

## Geometry and Applications 112 Exam Review

Complete all questions, and check your answers. If you have questions, ask! This review sheet is **not** meant to be your only resource for studying. Be sure to go over **all** assignments, tests, quizzes, warm ups and notes in order to cover all material. Make sure you attempt the questions, do not just look at them!

### Probability

- Using a tree diagram, how many sandwiches can be made from 3 different types of breads, 3 different kinds of sauces and 4 different kinds of meats?
- Using a tree diagram, how many daily menus can be made from 3 choices for breakfast, 2 choices for lunch and 2 choices for dinner?
- How many outfits can be made from 5 different shirts, 7 different pairs of pants, 4 different pairs of shoes and 4 belts?
- In Canada, postal codes have 6 characters with the first, third and fifth characters being letters, and the other being digits. How many postal codes are possible?
- In Canada and the US, telephone area codes consist of 3 digits. Suppose the first digit is from 2 to 9 inclusive, and the second digit is either a 0 or 1, and the third digit is any digit except 0.
  - Who many different area codes are possible with this criterion?
  - Suppose the restrictions on the first digit remain, but the restrictions on the second and third digits are removed so that any digit is allowed. How many different codes are possible now?
- A card is chosen from a deck of 52 cards. What is the probability of choosing:
  - A red card, replacing it and then an ace?
  - A black card, not putting it back, and then picking a red card?
- Ben chooses a card from a deck of 52 cards. What is the probability of choosing:
  - An ace or a jack?
  - An eight or a back card?
- Write the following as a quotient of factorials.
  - $12 \times 10 \times 9$
- Rewrite the following in factorial notation.
  - $10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$
  - $2 \times 1$
  - $12 \times 11 \times 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$
- Express each in the form  $nPr$ 
  - $5 \times 4 \times 3$
  - $99 \times 98 \times 97 \times 96$
  - $88 \times 87$
- Solve
  - ${}_6C_2$
  - ${}_5P_4$
  - $5!$
- The language with the most letters in it is Cambodian, which has 72 letters.
  - How many 3 letter arrangements, with no repeating letters, can be created with this alphabet?
  - How many 3 letter arrangements can be made if repeating letters are allowed?
- A popular rock group has written 30 songs, from which it selects to perform at a concert.
  - How many different opening sequences of 3 songs can they perform?
  - If the group performs all of its songs during the evening without repeating any of them, in how many orders could the songs be performed?
- A group of 5 students is to be selected from a class of 35 students.
  - How many different groups can be selected?

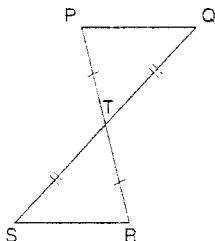
- b. Lisa, Gwen and Al are students in the class. How many possible groups include all 3 of these students?
- Ten people run for student council. Spots need to be filled for the positions of president, vice-president, secretary and treasurer. In how many different ways can the 4 positions be arranged?
  - Write the first 6 rows of Pascal's triangle along with the equivalent notation of  $nCr$
  - Apply Pascal's Theorem to answer the following questions
    - ${}^3C_2 + {}^3C_3$
    - ${}^5C_3 + {}^5C_4$
    - ${}^{10}C_6 + {}^{10}C_7$
  - Expand  $(a + b)^6$  using binomial expansion.
  - Expand  $(2x + 3)^4$  using binomial expansion.
  - A card is chosen from a well shuffled deck. Find the probability of choosing
    - An ace
    - Card with a number on it
    - Card with a face on it
    - 4 or a diamond
    - Red card or a queen
    - Black card or a number with a card on it

### Slope/distance/midpoint

- Calculate the slope of the following points
  - $(-4,2)$  and  $(9,1)$
  - $(-2,-3)$  and  $(3,4)$
- Prove that triangle BOX is a right triangle given B  $(-2,5)$ , O  $(6,8)$  and X  $(1,-3)$
- Calculate the distance of the following points
  - $(0,4)$  and  $(13,5)$
  - $(7,-7)$  and  $(8,-3)$
- Given the midpoint of  $(2,7)$  and an endpoint of  $(6,4)$  find the other endpoint.
- Calculate the midpoint of the following points
  - $(2,2)$  and  $(4,8)$
  - $(-3,-5)$  and  $(-6,4)$
- The vertices of a quadrilateral are A  $(-1,0)$ , B  $(1,-2)$ , C  $(4,1)$  and D  $(2,3)$ . Verify that ABCD is a rectangle. Sketch the figure.
- Verify that the quadrilateral with vertices P  $(-2,2)$ , Q  $(-2,-3)$ , R  $(-5,-5)$  and S  $(-5,0)$  is a parallelogram. Sketch the figure.
- Write the equation of a line that passes through  $(2,6)$  and  $(8,12)$
- Write the equation of a line that is perpendicular to  $2x + 3y - 7 = 0$  and with coordinates  $(-5,6)$

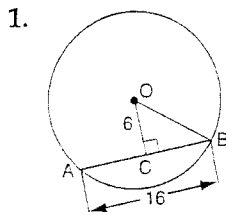
### Congruency

- If  $PT = RT$   
 $QT = ST$   
 Prove that  $PQ = RS$

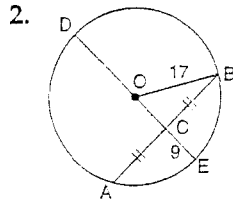


## Chord Properties

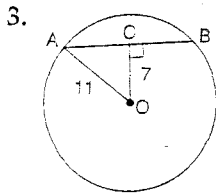
Determine the measurements of the following questions. Where required, round to 1 decimal place.



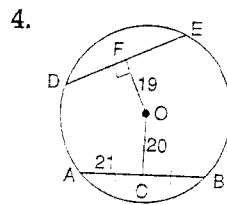
a) BC    b) OB



a) DC    b) AB



AB



a) OE    b) DE

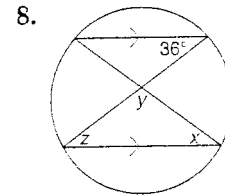
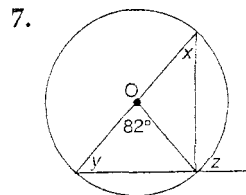
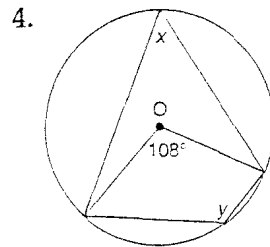
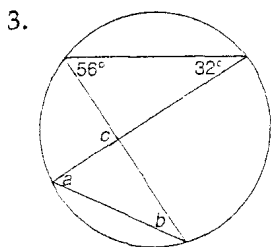
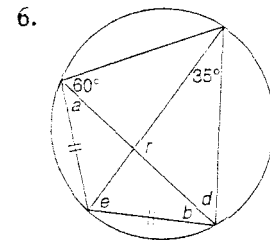
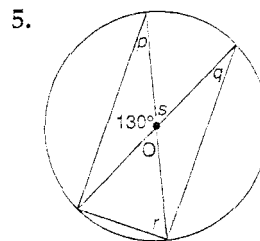
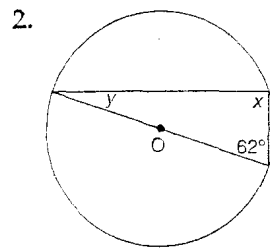
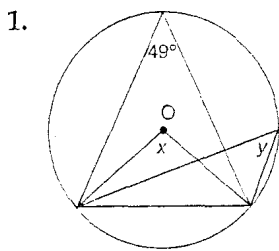
5. The radius of a circle measures 50 cm. Find the length of a chord that is 14 cm away from the circle's center.

6. A 13 cm long chord is found 15.6 cm from the center of the circle. Find the diameter of the circle.

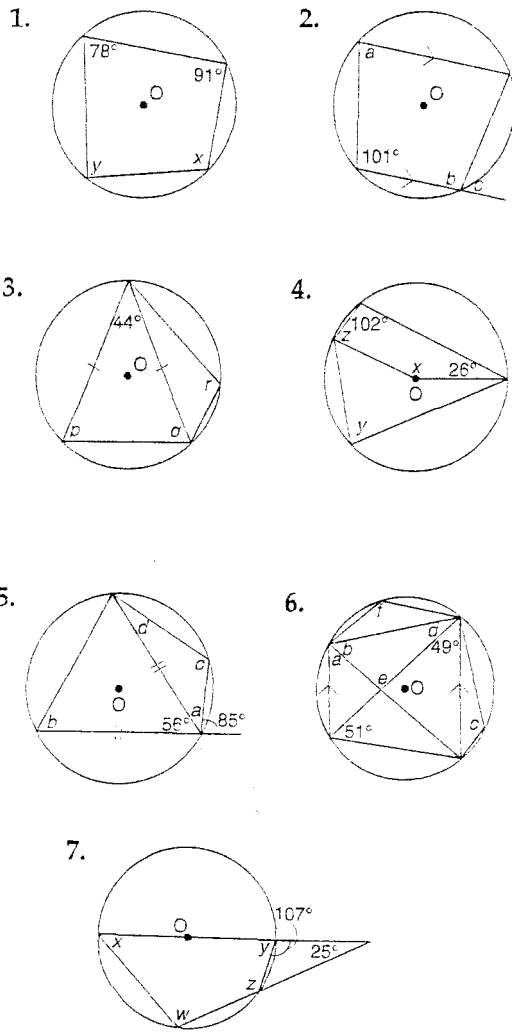
7. A chord that is 24 cm long is found in a circle with a diameter of 33 cm. Find the distance between the chord and the center of the circle.

8. AB and CD are two different chords found in the same circle. If the radius of the circle is 65 cm, AB is 66 cm long and CD is 126 cm long. Find the distance between chords AB and CD.

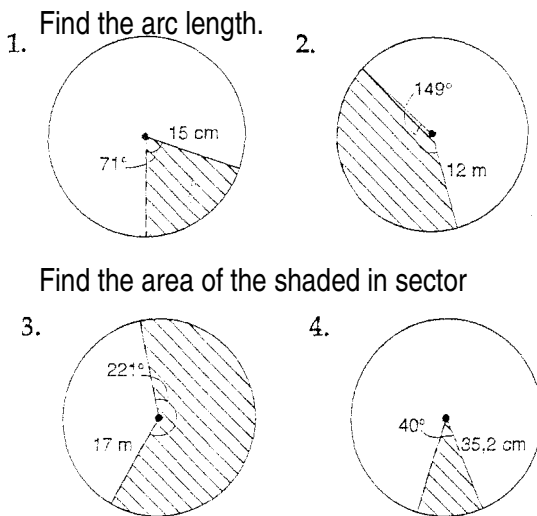
## Angles in a Circle



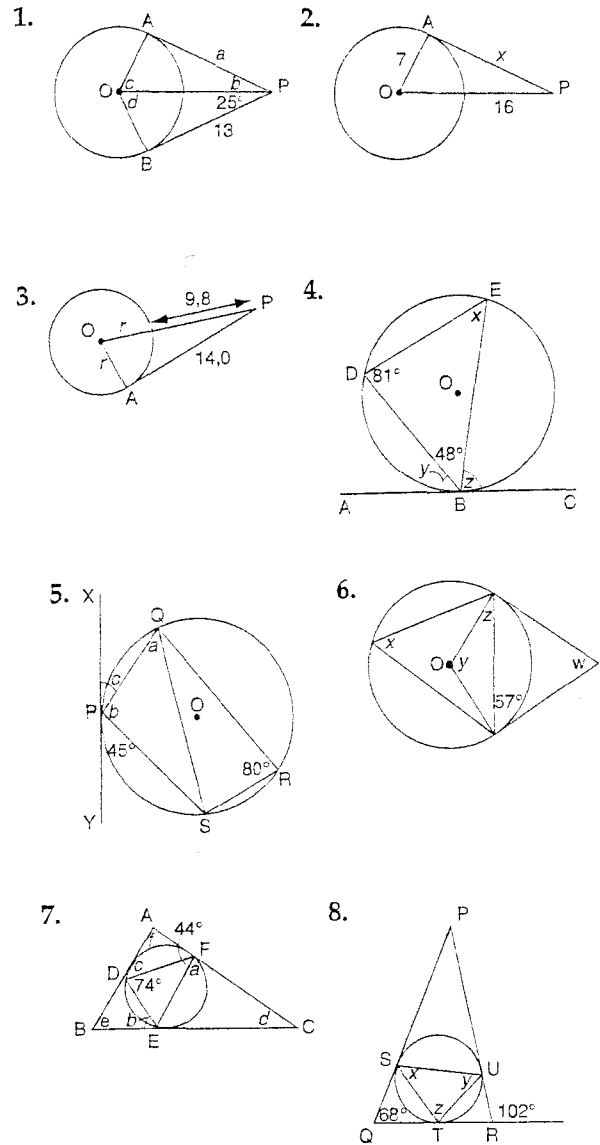
## Cyclic Quadrilaterals



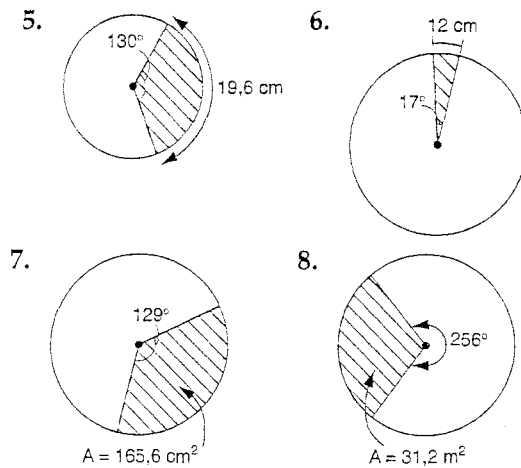
## Arcs and Sectors



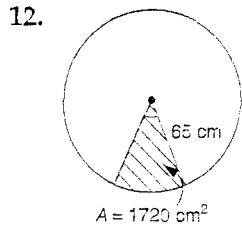
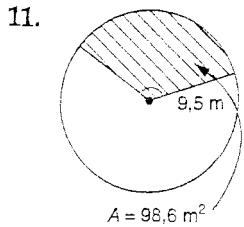
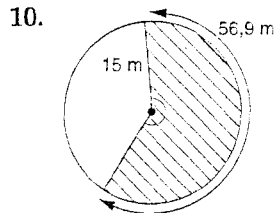
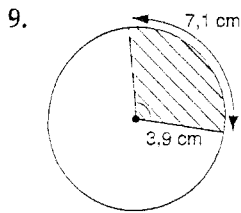
## Tangents



## Find the length of the radius



Find the measure of the angle



### Varied Questions – Find the Missing Measures

### Equations of a Circle

- Given the following circle in standard form  $(x - 3)^2 + (y + 5)^2 = 81$  determine the center, radius, mapping rule, general form and transformational form.
- Determine the equation in standard form of the following circle
  - Center at (8,2) and passes through (5,0)
  - Center at (2,3) and passes through (7,2)
- Find the center and the radius of each circle.
  - $x^2 - 6x + y^2 - 8y - 39 = 0$
  - $x^2 + 8x + y^2 + 4y = 12$
  - $x^2 + 8 + y^2 - 8y = 0$
  - $3x^2 - 18x + 3y^2 + 24y - 33 = 0$
- Determine the equation in standard form for the following mapping notations
  - $(x,y) \rightarrow (x + 4, y + 2)$
  - $(x,y) \rightarrow (x - 5, y - 7)$
  - $(x,y) \rightarrow (2x + 1, 2y + 9)$
  - $(x,y) \rightarrow (3x + 2, 3y - 10)$

