Geometry Lomac 2015-2016	Date 1/12 due 1/13	Quadratics: Modeling Day 2 7.7L

Name _____ **Per**_____

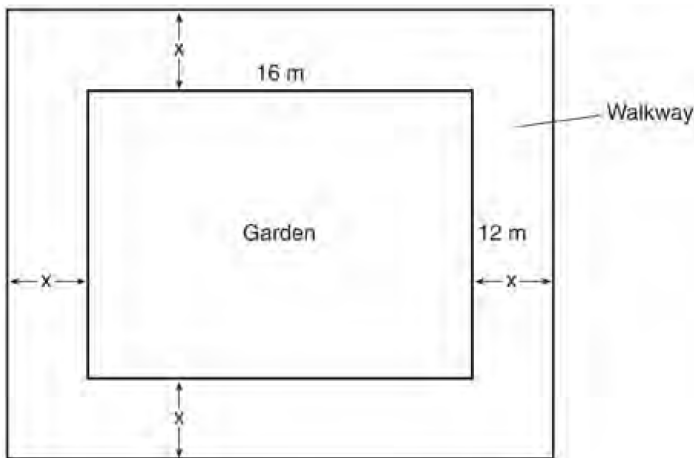   **LO:**   I can model situations with quadratics.

emath 11.7

☐ **DO NOW**   On the back of this packet

☐ **(1)**   **Quadratics: Modeling from the common core exam**

95   A rectangular garden measuring 12 meters by 16 meters is to have a walkway installed around it with a width of x meters, as shown in the diagram below. Together, the walkway and the garden have an area of 396 square meters.

Write an equation that can be used to find x, the width of the walkway. Describe how your equation models the situation. Determine and state the width of the walkway, in meters.

☐ (2)   **Quadratics: Modeling from the common core exam**

93   Sam and Jeremy have ages that are consecutive odd
integers. The product of their ages is 783. Which
equation could be used to find Jeremy's age, j, if he
is the younger man?

1   $j^2 + 2 = 783$

2   $j^2 - 2 = 783$

3   $j^2 + 2j = 783$

4   $j^2 - 2j = 783$

94   The length of the shortest side of a right triangle is
8 inches. The lengths of the other two sides are
represented by consecutive odd integers. Which
equation could be used to find the lengths of the
other sides of the triangle?

1   $8^2 + (x + 1) = x^2$

2   $x^2 + 8^2 = (x + 1)^2$

3   $8^2 + (x + 2) = x^2$

4   $x^2 + 8^2 = (x + 2)^2$

☐ (3) **Quadratics: Modeling from the common core exam**

97 New Clarendon Park is undergoing renovations to
its gardens. One garden that was originally a
square is being adjusted so that one side is doubled
in length, while the other side is decreased by three
meters. The new rectangular garden will have an
area that is 25% more than the original square
garden. Write an equation that could be used to
determine the length of a side of the original square
garden. Explain how your equation models the
situation. Determine the area, in square meters, of
the new rectangular garden.

98 A landscaper is creating a rectangular flower bed
such that the width is half of the length. The area
of the flower bed is 34 square feet. Write and solve
an equation to determine the width of the flower
bed, to the *nearest tenth of a foot*.

☐ (4) **Exit Ticket**

ON THE LAST PAGE

☐ (5) **Homework**

cont.

3. The price of a stock rose and then fell in the span of 10 days of trading. Its price at various points in time since it was first offered is given in the table below.

Day, d	0	2	4	6	8	10
Price, p	$30.50	$36.50	$38.75	$36.75	$30.75	$20.50

(a) Explain why a quadratic function will model this data better than a linear or exponential function.

(b) If a quadratic function of the form $p = a(d-h)^2 + k$ is used to model the price, p, of the stock as a function of the day, d, then give values for h and k. Justify your choices.

(c) Which of the following value of a would be the best choice for the model given your answers to (b)? Justify your choice.

$$a = -2 \qquad a = -\frac{1}{2} \qquad a = \frac{1}{2} \qquad a = 2$$

4. A farm is creating fenced in pens and wants to lay out the pens in the following rectangular configuration where the width of the pens is given by the variable x as shown. Engineers have only 90 feet of fencing to surround and divide the pens and have created the following equation for the total area enclosed, in square feet, based on the width of x:

$$A = 45x - 3x^2$$

(a) Determine the zeroes of this quadratic by factoring.
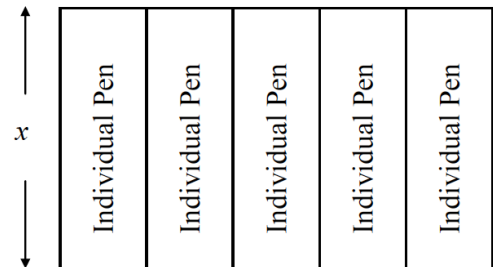
(b) How can you use your answers to (a) to help determine the x-value where the maximum area will occur?

(c) Find the maximum area of the pen. Show the calculation that gives your answer.

Exit Ticket   **Name**_____ **Date** _____ _____ **Per_** _____   **7.7L**

The LO (Learning Outcomes) are written below your name on the front of this packet. Demonstrate your achievement of these outcomes by doing the following:

Solve the problem below.

99 A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width. Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create. Explain how your equation or inequality models the situation. Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

DO NOW   **Name**_____ **Date** _____ **Per**_____   **7.7L**

(1) Translation to algebra progress. Write one or more algebraic statement(s) to represent this situation. Be sure to write at least one "Let" statement to define any variables.

Do not over think this question. WRITE A MATHEMATICAL EXPLANATION for your answer choice

101   A ball is thrown into the air from the edge of a 48-foot-high cliff so that it eventually lands on the ground. The graph below shows the height, y, of the ball from the ground after x seconds.
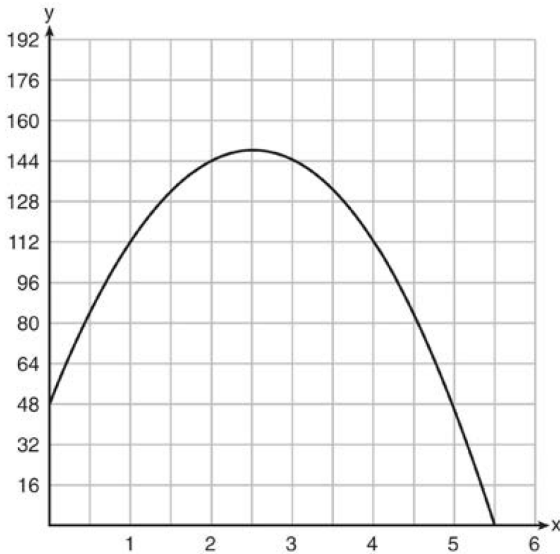
For which interval is the ball's height always *decreasing*?
1    $0 \leq x \leq 2.5$
2    $0 < x < 5.5$
3    $2.5 < x < 5.5$
4    $x \geq 2$