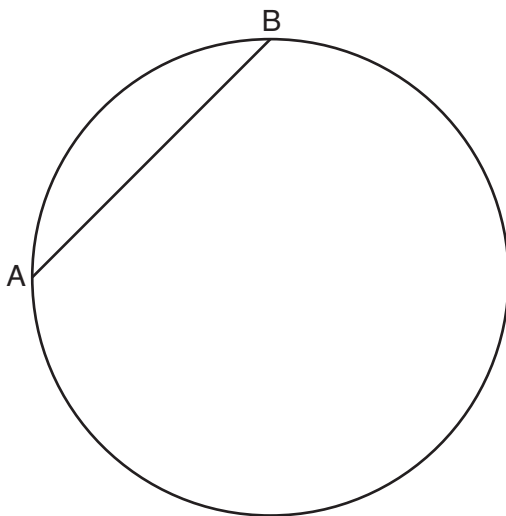
**24** If  $\sin(2x + 7)^\circ = \cos(4x - 7)^\circ$ , what is the value of  $x$ ?

- (1) 7
  - (2) 15
  - (3) 21
  - (4) 30
-

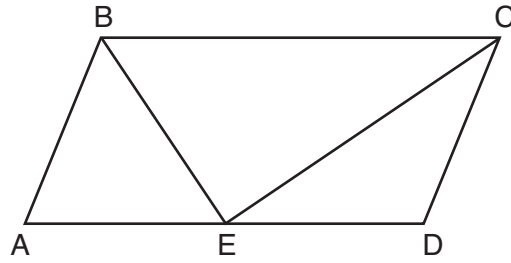
## Part II

Answer all 7 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [14]

- 25 In the circle below,  $\overline{AB}$  is a chord. Using a compass and straightedge, construct a diameter of the circle. [Leave all construction marks.]

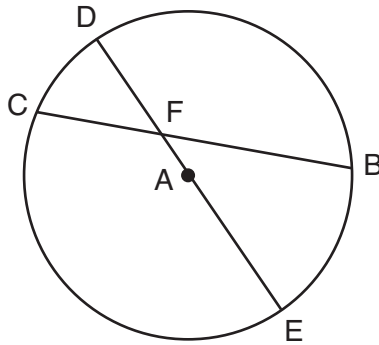


**26** In parallelogram  $ABCD$  shown below, the bisectors of  $\angle ABC$  and  $\angle DCB$  meet at  $E$ , a point on  $\overline{AD}$ .



If  $m\angle A = 68^\circ$ , determine and state  $m\angle BEC$ .

27 In circle A below, chord  $\overline{BC}$  and diameter  $\overline{DAE}$  intersect at  $F$ .



If  $m\widehat{CD} = 46^\circ$  and  $m\widehat{DB} = 102^\circ$ , what is  $m\angle CFE$ ?