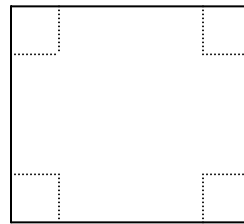


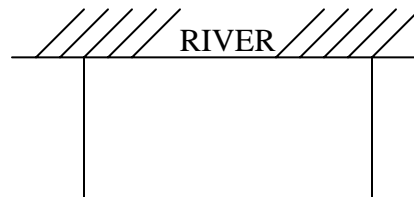
## Applications of Quadratic Equations

- (1) Find two consecutive odd integers whose product is 143.
- (2) Find two consecutive integers such that the sum of their squares is 145.
- (3) Find a rational number such that the sum of the number and its reciprocal is  $2\frac{1}{6}$ .
- (4) The sum of the reciprocals of two consecutive even integers is  $\frac{9}{40}$ . What are the integers?
- (5) A rectangle has a perimeter of 23 *cm* and an area of 33 *cm*<sup>2</sup>. Find the dimensions.

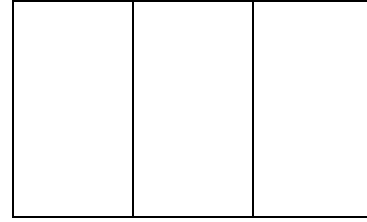
- (6) A square piece of cardboard was used to construct a tray by cutting 2-inch squares out of each corner and turning up the flaps. Find the size of the original square if the resulting tray has a volume of 128 *cu in*.



- (7) It took a faster runner 10 seconds longer to run a distance of 1500 feet than it took a slower runner to run a distance of 1000 feet. If the rate of the faster runner was 5 *ft/s* more than the rate of the slower runner, what was the rate of each?
- (8) It takes a boy 15 *min* longer to mow the lawn than it takes his sister, and if they both work together it takes them 56 *min*. How long does it take the boy to mow the lawn by himself?
- (9) At noon, Tom left point *A* walking due north; an hour later, Dick left point *A* walking due east. Both boys walked at 4 *mph*. When will the boys be 8 miles apart?
- (10) Trains *A* and *B* leave the same city at right angles at the same time. Train *B* travels 5 *mph* faster than train *A*. After 2 hours, they are 50 miles apart. Find the speed of each train.
- (11) A farmer has 1200 *m* of fencing. He wants to enclose a rectangular field bordering a river, with no fencing needed along the river. Find the dimensions of the field if the area of the field is 180,000 *sq m*.

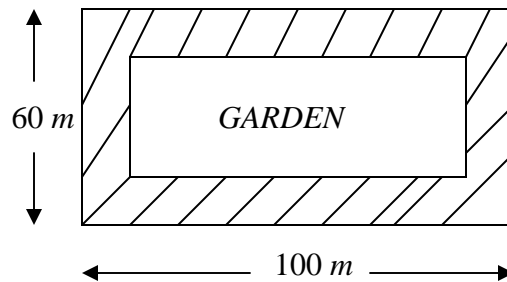


- (12) An ecologist is conducting a research project on breeding pheasants in captivity. She first must construct suitable pens. She wants a rectangular area with two additional fences across its width, as shown. Find the dimensions if she has 3600 m of fencing and the area of the rectangular area is 385,000 sq m.



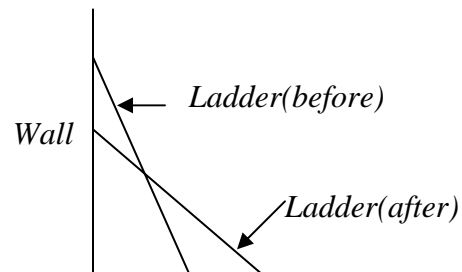
- (13) A rectangular field is to be enclosed on all four sides with a fence. Fencing material costs \$3 per foot for two opposite sides, and \$6 per foot for the other two opposite sides. Find the dimensions of the field with area 7500 sq ft that can be enclosed for \$2400.
- (14) The manager of an 80-unit apartment complex is trying to decide what rent to charge. Experience has shown that at a rent of \$200, all the units will be full, but one additional unit will remain vacant for each \$20 increase in rent. Find the number of occupied units if the total revenue is \$20,020.

- (15) A park in the shape of a rectangle has dimensions 60 m by 100 m. If the park contains a rectangular garden surrounded by a concrete terrace of uniform width, how wide is the terrace if the area of the garden is one-half the area of the park?



- (16) A ball is thrown vertically upward from the top of a 96-foot building with an initial velocity of 80 ft/sec. The distance  $s$  (in feet) of the ball from the ground after  $t$  seconds is given by the formula  $s = -16t^2 + 80t + 96$ .
- (i) After how many seconds does the ball strike the ground?
- (ii) After how many seconds will the ball pass the top of the building on its way down?

- (17) A 13-foot ladder leans against a wall. The foot of the ladder is 5 feet from the wall. How much would the foot of the ladder have to be pulled away from the wall so that the top of the ladder would slide down the wall by the same amount?



## Solution Key for Applications of Quadratic Equations

- (1) 11 and 13; -13 and -11
- (2) 8 and 9; -9 and -8
- (3)  $\frac{2}{3}$ ;  $\frac{3}{2}$
- (4) 8 and 10
- (5)  $5\frac{1}{2}$  cm by 6 cm
- (6) 12 in by 12 in
- (7) 20 ft/sec and 25 ft/sec; 25 ft/sec and 30ft/sec
- (8) 120 min
- (9)  $\approx 1:49.4$  pm
- (10) 15 mph and 20 mph
- (11) 300 m by 600 m (parallel to the river)
- (12) 550 m (width) by 700 m; 350 m (width) by 1100 m
- (13)  $\approx 179$  ft (\$3/ft) by  $\approx 42$  ft;  $\approx 21$  ft (\$3/ft) by  $\approx 358$  ft
- (14) 77 units ; 13 units
- (15)  $\approx 10.85$  m
- (16) (i) 6 seconds    (ii) 5 seconds
- (17) 7 feet