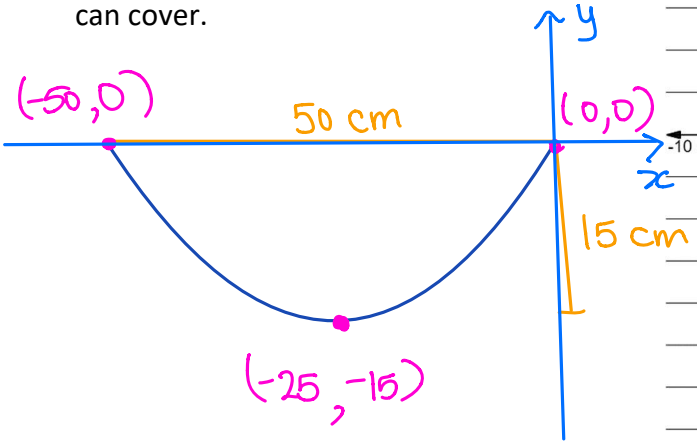
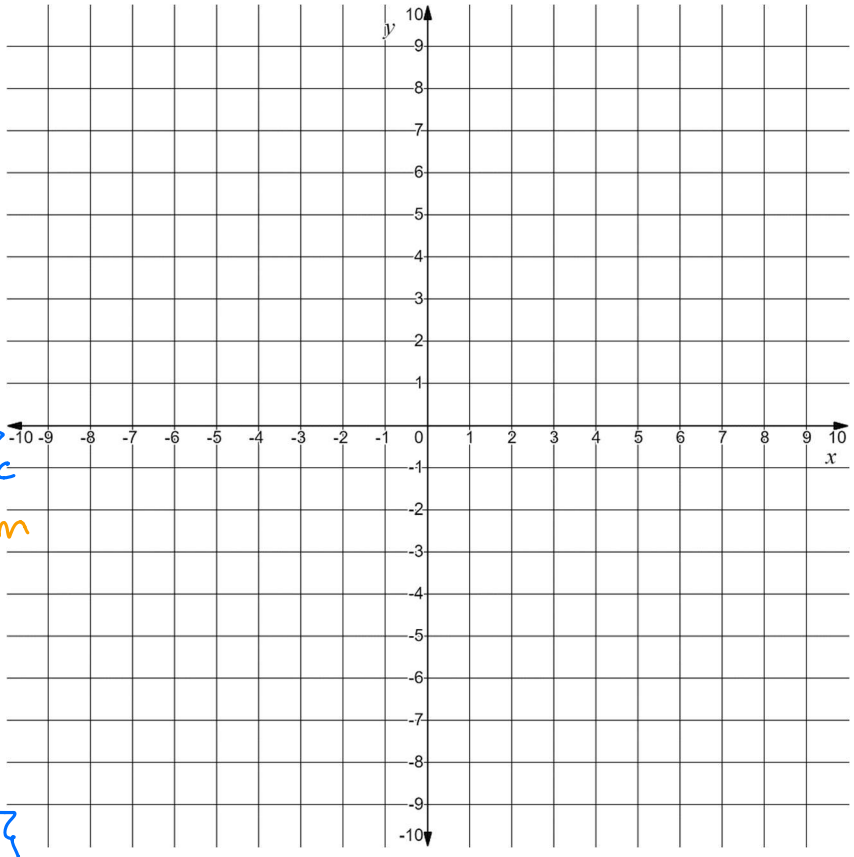
Name: _____ Date: _____

Learning Goal 9.2	Solving quadratic inequalities.

Example You can use a parabolic reflector to focus sound, light, or radio waves to a single point. A parabolic microphone is used by journalists to direct incoming sounds. If the reflector has a width of 50 cm and a maximum depth of 15 cm, describe the region that the microphone can cover.



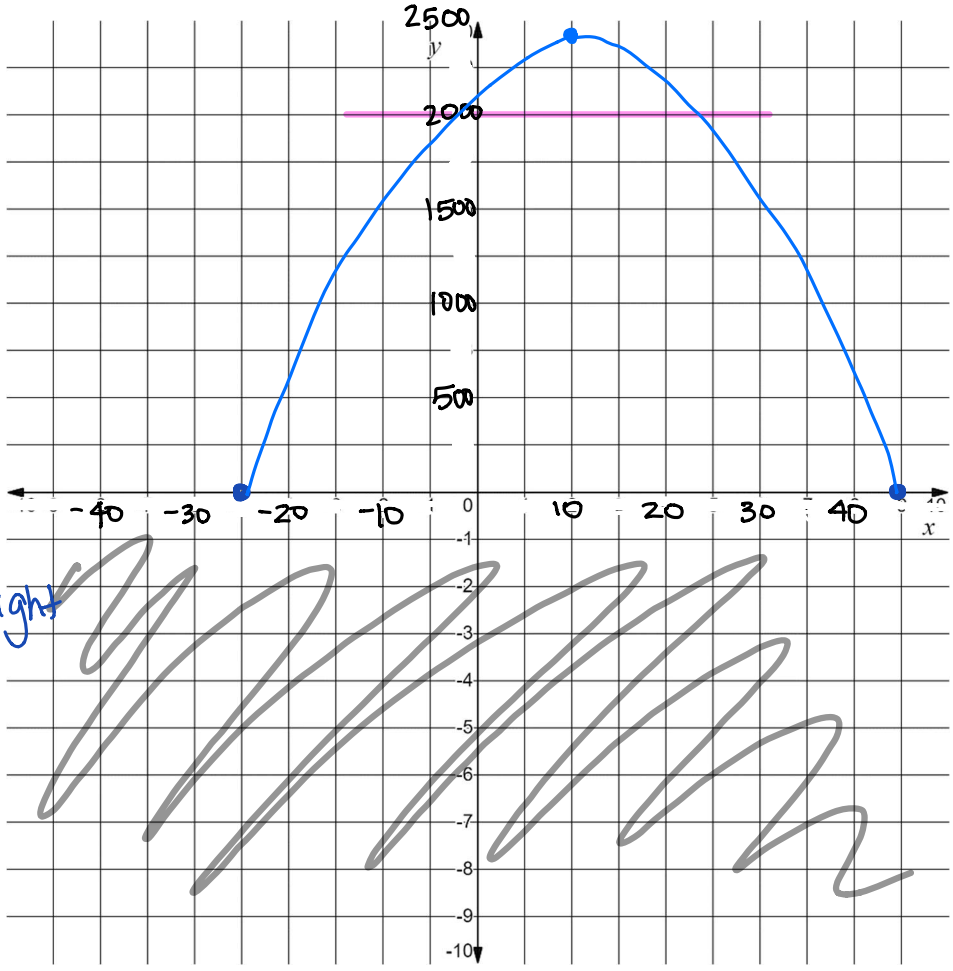


$\{x \mid -50 \le x \le 0, x \in \mathbb{R}\}$

$\{y \mid -15 \le y \le 0, y \in \mathbb{R}\}$

Example A bus company currently charges a fare of $50 on one of its routes and averages 45 passengers per trip. If is estimated that for every $2 increase in the price, one fewer passenger will take the bus. Write an inequality that models the revenue for this situation. What fare would produce revenues that exceed $2 000? Use a graph to show your work.

(10, 2450)



Revenue = 50 × 45
= price × tickets bought

Let R = the revenue from bus tickets

x = the number of changes in price.

$R = (50+2x)(45-x) = 0$

$50+2x = 0$
$2x = -50$
$x = -25$ → giving away the tickets

$45 - x = 0$
$45 = x$ ← no one is riding!

$R = 2250 - 50x + 90x - 2x^2$
$R = -2x^2 + 40x + 2250$
$= -2(x^2 - 20x) + 2250$
$= -2(x^2 - 20x + 100 - 100) + 2250$ $\left(\frac{-20}{2}\right)^2 = (-10)^2 = 100$
$= -2(x^2 - 20x + 100) + 200 + 2250$
$= -2(x-10)^2 + 2450$

(10, 2450) vertex.

$2000 \geq -2(x-10)^2 + 2450$
$-2450 \quad -2450$
$\frac{-450}{-2} \geq \frac{-2(x-10)^2}{-2}$
$\sqrt{225} \leq \sqrt{(x-10)^2}$
$\pm 15 \leq x - 10$

1. $-15 \leq x - 10$
$+10 \quad +10$
$x \geq -5$ ← $10 dec.

2. $15 \leq x - 10$
$x \leq 25$ ← $50 inc.

The bus tickets must be between $40 and $100.

Assignment p. 496 # 9 – 12, 14, 17 Quiz Next Day!