

Assignment

Date _____ Period _____

Solve each optimization problem.

- 1) A rancher wants to construct two identical rectangular corrals using 200 ft of fencing. The rancher decides to build them adjacent to each other, so they share fencing on one side. What dimensions should the rancher use to construct each corral so that together, they will enclose the largest possible area?

- 2) A company has started selling a new type of smartphone at the price of $\$110 - 0.05x$ where x is the number of smartphones manufactured per day. The parts for each smartphone cost \$50 and the labor and overhead for running the plant cost \$6000 per day. How many smartphones should the company manufacture and sell per day to maximize profit?

- 3) A farmer wants to construct a rectangular pigpen using 400 ft of fencing. The pen will be built next to an existing stone wall, so only three sides of fencing need to be constructed to enclose the pen. What dimensions should the farmer use to construct the pen with the largest possible area?

- 4) A cryptography expert is deciphering a computer code. To do this, the expert needs to minimize the product of a positive rational number and a negative rational number, given that the positive number is exactly 9 greater than the negative number. What final product is the expert looking for?

- 5) A supermarket employee wants to construct an open-top box from a 14 by 30 in piece of cardboard. To do this, the employee plans to cut out squares of equal size from the four corners so the four sides can be bent upwards. What size should the squares be in order to create a box with the largest possible volume?

- 6) A cryptography expert is deciphering a computer code. To do this, the expert needs to minimize the product of a positive rational number and a negative rational number, given that the positive number is exactly 5 greater than the negative number. What final product is the expert looking for?
- 7) A company has started selling a new type of smartphone at the price of $\$130 - 0.1x$ where x is the number of smartphones manufactured per day. The parts for each smartphone cost $\$60$ and the labor and overhead for running the plant cost $\$4000$ per day. How many smartphones should the company manufacture and sell per day to maximize profit?
- 8) A farmer wants to construct a rectangular pigpen using 300 ft of fencing. The pen will be built next to an existing stone wall, so only three sides of fencing need to be constructed to enclose the pen. What dimensions should the farmer use to construct the pen with the largest possible area?
- 9) A supermarket employee wants to construct an open-top box from a 10 by 16 in piece of cardboard. To do this, the employee plans to cut out squares of equal size from the four corners so the four sides can be bent upwards. What size should the squares be in order to create a box with the largest possible volume?
- 10) A rancher wants to construct two identical rectangular corrals using 400 ft of fencing. The rancher decides to build them adjacent to each other, so they share fencing on one side. What dimensions should the rancher use to construct each corral so that together, they will enclose the largest possible area?

- 11) A company has started selling a new type of smartphone at the price of $\$140 - 0.1x$ where x is the number of smartphones manufactured per day. The parts for each smartphone cost $\$60$ and the labor and overhead for running the plant cost $\$5000$ per day. How many smartphones should the company manufacture and sell per day to maximize profit?
- 12) A supermarket employee wants to construct an open-top box from a 16 by 30 in piece of cardboard. To do this, the employee plans to cut out squares of equal size from the four corners so the four sides can be bent upwards. What size should the squares be in order to create a box with the largest possible volume?
- 13) A farmer wants to construct a rectangular pigpen using 400 ft of fencing. The pen will be built next to an existing stone wall, so only three sides of fencing need to be constructed to enclose the pen. What dimensions should the farmer use to construct the pen with the largest possible area?
- 14) A cryptography expert is deciphering a computer code. To do this, the expert needs to minimize the product of a positive rational number and a negative rational number, given that the positive number is exactly 7 greater than the negative number. What final product is the expert looking for?
- 15) A rancher wants to construct two identical rectangular corrals using 200 ft of fencing. The rancher decides to build them adjacent to each other, so they share fencing on one side. What dimensions should the rancher use to construct each corral so that together, they will enclose the largest possible area?

Answers to Assignment (ID: 1)

- 1) 25 ft (non-adjacent sides) by $\frac{100}{3}$ ft (adjacent sides)
- 2) 600
- 3) 100 ft (perpendicular to wall) by 200 ft (parallel to wall)
- 4) $-\frac{81}{4}$ 5) 3 in 6) $-\frac{25}{4}$ 7) 350
- 8) 75 ft (perpendicular to wall) by 150 ft (parallel to wall)
- 9) 2 in
- 10) 50 ft (non-adjacent sides) by $\frac{200}{3}$ ft (adjacent sides)
- 11) 400 12) $\frac{10}{3}$ in
- 13) 100 ft (perpendicular to wall) by 200 ft (parallel to wall)
- 14) $-\frac{49}{4}$
- 15) 25 ft (non-adjacent sides) by $\frac{100}{3}$ ft (adjacent sides)