

2- Correction key

1	Area of park without sidewalk	$x(2x) = 2x^2$	
	Area of park with sidewalk	$(x + 4)(2x + 4)$ $= 2x^2 + 12x + 16$	
	Area of sidewalk only	$2x^2 + 12x + 16 - 2x^2$ $= 12x + 16$	
	Width of park	$12x + 16 = 136$ $12x = 120$ $x = 10$	

Area of park without sidewalk. $x(2x) = 10 \times 20 = 200$

Result The area of the park without the sidewalk is 200 m².

2 Area of the first rectangle $(x + 3)(2x - 1) = 2x^2 + 5x - 3$

Dimensions of the new rectangle

length : $x + 3 - 3 = x$

width : $2x - 1 - 3 = 2x - 4$

Area of the new rectangle $(x)(2x - 4) = 2x^2 - 4x$

Difference between the areas $2x^2 + 5x - 3 - (2x^2 - 4x) =$
 $2x^2 + 5x - 3 - 2x^2 + 4x =$
 $(9x - 3) \text{ cm}^2$

Result The difference between the areas is $(9x - 3) \text{ cm}^2$

3 a) $x^2 + 5x$ d) $4a^3 - 2a + 3$

b) $10a^3b^2 - 4a^2b^2$ e) $9x^2 - 24x + 16$

c) $\frac{8}{3}xy - 2y$

4 Total length of the 3 sides of known length $(x + 6) + (x - 4) + (x + 2) = (3x + 4)$

Length of the 4th side $(5x + 7) - (3x + 4) = (2x + 3)$

Price of the fence installed on the 4th side $(2x + 3) \times (x - 5) = (2x^2 - 7x - 15)$

Result $\$(2x^2 - 7x - 15)$

5 Length of rectangle $\frac{6x^2 + 5x}{x} = 6x + 5$

Perimeter of equilateral triangle $3(6x + 5)$

Result The perimeter of the triangle is $3(6x + 5)$ or $18x + 15$.

6 Calculate perimeter of inner edge of the track $P_I = 2(8x + 3) + 2(25)$
 $= 16x + 6 + 50 = (16x + 56) \text{ m}$

Calculate perimeter of outer edge of the track $P_O = 2(8x + 3 + 2x) + 2(25 + 2x)$
 $= 16x + 6 + 4x + 50 + 4x$
 $= (24x + 56) \text{ m}$

Difference between perimeters $d = (24x + 56) - (16x + 56)$
 $= (8x) \text{ m}$

After 1 lap, the difference is 32 m $8x = 32$
 $x = 4$

Length of the soccer field $8x + 3 = 8(4) + 3 = 35 \text{ m}$

Answer: The length of the soccer field is 35 m.

7 Area of room $\text{Area}_{(r)} = (3x)(x + 5)$
 $= 3x^2 + 15x$

Area of room = Area of hallway
 $3x^2 + 15x = (x) \cdot (\text{length of hallway})$

Length of hallway
 $\frac{3x^2 + 15x}{x} = 3x + 15$

Perimeter of room $2(x + 5) + 2(3x) = 8x + 10$

Perimeter of hallway $2(x) + 2(3x + 15) = 8x + 30$

Difference $8x + 30 - (8x + 10) = 20$

Answer: The difference between their perimeters is **20** units.

Note: Do not penalize students whose answer is -20 units.

Students who determined the length of the hallway have shown that they have a partial understanding of the problem.