

## Full Parking Lot

All 20 spaces in my favorite parking lot are filled by vehicles. Some are occupied by two-wheeled motorcycles, and others by cars. Each space has only one vehicle occupying it. To calm myself, I counted the wheels in the parking lot and there were 66. How many cars and how many motorcycles have invaded my lot?

Show all work and explain how you arrived at your final solution.

$$\begin{array}{r} m + c = 20 \\ -c \quad -c \end{array} \rightarrow m = 20 - c$$

$$2m + 4c = 66$$

$$\begin{array}{r} 2(20 - c) + 4c = 66 \\ 40 - 2c + 4c = 66 \\ 40 + 2c = 66 \\ -40 \quad -40 \\ \hline \end{array}$$

$$\frac{2c}{2} = \frac{26}{2}$$

$$c = 13$$

$$\begin{array}{r} m = 20 - c \\ 20 - 13 \\ 7 \end{array}$$

$$\begin{array}{l} c = 13 \\ m = 7 \end{array}$$

c	c	c	c	m
c	c	c	m	m
c	c	c	m	m
c	c	c	m	m

$$\begin{array}{r} 2 \times 7 = 14 \\ 4 \times 3 = 52 \\ \hline \rightarrow 66 \end{array}$$

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$$2m + 4c = 66$$

$$m + c = 20$$

↓

$$2m + 4c = 66$$

$$\underline{-2m - 2c = -40}$$

$$2c = 26$$

$$c = 13$$

↓

$$2m + 52 = 66$$

$$2m = 14$$

$$m = 7$$

13 cars + 7 motor  
cycles

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$$\begin{array}{r}
 \text{Cars} = 13 \\
 \text{Motorcycles} = 7 \\
 \boxed{20 - 13 = 7}
 \end{array}
 \quad
 \begin{array}{r}
 66 = 2m + 4c \\
 -4c \quad -4c \\
 \hline
 66 - 4m = 2m \\
 \frac{66}{2} - \frac{4m}{2} = \frac{2m}{2} \\
 33 - 2c = m \\
 20 = 33 - 2c + c \\
 20 = 33 - c \\
 -33 \quad -33 \\
 \hline
 -13 = -c \\
 \frac{-13}{-1} = \frac{-c}{-1} \\
 \boxed{c = 13}
 \end{array}$$

There is 20 vehicles and 66 wheels  
 so if you multiply 13 by 4 equals 52  
 and when you multiply 7 by 2 equals 14.  
 I solved it by taking the number of wheels  
 and the of wheels in cars and motorcycles,  
 and made this equation  $66 = 2m + 4c$  than I  
 solved for the number motorcycles then  
 subtracted it from the number vehicles to get  
 the number of cars.

Name \_\_\_\_\_

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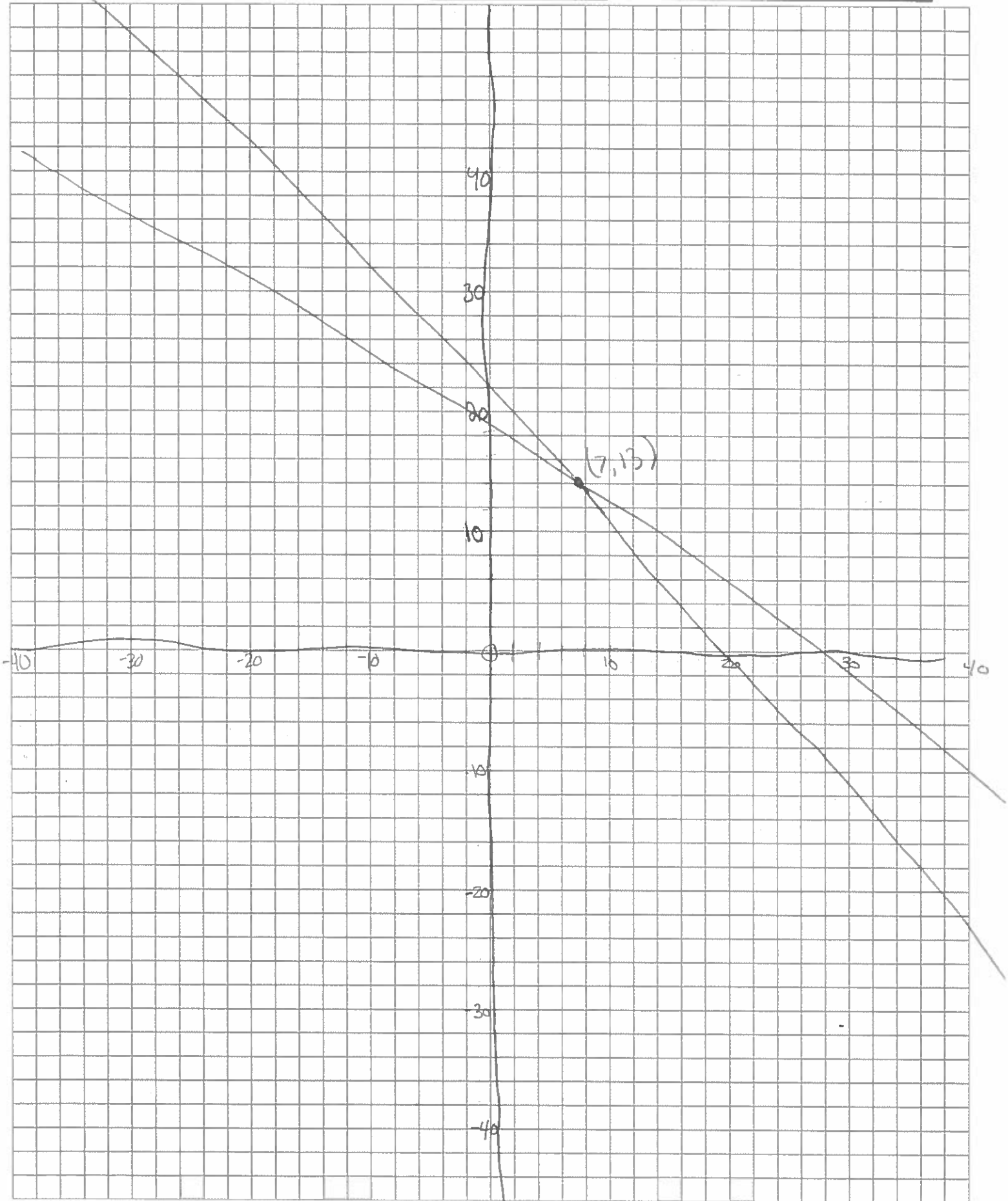
13 cars

$$x + y = 20$$

7 motorcycles

$$4x + 2y = 66$$

We put the equation in the Desmos calculator and look at the point they intersected and it intersect at  $(13, 7)$   
x y



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$4 \times 10 = 40$	4	4	4	4	4
$4 \times 12 = 48$	4	4	4	4	4
$4 \times 13 = 52$	4	4	4	4	4
$2 \times 7 = 14$	4	4	4	2	2
$15 + 14 = 66$	2	2	2	2	2

7 motorcycles  
13 cars

We drew 20 parking spaces and 1st filled 10 spots with cars and 10 with motorcycles. We multiplied 10 by 2 for motorcycles and did the same for the cars but times 4, they didn't equal 66 so we kept using the same method increasing the number of cars until we added the total amount of cars wheels and motorcycle wheels to get 66.

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7 motorcycles 13 cars

The picture represents the parking lot and the dots on the inside represent the car and motorcycle wheels.

