Name: _____

A.CED.A.1: Geometric Applications of Quadratics 2b

1 A farmer has a rectangular field that measures 100 feet by 150 feet. He plans to increase the area of the field by 20%. He will do this by increasing the length and width by the same amount, x. Which equation represents the area of the new field?

2 What is the length of one side of the square whose perimeter has the same numerical value as its area?

3 A rectangle has an area of 24 square units. The width is 5 units less than the length. What is the length, in units, of the rectangle?

4 The length of a rectangle is 3 inches more than its width. The area of the rectangle is 40 square inches. What is the length, in inches, of the rectangle?

5 A contractor needs 54 square feet of brick to construct a rectangular walkway. The length of the walkway is 15 feet more than the width. Write an equation that could be used to determine the dimensions of the walkway. Solve this equation to find the length and width, in feet, of the walkway.

6 The area of the rectangular playground enclosure at South School is 500 square meters. The length of the playground is 5 meters longer than the width. Find the dimensions of the playground, in meters. [*Only an algebraic solution will be accepted.*]

7 Jack is building a rectangular dog pen that he wishes to enclose. The width of the pen is 2 yards less than the length. If the area of the dog pen is 15 square yards, how many yards of fencing would he need to completely enclose the pen?

8 Javon's homework is to determine the dimensions of his rectangular backyard. He knows that the length is 10 feet more than the width, and the total area is 144 square feet. Write an equation that Javon could use to solve this problem. Then find the dimensions, in feet, of his backyard.

9 A rectangular park is three blocks longer than it is wide. The area of the park is 40 square blocks. If w represents the width, write an equation in terms of w for the area of the park. Find the length and the width of the park.

10 A rectangular piece of cardboard is to be formed into an uncovered box. The piece of cardboard is 2 centimeters longer than it is wide. A square that measures 3 centimeters on a side is cut from each corner. When the sides are turned up to form the box, its volume is 765 cubic centimeters. Find the dimensions, in centimeters, of the original piece of cardboard.

A.CED.A.1: Geometric Applications of Quadratics 2b
Answer Section

1 ANS:
$(100+x)(150+x) = 18,000$
$100 \times 150 \times 120\% = 18000$

REF: 060425a

2 ANS:
4

$$4s = s^2$$
$$s^2 - 4s = 0$$
$$s(s-4) = 0$$
$$s = 0 \text{ or } s = 4$$

REF: 060608a

3 ANS:
8

$$l(l-5) = 24$$
$$l^2 - 5l - 24 = 0$$
$$(l-8)(l+3) = 0$$
$$l = 8$$

REF: 080817ia

4 ANS:
8

$$l(l-3) = 40$$
$$l^2 - 3l - 40 = 0$$
$$(l-8)(l+5) = 0$$
$$l = 8$$

REF: 081116ia

5 ANS:
$w(w+15) = 54$, 3, 18. $w(w+15) = 54$

$$w^2 + 15w - 54 = 0$$
$$(w+18)(w-3) = 0$$
$$w = 3$$

REF: 060837ia

6 ANS:

$w = 20, l = 25.$ $w(w+5) = 500$
$w^2 + 5w - 500 = 0$
$(w+25)(w-20) = 0$
$w = 20$

REF: 060035a

7 ANS:

16. $w(w+2) = 15$
$w^2 + 2w - 15 = 0$
$(w+5)(w-3) = 0$
$w = 3$. If w=3, then l=5.

REF: 080035a

8 ANS:

$w(w+10) = 144$; $w = 8, l = 18.$ $w(w+10) = 144$
$w^2 + 10w - 144 = 0$
$(w+18)(w-8) = 0$
$w = 8$

REF: 010233a

9 ANS:

$w(w+3) = 40$, $w = 5, l = 8.$ $w(w+3) = 40$
$w^2 + 3w - 40 = 0$
$(w+8)(w-5) = 0$
$w = 5$

REF: 080232a

10 ANS:

$V = lwh$
$765 = (w+2)(w)(3)$
$765 = 3w^2 + 6w$

21x23. $3w^2 + 6w - 765 = 0$
$w^2 + 2w - 255 = 0$
$(w+17)(w-15) = 0$
$w = 15$
If the width of the box is 15, adding the widths of the cutout squares means the width of the *original* sheet of cardboard is 21 (15 + 3 + 3). The length is 2 more, or 23.

REF: 080431b