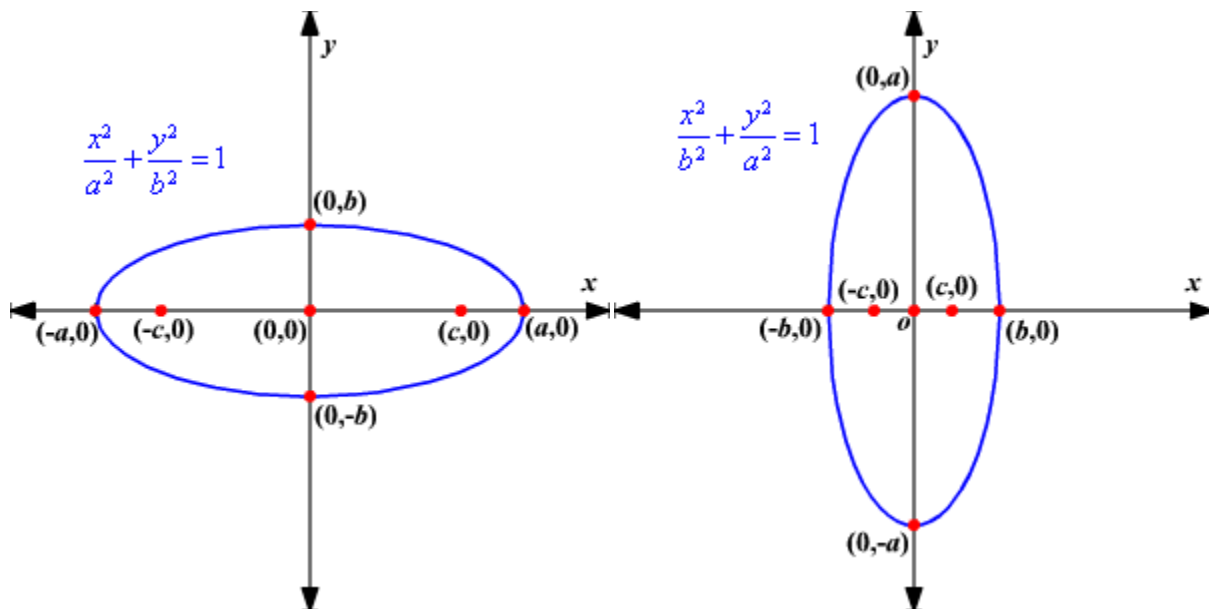


## ATHS FC – Math Department Al Ain Remedial worksheet

<b>Section</b>		<b>Date</b>	
<b>Name</b>		<b>Lesson</b>	10.4, 10.5, 0.4, 0.5 and 0.6
<b>ID</b>		<b>Marks</b>	

### Lesson 10.4 (Ellipses)



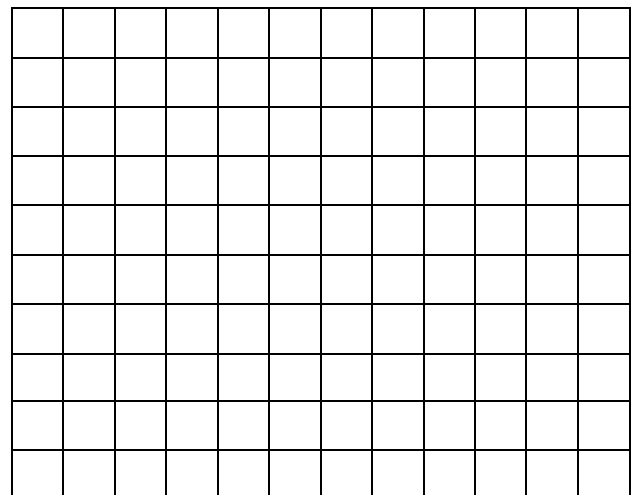
**KEY CONCEPT****Equations of Ellipses with Centers at the Origin**

Standard Form of Equation	$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$	$\frac{y^2}{a^2} + \frac{x^2}{b^2} = 1$
Direction of Major Axis	horizontal	vertical
Foci	$(c, 0), (-c, 0)$	$(0, c), (0, -c)$
Length of Major Axis	$2a$ units	$2a$ units
Length of Minor Axis	$2b$ units	$2b$ units

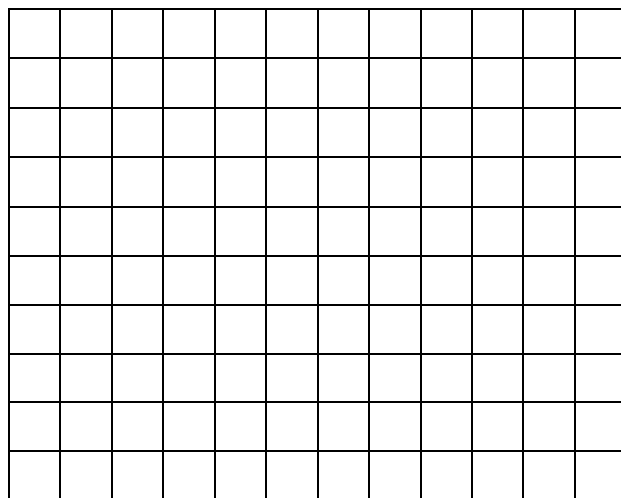
$$c^2 = a^2 - b^2$$

**Question 1:** Find the coordinates of the vertices, the foci, length of the major and minor axis for the following ellipses, then graph

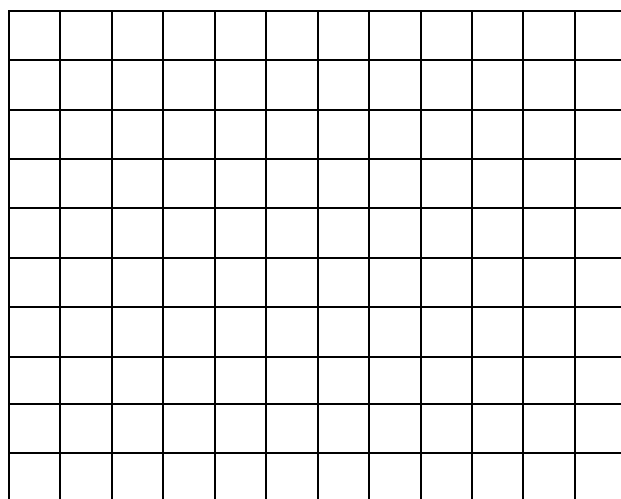
1.  $\frac{x^2}{9} + \frac{y^2}{25} = 1$



2.  $\frac{x^2}{64} + \frac{y^2}{100} = 1$



3.  $4x^2 + 25y^2 = 25$



**Question 2:**

Write an equation for an ellipse that satisfies each set of conditions.

**a)** Center at  $(0, 0)$ , focus at  $(2, 0)$ , vertex at  $(-3, 0)$

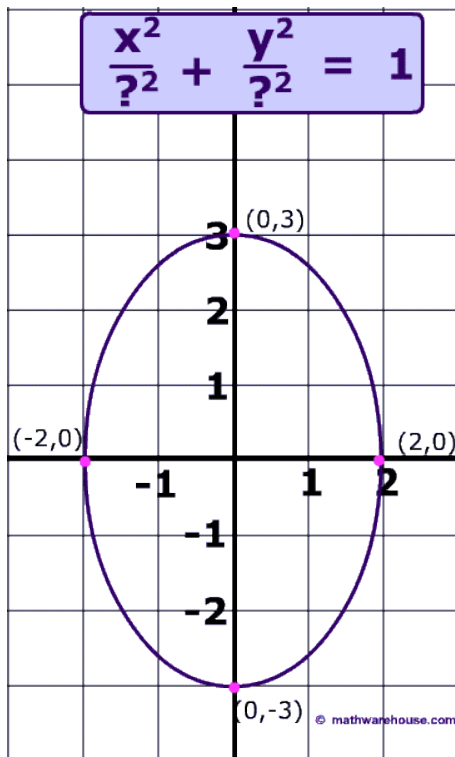
**b)** Center at  $(0,0)$ , focus at  $(0, 8)$ , vertex at  $(0, 10)$

**c)** Center at  $(0, 0)$ , vertex at  $(-5, 0)$ , co-vertex at  $(0,3)$

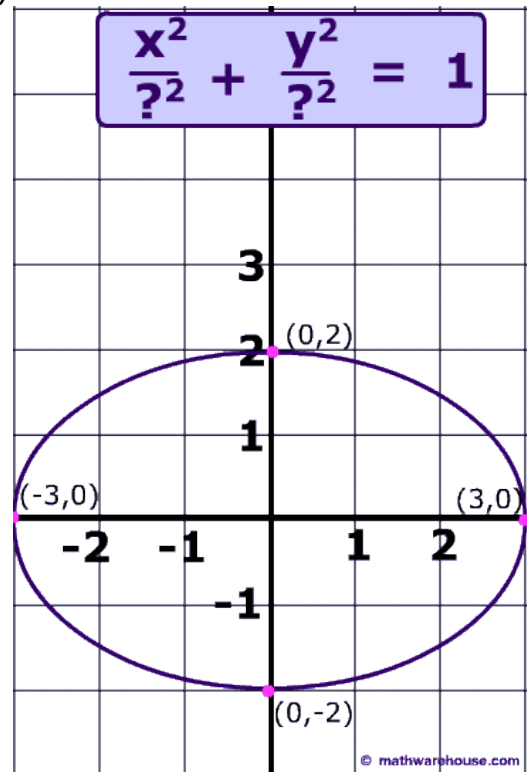
**d)** Center at  $(0, 0)$ , vertex at  $(0, -8)$ , co-vertex at  $(-5, 0)$

**Question 3:** write an equation for each ellipse

a)



b)



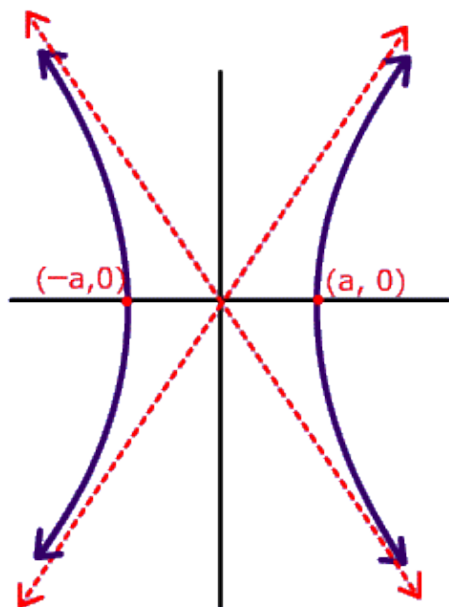
# Lesson 10.5 (hyperbola)

## Horizontal Transverse Axis

$$\frac{X^2}{a^2} - \frac{Y^2}{b^2} = 1$$

$$y = -\frac{b}{a}x$$

$$y = \frac{b}{a}x$$

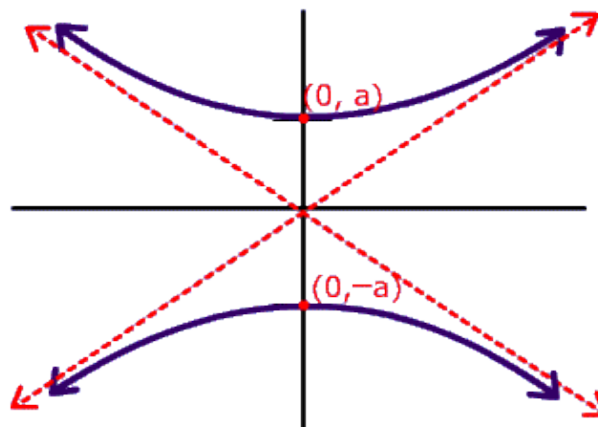


## Vertical Transverse Axis

$$\frac{Y^2}{a^2} - \frac{X^2}{b^2} = 1$$

$$y = -\frac{a}{b}x$$

$$y = \frac{a}{b}x$$



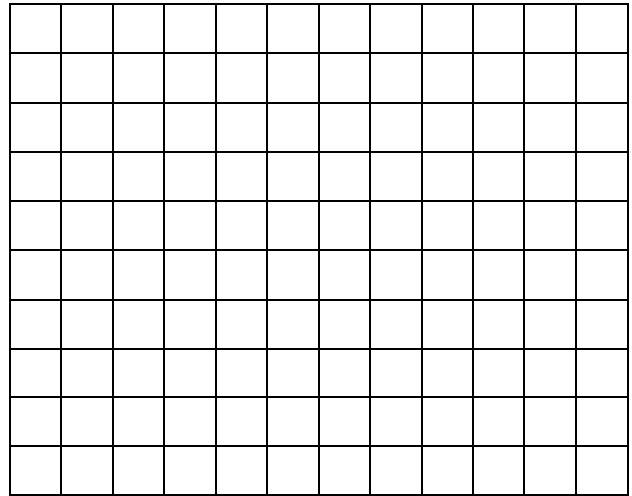
www.mathwarehouse.com

KEY CONCEPT	Equations of Hyperbolas with Centers at the Origin	
Standard Form of Equation	$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$	$\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$
Direction of Transverse Axis	horizontal	vertical
Foci	$(c, 0), (-c, 0)$	$(0, c), (0, -c)$
Vertices	$(a, 0), (-a, 0)$	$(0, a), (0, -a)$
Length of Transverse Axis	$2a$ units	$2a$ units
Length of Conjugate Axis	$2b$ units	$2b$ units
Equations of Asymptotes	$y = \pm \frac{b}{a}x$	$y = \pm \frac{a}{b}x$

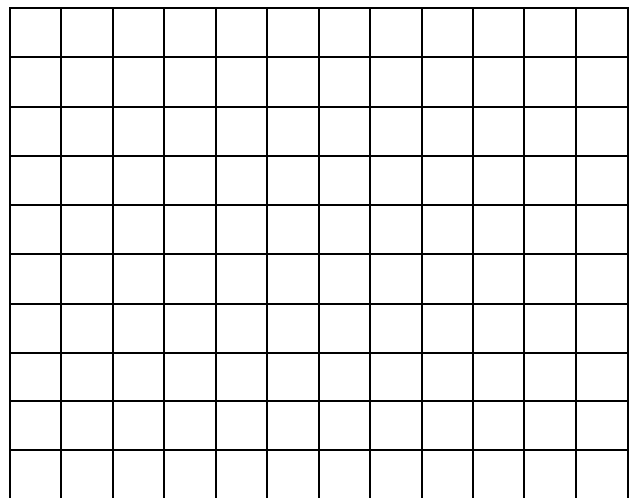
$$c^2 = a^2 + b^2$$

**Question 1:** Find the coordinates of the vertices, the foci, co-vertices and equations of asymptotes then graph

$$1. \frac{x^2}{4} - \frac{y^2}{9} = 1$$



$$2. \frac{y^2}{36} - \frac{x^2}{25} = 1$$



## Question 2:

Write an equation for each hyperbola that satisfies each set of conditions.

a) Vertices( 8,0) and ( -8 , 0 ) , conjugate axis of length 20 units

b) Vertices( 0,6) and ( 0 , -6) , conjugate axis of length 24 units

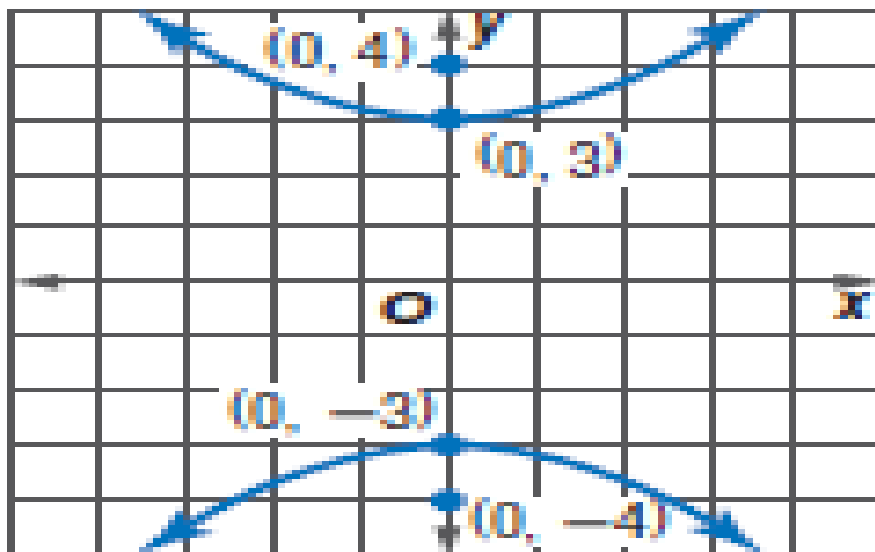
c) Vertices( 6,0) and ( -6 , 0 ) , Foci( 8, 0 ) and ( - 8 , 0 )

d) Vertices( 9,0) and ( -9 , 0 ) , Asymptotes:  $y = \pm \frac{7}{9}$

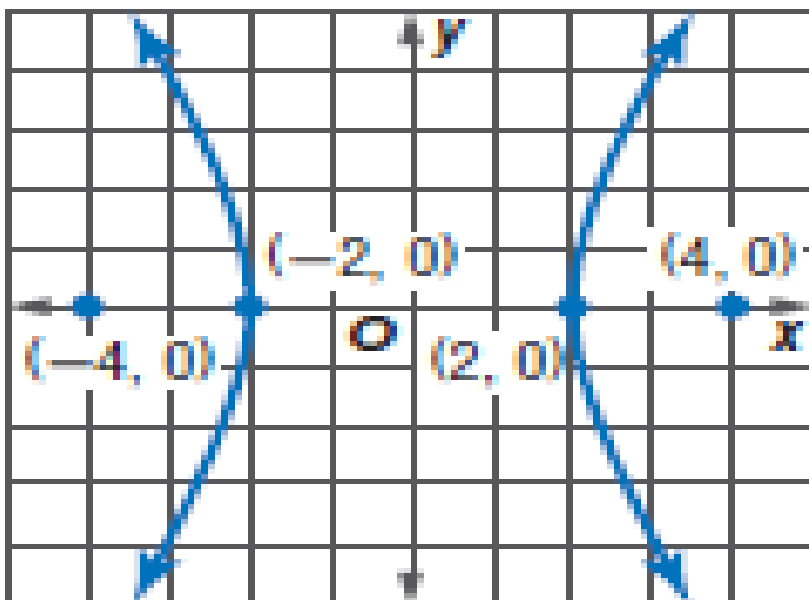


**Question 3:** write an equation for each hyperbola

a)

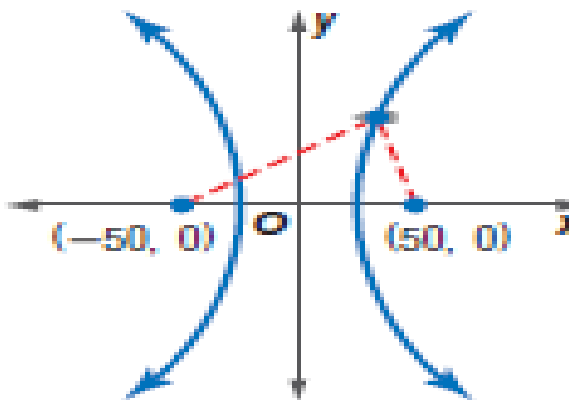


b)



#### Question 4:

Two stations send out signals at the same time. A ship notes the difference in the times at which it receives the signals. The ship is on a hyperbola with the stations at the foci. Suppose a ship determines the difference of its distances from two stations is 50 nautical miles. Write an equation for a hyperbola on which the ship lies if the stations are at  $(-50, 0)$  and  $(50, 0)$



## Lesson 0.4 (counting Technique)

- 1) Pizza house offers three different crusts, four sizes and eight toppings. How many different ways can a customer order a pizza?
- 2) Omar Math's quiz has eight true-false questions, how many different choices for giving answers to the eight questions are possible?
- 3) How many different 5 – digit codes are possible if the first digit can not be 0 and no digit may be used more than once?
- 4) How many different ways can the letters of the word MISSISSIPPI be arranged?
- 5) A student council committee must be composed of two juniors and two sophomores, how many different committees can be chosen from seven juniors and five sophomores?

- 6) There are 10 finalists in a figure skating competition. How many ways can gold, silver and bronze medals be awarded?
- 7) A newspaper has nine reporters available to cover four different stories how many ways can the reporters be assigned to cover the stories?
- 8) Five cards are drawn from a standard deck of cards. How many hands consist of three clubs and two diamonds?
- 9) A group of seven students working on a project needs to choose two students to represent the group's report. How many ways can they choose the two students?
- 10) Determine whether the situation involves permutation or combination then find the possibilities. The number of ways an 11 player team is selected from 25 to form a football team if each of the eleven players can play any position

## Lesson 0.6 (Multiplying probability)

- 1) Hind has a collection of 32CD,18 Jazz and 14 classical music , as she is leaving for a trip she randomly takes 6 CDs to take with her. What is the probability that she selects 3 Jazz and 3 classical?
- 2) Ahmad has five books on the floor one for each of his classes: Algebra 2, chemistry, English, Spanish and history. Ahmad is going to put the books on the shelf , if he picks the books up at random and places them in a row on the same shelf , what is the probability that his English , Spanish and Algebra 2 books will be the left most books on the shelf but not necessarily in that order
- 3) A board game is played with tiles with letters on one side. There are 56 tiles with consonants and 42 tiles with vowels. Each player must choose seven of the tiles at the beginning of the game what is the probability that the player selects four consonants and three vowels

- 4) A jar contains 4 red marbles , 3 green and 2 blue. If a marble is drawn at random what is the probability that it is not green?
- 5) A coin is tossed and a die is rolled what is the probability of a head and 3?
- 6) What is the probability of getting heads each time if a coin is tossed 3 times?
- 7) In a board game three dice are rolled what is the probability that the first die shows a 6, the second die shows a 6 and the third die does not?
- 8) Three cards are drawn from a standard deck of cards without replacement Find the probability of drawing a diamond, a club and another diamond in that order?

9) A bag contains 12 red, 9 blue, 11 yellow and 8 green marbles, if two marbles are drawn at random and not replaced what is the probability that a red and then a blue marble are drawn?

10) At a restaurant 25% of customers orders chili. If 4 % of customers order chili and a baked potato , find the probability that someone who orders chili also orders a baked potato

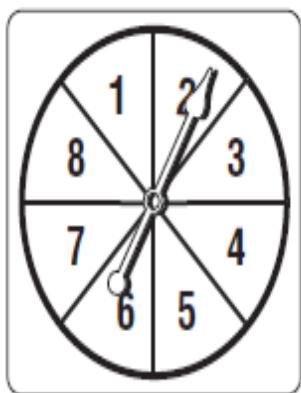
11) The table shows attendance of a wedding. Find the probability that the person can attend the wedding given that the person is in the bride's family

Family	Bride's Family	Groom's Family
Can Attend	104	112
Cannot Attend	32	14

- 12) The table shows the number of students who play baseball. Find the probability that a student plays baseball given that the student is senior

Class	Plays Baseball	Does Not Play Baseball
Junior	22	352
Senior	34	306

- 13) What is the probability that the spinner lands on 7 given that it has spun a number greater than 5?



- 14) Suppose the probability that a student takes AP calculus and is set on the honor roll is 0.0035 , and the probability that a student is on the honor roll is 0.23 Find the probability that a student takes AP calculus given that he is on the honor roll



## Lesson 0.5 (Adding probability)

- 1) Suppose that 1400 students , 550 take Spanish , 700 take biology and 400 take both ,What is the probability that a student selected at random takes Spanish or biology
  
- 2) What is the probability of drawing a king or spade from a deck of 52 cards
  
- 3) There are 7 girls and 6 boys on the junior class committee. A sub -committee of 4 people is being chosen at random what is the probability that the sub-committee will have at least 2 girls
  
- 4) Omar has a stack of 8 baseball cards , 5 basketball cards and 6 soccer cards if he selects a card at random from the stack what is the probability that it is baseball or soccer card

5) Two cards are drawn from a standard deck of playing cards

Find each probability

a)  $P$  ( both queens or both red )

b)  $P$  ( both either black or an ace )

6) Determine whether the events are mutually exclusive or not mutually exclusive then find the probability

a) Two dice are rolled

Find  $P$  (sum  $< 3$  or sum  $> 10$ )

b) A card is drawn from a standard playing cards

Find  $P$  (jack or red card)

7) There are 40 vehicles on a rental car lot. All are either sedans or SUV's

There are 18 red vehicles, and 3 of them are sedans.

There are 15 blue vehicles, and 9 of them are SUVs.

Of the remaining vehicles all are black and 2 are SUVs.

A vehicle is selected at random

Find the **probability**

a)  $P$  ( blue or black )

b)  $P$  ( red or SUV )

c)  $P$  ( black or sedan )