

For each of the following, find the maximum and minimum values of the given function with the given constraints.

1. $M = 3x + 5y$

$$3 \leq x \leq 9$$

$$y \geq 6$$

$$y \leq \frac{1}{3}x + 7$$

2. $N = 4x - 2y$

$$0 \leq x \leq 8$$

$$0 \leq y$$

$$2x + y \leq 18$$

$$2x - 3y \geq -6$$

3. Victor owns a book publishing company. Each paperback book he makes uses 100 sheets of paper and each hardcover book uses 200 sheets of paper. A company put in an order for 30 hardcover books and 60 paperback books. They will pay \$10 for each hardcover book and \$8 for each paperback book. If Victor only has 8,000 sheets of paper, what is the number of paperback and hardcover books he can make with the supplies he has to maximize his profits?