2.6 Long Run Industry Equilibrium - Practice Problems

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The supply of bicycle rentals in a small town is given by:

$$q_S = 10p - 200$$

1. Find the inverse supply function.

Solve the supply function for p:

$q_S = 10p - 200$	The supply function
$q_S - 10p = -200$	Subtracting $10p$
$-10p = -200 - q_S$	Subtracting q_S
$p = 20 + \frac{1}{10}q_S$	Dividing by -10

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2. What is the price elasticity of supply at a price of $25.00?

First we use the supply function and find q_S when $p = 25$:

$q_S = 10p - 200$	The supply function
$q_S = 10(25) - 200$	Plugging in 25
$q_S = 250 - 200$	Multiplying
$q_S = 50$	Subtracting

Now we know the price, quantity, and slope, so we can use the elasticity formula.

$\epsilon_S = \frac{1}{slope} \times \frac{p}{q_S}$	The formula for elasticity
$\epsilon_S = \frac{1}{\frac{1}{10}} \times \frac{25}{50}$	Plugging in
$\epsilon_S = 10 \times 0.5$	Simplifying
$\epsilon_S = 5$	Multiplying

This is relatively elastic.

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3. What is the price elasticity of supply at a price of $50.00?

First we use the supply function and find q_S when $p = 50$:

$q_S = 10p - 200$	The supply function
$q_S = 10(50) - 200$	Plugging in 25
$q_S = 500 - 200$	Multiplying
$q_S = 300$	Subtracting

Now we know the price, quantity, and slope, so we can use the elasticity formula.

$\epsilon_S = \frac{1}{slope} \times \frac{p}{q_S}$	The formula for elasticity
$\epsilon_S = \frac{1}{\frac{1}{10}} \times \frac{50}{300}$	Plugging in
$\epsilon_S = 10 \times \frac{50}{300}$	Simplifying
$\epsilon_S = 1.667$	Multiplying

This is also relatively elastic, but less elastic than at the lower price.