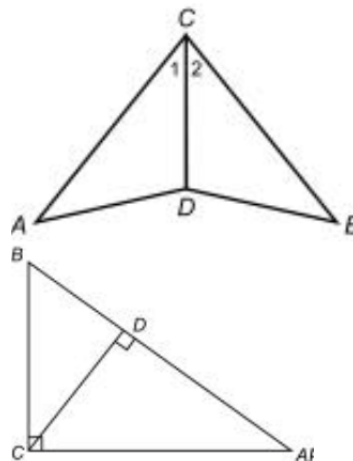


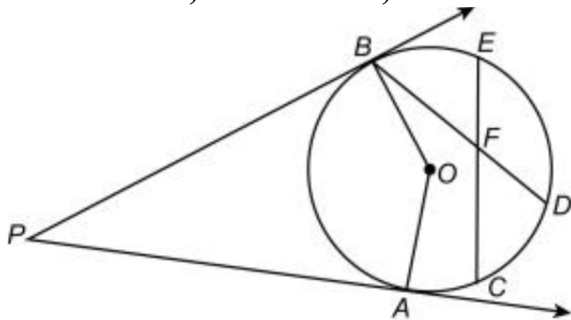
Math 30 – Final Exam take home problems – Fall '12  
 Write all responses on separate paper.

1. Which of the following is an example of inductive reasoning and which is deductive? Indicate 'inductive' by writing an "I" in the space before the statement; indicate 'deductive' by writing a "D" and write "N" for neither.
  - a. \_\_\_ This cat is black. That cat is black A third cat is black. Therefore all cats are black.
  - b. \_\_\_ If all men are mortal and Jose is a man, then Jose is mortal.
  - c. \_\_\_ This marble from the bag is blue. That marble from the bag is blue. A third marble from the bag is black. Therefore all the marbles in the bag are either black or blue.
  - d. \_\_\_ If Joe has acute appendicitis, he is very sick. Joe does have acute appendicitis. Therefore Joe is very sick.
  - e. \_\_\_ If Joe has acute appendicitis, he is very sick. Joe is very sick. Therefore Joe has acute appendicitis.
2. Use inductive reasoning to give the next element in the list:  $-2, 4, -8, 16, \dots$
3. State the law that justifies the statement: If  $8 = 8$ , then  $8 = 8$ .
4. Consider the statement "If it is a banana, then a monkey will eat it."
  - a. Give the inverse of the statement.
  - b. Give the converse of the statement.
  - c. Give the contrapositive of the statement.
5. The sum of measures of the interior angles of a polygon is  $1080^\circ$ . How many sides does it have?
6. Find the area of a parallelogram with base 18 cm and height 14 cm.
7. Given that  $\angle A$  is the complement of  $\angle C$  and  $\angle B$  is the complement of  $\angle C$ , prove  $\angle A \cong \angle B$ .
8. Give a two column proof.  
 Given that  $CD$  bisects  $\angle ACB$  and  $AC = BC$ ,  
 prove:  $\angle A \cong \angle B$



9. In the figure, if  $AD = 16$  m and  $BD = 8$  m, find  $CD$ .

Use the figure below to answer questions 10 -15.  $\overline{PA}$  and  $\overline{PB}$  are tangents,  $m\angle AOB=150^\circ$ ,  $BF = 6$  meters,  $DF = 5$  meters,  $EF = 3$  meters, and  $PA = 14$  meters.



10. Find  $m\angle P$ .
11. Find  $PB$ .
12. Find  $m\angle PAO$ .
13. Find  $CF$ .
14. If  $OP = 14.5$  meters, what is the radius of the circle?
15. If  $m\widehat{BE} = 33^\circ$  and  $m\widehat{CD} = 37^\circ$ , what is
  - a.  $m\angle COD$ ?
  - b.  $m\angle CFD$ ?
  - c.  $m\angle CBD$ ?
16.  $\overline{AB}$  and  $\overline{AC}$  are tangent to circle  $O$  at  $B$  and  $C$  respectively, and  $\overline{CE}$  is perpendicular to diameter  $\overline{BD}$ .
  - a. Draw a figure illustrating this.
  - b. Prove that  $(BE)(BO) = (AB)(CE)$
  - c. Find the value of  $AB$  when  $E$  coincides with  $O$ .
  - d. Show that the theorem is true when  $E$  is between  $B$  and  $O$ .
  - e. Show that  $\frac{AB}{\sqrt{BE}} = \frac{BO}{\sqrt{ED}}$
17. Two parallel tangents to circle  $O$  meet the circle at points  $M$  and  $N$ . A third tangent to circle  $O$ , at point  $P$ , meets the other two tangents at  $K$  and  $L$ . Prove that a circle, whose diameter is  $KL$ , passes through  $O$ , the center of the original circle.
18. As to problem 17, further prove that for different positions of the point  $P$ , on arc  $\widehat{MN}$  a family of circles is obtained tangent to each other at  $O$ .