

Section I: Analytic Geometry

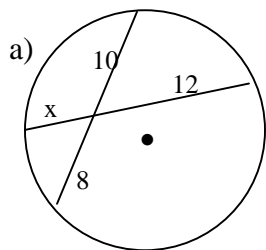
- A line segment has endpoints A(- 8, 4) and B(7, 2). Find the following:
 - Slope of the line segment
 - Midpoint
 - Length of the line segment
 - Equation of the line in standard form
- Calculate the x and y intercepts and the slope of the following lines
 - $7x - 5 = 9y + 2$
 - $x = 2$
 - $y + 7 = 0$
- A line segment has one endpoint (4, 9) and a midpoint of (5, - 3). Find the other endpoint
- Find the equations of the following lines in $Ax + By + C = 0$ form
 - With slope $\frac{-4}{9}$ and through (- 8, 2)
 - Parallel to $3x - 5y - 2 = 0$ and on (4, 7)
 - With x intercept 12 and y intercept - 3
 - Perpendicular to $7y = - 8x + 2$ and same x intercept as $9x - 5y + 18 = 0$
- ABC has vertices A(12, - 4); B(2, 2) and C (- 2 , - 2)

Find the equation of the altitude from B to AC
 Find the equation of the median from A to BC
 Find the equation of the perpendicular bisector of AB

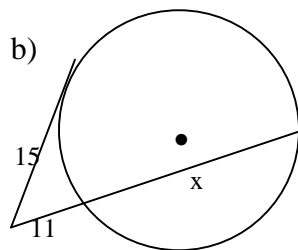
6. Prove A (1, - 1) B(- 5, 23) and C (3, - 9) are collinear.

Section II: Circles (deductive geometry)

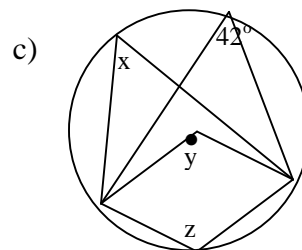
1. Find the missing values (O is the center)



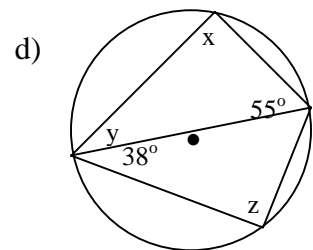
x = _____



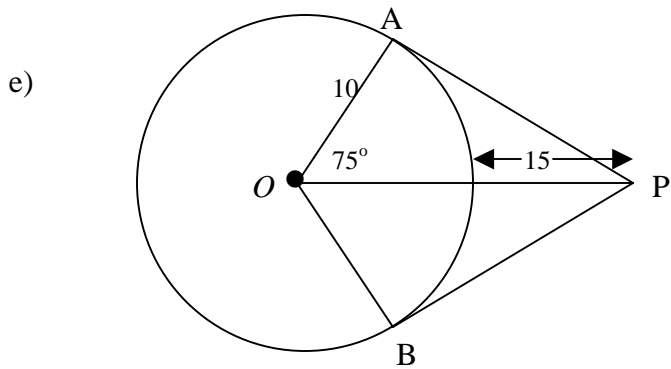
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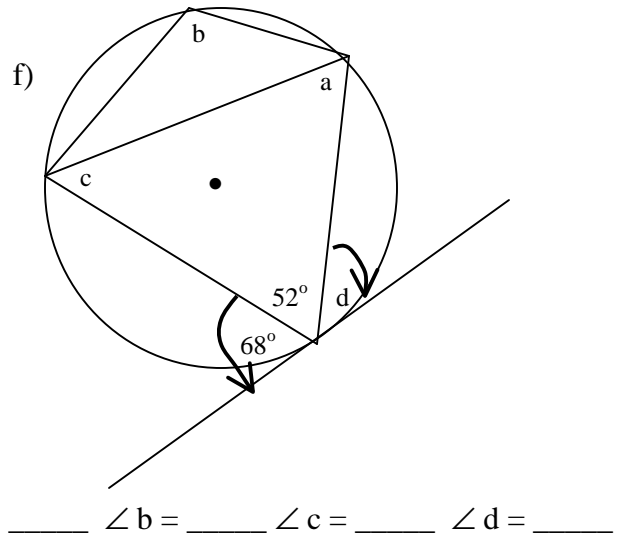
x = _____ y = _____ z = _____



x = _____
 y = _____
 z = _____



$$\begin{array}{ll} \angle OAP = & \angle OBP = \\ \angle APO = & \angle BPO = \\ OB = & AP = \quad BP = \end{array}$$



- A circle has equation $x^2 + y^2 = 121$. State the radius and the coordinates of the center.
- Given a circle with center $(-5, 2)$ and $r = 6$; write the equation of this circle in :
 - standard form
 - transformational form
 - general form
 - write the mapping rule
- If the circle in question 3 has its center moved 2 units right (east) and 3 units down (south) and has its radius enlarged by a factor of 4, write the equation of the new circle.
- For each of the following state the coordinates of the center and the radius.

a) $(x - 8)^2 + (y + 3)^2 = 25$ b) $\left[\frac{1}{4}(x + 2)\right]^2 + \left[\frac{1}{4}(y + 1)\right]^2 = 1$

c) $(x, y) \rightarrow (\sqrt{7}x - 9, \sqrt{7}y - 10)$

- A chord is 16 cm long and is 7 cm from the center of a circle. Find the radius of the circle.
- The diameter of a circle is 26 cm and a chord is 12 cm long. How far is the chord from the center?
- Write each of the following in
 - standard form,
 - transformational form
 - and
 - iii) write the mapping rule.

a) $x^2 + y^2 + 10x - 4y - 7 = 0$ b) $2x^2 + 2y^2 - 2x + 6y - 5 = 0$
- Find 'k' if $(-2, 1)$ lies on $x^2 + y^2 - kx + ky - 2 = 0$

Section III: PROBABILITY

- A bag of marbles contains 4 red, 6 blue and 5 green marbles. A marble is picked, replaced, and then another is picked. What is the probability of:
 - first a blue then a green marble
 - a blue and a green marble
 - 2 red marbles in a row
 - not getting a red marble either time
- Do question 1 assuming the first marble is NOT replaced.
- Dave rolls 2 dice. What is the probability of
 - a sum of 5
 - rolling a 2 on the first die and a 5 on the second
 - a roll with all odd numbers
- A card is drawn from a standard deck. (52 cards, 4 suits – with 13 cards each). What is the probability of:
 - a 5 or a face card
 - a number card or an ace
 - a diamond or a jack
 - a queen or a king
 - a red card or an even numbered card
- A coin is tossed and a die is rolled. Find the probability of:
 - a tail or an even number
 - a head or a prime number.
 - A tail or a 5

Section IV: Factorials, Perms, Combs, Binomial Theorem.

- How many outfits can you make from 5 shirts, 7 sweaters, and 9 pairs of pants?
- Calculate the following:
 - $\frac{12!}{8!}$
 - $\frac{7!+6!}{5!}$
 - $\frac{958!}{956!}$
 - $\frac{19!}{12!5!}$
 - $7! 6!$
- Simplify
 - $725 \times 724!$
 - $\frac{n!}{(n+2)!}$

4. Calculate the following:

a) ${}_8P_3$

b) ${}_8C_3$

c) ${}_7C_4 \times {}_5C_2$

d) $\binom{9}{4} \binom{7}{2}$

5. A club has 15 members. In how many ways can :

a) a president, vice president and secretary be elected?

b) A committee of 3 members be elected?

6. In how many ways can you arrange the letters in

a) attitude

b) equation

7. I have 11 books. In how many ways can I

a) arrange 7 on a shelf?

b) Arrange all 11 on a shelf

c) Pick 5 off a shelf

d) Pick all 11 off a shelf

8. Expand using the binomial theorem:

a) $(x + y)^5$

b) $(3x - 2)^4$

9. Five cards are drawn from a standard deck. Find the probability of

a) 3 kings and 2 Queens

b) 4 aces

c) two 5's, two 10's and a 7

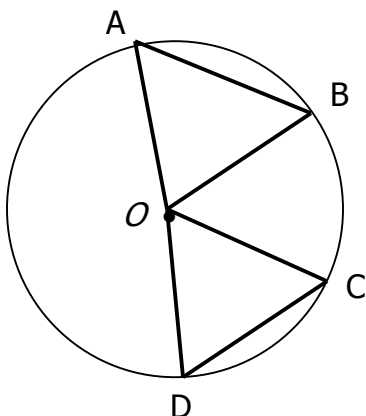
Section VI : CONGRUENCY

Write proofs for the following:

a) Given the following diagram

And $AB = CD$

PROVE $\angle ABO = \angle DCO$



b) Given $DK \parallel PQ$

$DS = QS$

PROVE: $KS = PS$

