

**A.A.8: Writing Quadratics: Analyze and solve verbal problems that involve quadratic equations**

- 1 When 36 is subtracted from the square of a number, the result is five times the number. What is the positive solution?
  - 1) 9
  - 2) 6
  - 3) 3
  - 4) 4
- 2 The square of a positive number is 24 more than 5 times the number. What is the value of the number?
  - 1) 6
  - 2) 8
  - 3) 3
  - 4) 4
- 3 Byron is 3 years older than Doug. The product of their ages is 40. How old is Doug?
  - 1) 10
  - 2) 8
  - 3) 5
  - 4) 4
- 4 Noj is 5 years older than Jacob. The product of their ages is 84. How old is Noj?
  - 1) 6
  - 2) 7
  - 3) 12
  - 4) 14
- 5 Find two consecutive numbers whose product is 306.
- 6 Find three consecutive positive even integers such that the product of the second and third integers is twenty more than ten times the first integer. [Only an algebraic solution can receive full credit.]
- 7 Find three consecutive odd integers such that the product of the first and the second exceeds the third by 8.
- 8 Three brothers have ages that are consecutive even integers. The product of the first and third boys' ages is 20 more than twice the second boy's age. Find the age of *each* of the three boys.
- 9 Tamara has two sisters. One of the sisters is 7 years older than Tamara. The other sister is 3 years younger than Tamara. The product of Tamara's sisters' ages is 24. How old is Tamara?

# **A.A.8: Writing Quadratics: Analyze and solve verbal problems that involve quadratic equations**

## **Answer Section**

1 ANS: 1

$$x^2 - 36 = 5x$$

$$x^2 - 5x - 36 = 0$$

$$(x - 9)(x + 4) = 0$$

$$x = 9$$

REF: 061020ia

2 ANS: 2

$$x^2 = 5x + 24$$

$$x^2 - 5x - 24 = 0$$

$$(x - 8)(x + 3) = 0$$

$$x = 8$$

REF: 061518ia

3 ANS: 3

$$b = 3 + d \quad (3 + d)d = 40$$

$$bd = 40 \quad d^2 + 3d - 40 = 0$$

$$(d + 8)(d - 5) = 0$$

$$d = 5$$

REF: 011208ia

4 ANS: 3

$$N = 5 + J \quad N(N - 5) = 84$$

$$J = N - 5 \quad N^2 - 5N - 84 = 0$$

$$NJ = 84 \quad (N - 12)(N + 7) = 0$$

$$N = 12$$

REF: 081304ia

5 ANS:

17 and 18

REF: 019917al

6 ANS:

6, 8, 10. Three consecutive even integers are  $x$ ,  $x + 2$  and  $x + 4$ .  $(x + 2)(x + 4) = 10x + 20$ 

$$x^2 + 6x + 8 = 10x + 20$$

$$x^2 - 4x - 12 = 0$$

$$(x - 6)(x + 2) = 0$$

$$x = 6$$

REF: 011039ia

7 ANS:

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

$$x^2 + 2x - x - 4 = 8$$

3, 5, 7.  $x$  = first odd integer,  $x + 2$  = second odd integer,  $x + 4$  = third odd integer.  $x^2 + x - 12 = 0$ 

$$(x + 4)(x - 3) = 0$$

$$x = -4 \quad x = 3$$

REF: 060131a

8 ANS:

$$x(x + 4) - 2(x + 2) = 20$$

$$x^2 + 4x - 2x - 4 = 20$$

4, 6, 8.  $x$  = youngest brother,  $x + 2$  = middle brother,  $x + 4$  = oldest brother.  $x^2 + 2x - 24 = 0$ 

$$(x + 6)(x - 4) = 0$$

$$x = -6 \quad x = 4$$

REF: 010326a

9 ANS:

5.  $x$  = Tamara's age,  $x + 7$  = Tamara's older sister,  $x - 3$  = Tamara's younger sister.

$$(x + 7)(x - 3) = 24$$

$$x^2 + 7x - 3x - 21 = 24$$

$$x^2 + 4x - 45 = 0$$

$$(x + 9)(x - 5) = 0$$

$$x = -9 \quad x = 5$$

REF: 060636a