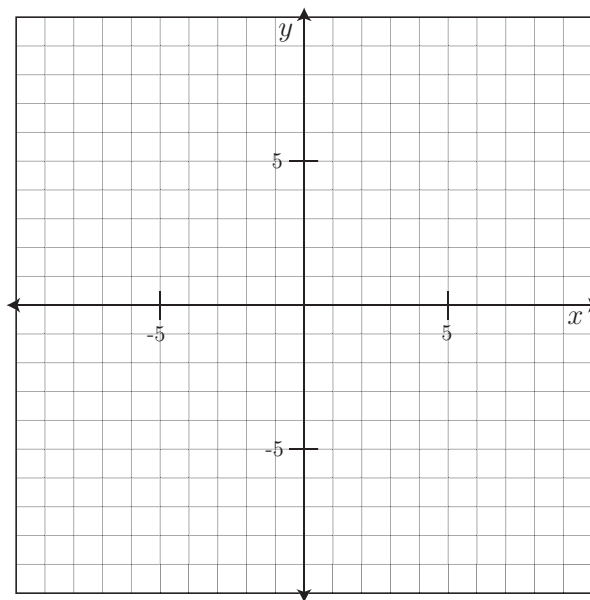


Show all relevant work!

YOU MAY USE A CALCULATOR TO VERIFY SOLUTIONS, BUT NOT TO PROVIDE THEM.

1. Graph the solution to this system of inequalities.

$$\begin{aligned} \ell_1: 3x - 4y &\geq 24 \\ \ell_2: y &< -\frac{4}{3}x + 3 \end{aligned}$$

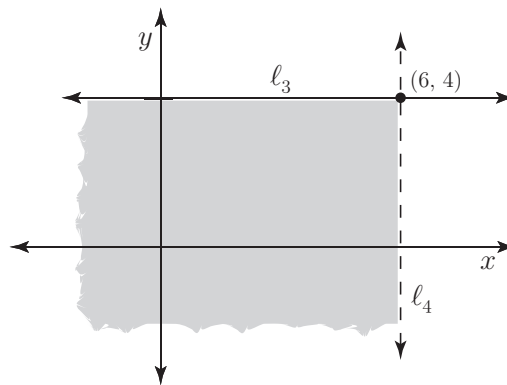


2. Choose a test point from the solution set you graphed above and show that it satisfies both inequalities.

3. Write the system of inequalities to match those graphed below.

$$\ell_3: \underline{\hspace{10em}}$$

$$\ell_4: \underline{\hspace{10em}}$$



4. Simplify $(6x^3 - 3x^2 + 4) - (-7x^3 + x - 1)$

5. Distribute and simplify.

(a) $(3x - 5)(x + 7)$

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

(c) $(x - 7)(x + 7)$

(d) $(x - 1)^3$

6. For $f(x) = 3x^2 - 5x + 2$, find $f(-2)$.

7. Use the definition of an exponent to help you demonstrate why $(x^3)^2 = x^6$.

8. Simplify (write without denominators).

(a) $(3w^3u^5)^3$

(b) $\frac{x^{-3}y^{-1}z^4}{x^{-3}y^2z^{-4}}$

9. Simplify (write without negative exponents).

(a) $\frac{(3x^{-2}y^3)^0}{x^4y^{-4}}$

(b) $\frac{(2b^{-4}c)^{-3}}{(2b^2c^{-5})^2}$

(c) $\left(\frac{2a^{-10}b^8}{3a^4b^{-3}}\right)^{-3}$

10. Is the relationship between the the number of boxes you can fit into a moving van and the size of the boxes directly proportional or inversely proportional? Explain.

11. The amount of time it takes to cook something in a microwave varies directly with the item's weight. If it takes six minutes to cook 1.2 pounds of potatoes, how long will it take to cook 8 pounds of potatoes?

12. The death rate (in number of deaths per 100,000 people) is shown in the table below for various years. The US population (in 100,000's of people) is also shown in the table below.

Numbers of Part Time and Full Time Instructors

Death Rate		Population	
Year	(number of deaths per 100,000 people)	Year	(in 100,000's)
1960	559	1990	2487
1970	493	1995	2630
1980	412	2000	2814
1990	322	2005	2965
2000	258	2008	3051
2005	211		

Source: *U.S. Center for Health Statistics; US Census Bureau*

- (a) Let $R(t)$ be the death rate (in number of deaths per 100,000 people) at t years since 1960. Find the regression equation of R to model the situation.
- (b) Now let $P(t)$ be the US population (in 100,000's of people) at t years since 1970. Find the regression equation of $P(t)$ to describe the situation.
- (c) Find an equation for the product function, $R \cdot P$ and explain what the function $R \cdot P$ models. Include units in your answer.
- (d) Find $(R \cdot P)(54)$ and explain it's meaning.

(e) Use “intersect” on a graphing calculator to verify your work in part (d). Write the intersection point below.