

# Quadratic Word Problems

- ①  $x$  = 1st number  $x+1$  = 2nd number

$$x(x+1) = 272$$

$$x^2 + x = 272$$

$$x^2 + x - 272 = 0$$

$$(x-16)(x+17) = 0$$

$$x-16=0 \quad x+17=0$$

$$x=16 \quad x=-17$$

$$\begin{array}{r} -272 \\ -16 \quad 17 \\ \hline 1 \end{array}$$

The numbers are  
16 & 17 and -17 & -16.

- ②  $x$  = 1st number  $x+2$  = 2nd even #

$$x(x+2) = 528$$

$$x^2 + 2x = 528$$

$$x^2 + 2x - 528 = 0$$

$$(x-22)(x+24) = 0$$

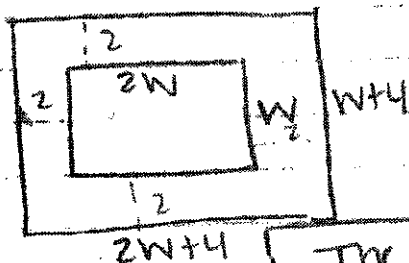
$$x-22=0 \quad x+24=0$$

$$x=22 \quad x=-24$$

$$\begin{array}{r} -528 \\ -22 \quad 24 \\ \hline 1 \end{array}$$

The numbers  
are 22 & 24  
and -24 & -22.

③



$$(2w+4)(w+4) - [w(2w)] = 196$$

$$2w^2 + 4w + 8w + 16 - 2w^2 = 196$$

$$12w + 16 = 196$$

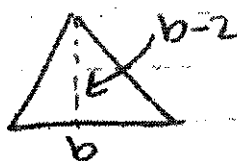
$$-16 \quad -16$$

$$12w = 180$$

$$w = 15$$

The dimensions  
are 15 ft x 30 ft.

④



$$\frac{1}{2}(b)(b-2) = 60$$

$$\left(\frac{1}{2}(b^2 - 2b)\right) = 60 \quad 2$$

$$b^2 - 2b = 120$$

$$b^2 - 2b - 120 = 0$$

$$(b-12)(b+10) = 0$$

$$b-12=0 \quad b+10=0$$

$$b=12 \quad b=-10$$

$$\begin{array}{r} -120 \\ -12 \quad 10 \\ \hline -2 \end{array}$$

Base is  
12mm and  
height is  
10mm

⑤  $x = 1st \#$   $x+1 = 2nd \text{ number}$

$$\begin{aligned} x(x+1) &= 210 \\ x^2 + x &= 210 \\ x^2 + x - 210 &= 0 \\ (x-14)(x+15) &= 0 \\ x-14=0 & \quad x+15=0 \\ x=14 & \quad x=-15 \end{aligned}$$

$$\begin{array}{r} -210 \\ -14 \quad 15 \\ 1 \end{array}$$

The numbers  
are 14 + 15  
and -15 + -14

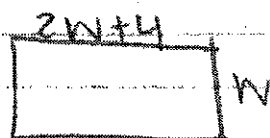
⑥  $x = 1st \#$

$$\begin{aligned} x + x^2 &= 156 \\ x^2 + x - 156 &= 0 \\ (x-12)(x+13) &= 0 \\ x-12=0 & \quad x+13=0 \\ x=12 & \quad x=-13 \end{aligned}$$

$$\begin{array}{r} -156 \\ -12 \quad 13 \\ 1 \end{array}$$

The numbers  
are 12  
or -13

⑦



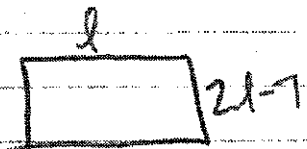
$$\begin{aligned} w(2w+4) &= 48 \\ 2w^2 + 4w &= 48 \\ 2w^2 + 4w - 48 &= 0 \end{aligned}$$

$$\begin{array}{r} -24 \\ 6 \quad -4 \\ 2 \end{array}$$

The dimensions  
are 4 ft + x  
12 ft.

$$\begin{aligned} w^2 + 2w - 24 &= 0 \\ (w+6)(w-4) &= 0 \\ w+6=0 & \quad w-4=0 \\ w=-6 & \quad w=4 \end{aligned}$$

⑧



$$\begin{aligned} l(2l-7) &= 30 \\ 2l^2 - 7l &= 30 \\ 2l^2 - 7l - 30 &= 0 \\ (l-6)(2l+5) &= 0 \\ l-6=0 & \quad 2l+5=0 \\ l=6 & \quad 2l=-5 \end{aligned}$$

$$\begin{array}{r} -60 \\ -6 \quad -12 \\ 2 \quad -5 \end{array}$$

6 cm x  
5 cm

⑨  $X = \text{number}$   
 $\frac{4X^2}{4} = \frac{20X}{4}$

The number  
is 0 or 5

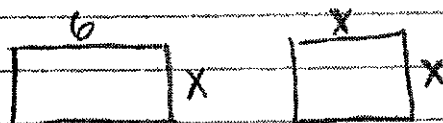
$X^2 = 5X$   
 $X^2 - 5X = 0$   
 $X(X-5) = 0$   
 $X = 0 \quad X - 5 = 0$   
 $X = 5$

⑩  $X = \text{side length}$   
 $X^2 = 5(4X)$

The side length  
is 20 units

$X^2 = 20X$   
 $X^2 - 20X = 0$   
 $X(X-20) = 0$   
 $X = 0 \quad X = 20$

⑪

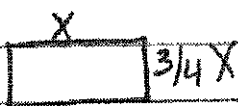


$6X = 2X^2$

$3X = X^2$   
 $0 = X^2 - 3X$   
 $0 = X(X-3)$   
 $X = 0 \quad X - 3 = 0$   
 $X = 3$

The dimensions  
of square is 3in x 3in  
and rectangle is  
3in x 6in.

⑫



$X(3/4 X) = 108$   
 $(3/4 X^2 = 108) \cdot 4$   
 $3X^2 = 432$

12 m x  
9 m.

$X^2 = 144$   
 $X^2 - 144 = 0$   
 $(X-12)(X+12) = 0$

$X - 12 = 0 \quad X + 12 = 0$   
 $X = 12 \quad X = -12$

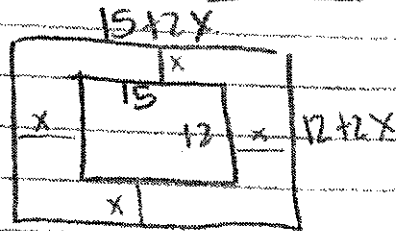
$$\begin{array}{r} 3 \\ 7 \times 5 \\ 2 \end{array}$$

(13)  $y = 1st \#$   $x+1 = 2nd \#$

$$\begin{aligned} x^2 + 2(x+1) &= 37 \\ x^2 + 2x + 2 &= 37 \\ x^2 + 2x - 35 &= 0 \\ (x+7)(x-5) &= 0 \\ x+7=0 & \quad x-5=0 \\ x=-7 & \quad \boxed{x=5} \end{aligned}$$

The #s are  
5 and 6

(14)



$$-3 = \frac{-6}{2} \times \frac{33}{2}$$

The path is 3m.

$$(2x+12)(2x+15) = 378$$

$$4x^2 + 30x + 24x + 180 = 378$$

$$-378 \quad -378$$

$$4x^2 + 54x - 198 = 0$$

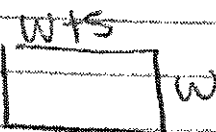
$$2x^2 + 27x - 99 = 0$$

$$(x-3)(2x+33) = 0$$

$$x-3=0 \quad 2x+33=0$$

$$\boxed{x=3} \quad 2x = -33$$

(15)



5 ft  $\times$  10 ft

$$w(w+5) = 300$$

$$w^2 + 5w - 300 = 0$$

$$(w-15)(w+20) = 0$$

$$w-15=0 \quad w+20=0$$

$$\boxed{w=15} \quad w = -20$$

$$\begin{array}{r} 300 \\ -15 \times 20 \\ 5 \end{array}$$

(16)



5 ft  $\times$  20 ft

$$w(w+15) = 100$$

$$w^2 + 15w - 100 = 0$$

$$(w+20)(w-5) = 0$$

$$w+20=0 \quad w-5=0$$

$$w = -20 \quad \boxed{w=5}$$

$$\begin{array}{r} 100 \\ 20 \times -5 \\ 15 \end{array}$$

(17)



$$w(2w+5) = 250$$

$$2w^2 + 5w = 250$$

$$2w^2 + 5w - 250 = 0$$

$$(2w+25)(w-10) = 0$$

$$w-10=0 \quad 2w+25=0$$

$$\boxed{w=10} \quad 2w = -25$$

10 ft  $\times$  25 ft

$$\begin{array}{r} -500 \\ 25 \times -20 \\ 5 \end{array}$$