

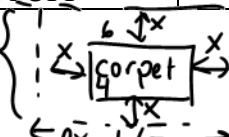
Did You Hear About ...

A THE	B CROOKED	C FURNITURE	D DEALER
E WHO	F BUYS	G HOT	H WATERBEDS ?

Solve each problem below. Find your answer in the answer column and notice the word next to it. Write this word in the box containing the letter of that exercise. Keep working and you will hear about something hot.

- A. The length of a rectangle is 3 cm more than the width. The area is 70 cm^2 . Find the dimensions of the rectangle.
- $70 = x(x+3)$
 $70 = x^2 + 3x$
 $0 = x^2 + 3x - 70$
 $0 = (x-7)(x+10)$
 $x-7=0 \Rightarrow x=7$
 $x+10=0 \Rightarrow x=-10$
 $\therefore \text{Length} = 10$
 $\text{Width} = 7$
- B. The length of a rectangle is 4 cm more than the width. The area is 96 cm^2 . Find the dimensions of the rectangle.
- $96 = x(x+4)$
 $96 = x^2 + 4x$
 $0 = x^2 + 4x - 96$
 $0 = (x-8)(x+12)$
 $x-8=0 \Rightarrow x=8$
 $x+12=0 \Rightarrow x=-12$
 $\therefore \text{Length} = 12$
 $\text{Width} = 8$
- C. The length of a photograph is 1 cm less than twice the width. The area is 45 cm^2 . Find the dimensions of the photograph.
- $45 = x(2x-1)$
 $45 = 2x^2 - x$
 $0 = 2x^2 - x - 45$
 $0 = 2x^2 - 10x + 9x - 45$
 $0 = 2x(x-5) + 9(x-5)$
 $0 = (2x+9)(x-5)$
 $x-5=0 \Rightarrow x=5$
 $2x+9=0 \Rightarrow x=-4.5$
 $\therefore \text{Length} = 9$
 $\text{Width} = 5$
- D. If the sides of a square are increased by 3 m, the area becomes 64 m^2 . Find the length of a side of the original square.
- $64 = (x+3)^2$
 $64 = x^2 + 6x + 9$
 $0 = x^2 + 6x - 55$
 $0 = (x-5)(x+11)$
 $x-5=0 \Rightarrow x=5$
 $x+11=0 \Rightarrow x=-11$
 $\therefore \text{Length} = 5$
 $\text{Width} = 5$
- E. A square field had 5 m added to its length and 2 m added to its width. The field then had an area of 130 m^2 . Find the length of a side of the original field.
- $130 = (x+5)(x+2)$
 $130 = x^2 + 7x + 10$
 $0 = x^2 + 7x - 120$
 $0 = (x-8)(x+15)$
 $x-8=0 \Rightarrow x=8$
 $x+15=0 \Rightarrow x=-15$
 $\therefore 8 \text{ m}$
- F. The dimensions of a rectangular garden were 4 m by 5 m. Each dimension was increased by the same amount. The garden then had an area of 56 m^2 . Find the dimensions of the new garden. (Hint: Let x be the amount of increase).
- $56 = (x+4)(x+5)$
 $56 = x^2 + 9x + 20$
 $0 = x^2 + 9x - 36$
 $0 = (x-3)(x+12)$
 $x-3=0 \Rightarrow x=3$
 $x+12=0 \Rightarrow x=-12$
 $\therefore \text{Length} = 8$
 $\text{Width} = 7$
- G. The dimensions of a rectangular garden were 3 m by 10 m. When both dimensions were increased by equal amounts, the area of the garden doubled. Find the dimensions of the new garden.
- $60 = (x+3)(x+10)$
 $60 = x^2 + 13x + 30$
 $0 = x^2 + 13x - 30$
 $0 = (x-2)(x+15)$
 $x-2=0 \Rightarrow x=2$
 $x+15=0 \Rightarrow x=-15$
 $\therefore \text{Length} = 12$
 $\text{Width} = 5$
- H. A 4 m by 6 m rug covers half of the floor area of a room and leaves a uniform strip of bare floor around the edges. What are the dimensions of the room?

6m - THAT	6 5 m by 12 m - HOT	7 7 cm by 10 cm - THE	8 8 cm by 11 cm - CHAIRS	E 8 m - WHO
4 cm by 7 cm - GUY	D 5 m - DEALER	9 7 m by 9 m - PILLOWS	B 8 cm by 12 cm - CROOKED	F 7 m by 8 m - BUYS
5 m by 6 m - STUFF	C 6 m by 8 m - WATERBEDS	8 8 m by 9 m - SELLS	7 7 m by 14 m - TABLES	C 5 cm by 9 cm - FURNITURE

$2x+4$ 

$48 = (2x+6)(2x+4)$
 $48 = 2(x+3)2(x+2)$
 $48 = 4(x+3)(x+2)$
 $12 = (x+3)(x+2)$
 $12 = x^2 + 5x + 6$
 $0 = x^2 + 5x - 6$
 $0 = (x-1)(x+6)$
 $x-1=0 \Rightarrow x=1$
 $x+6=0 \Rightarrow x=-6$
 $\therefore \text{Length} = 12$
 $\text{Width} = 6$

Page 1 of 2

1. The height of a football kicked from the ground is given by the equation $h = -4t^2 + 20t$, where h is the height in metres and t is the time in seconds from its release.
 - a. When will the football hit the ground?
 - b. For how long is the ball above 16m?
2. The height of water, h , in metres, from a garden hose is given by $h = -5t^2 + 15t$, where t is time in seconds. Determine how long the water is in the air.
3. A ball is thrown into the water from a cliff that is 175m high. The height of the ball above the water after it is thrown is modelled by $h = -5t^2 + 10t + 175$, where h is the height in metres and t is in seconds.
 - a. When will the ball hit the water below the cliff?
 - b. When will the ball reach a ledge that is 100m above the water?
4. A model rocket is launched from the ground. The height, h , in metres, at any time, t , in seconds, is described by $h = 30t - 5t^2$.
 - a. When will the rocket hit the ground?
 - b. At what times is the rocket at 25m?
5. The width of a rectangle is 16 feet less than 3 times the length. If the area is 35 square feet, find the dimensions of the rectangle.
6. The width of a rectangle is 15 cm. less than 3 times the length. If the area is 42 square cm. find the dimensions of the rectangle.
- 7. A garden measuring 12 meters by 16 meters is to have a pedestrian pathway installed all around it, increasing the total area to 285 square meters. What will be the width of the pathway?
8. Find the dimensions of a rectangle with an area of 10 square feet if its length is 8 feet more than 2 times its width.

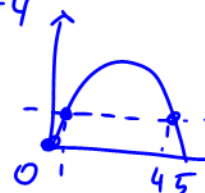
Answers:

- | | | | | | |
|----------------|---------------|-------------|-----------|----------------|-----------|
| 1a. 5 sec | b. 3 sec | 2. 3 sec | 3a. 7 sec | b. 5 sec | 4a. 6 sec |
| b. 1 and 5 sec | 5. 7 ft, 5 ft | 6. 7ft, 6ft | 7. 1.5 m | 8. 10 ft, 1 ft | |

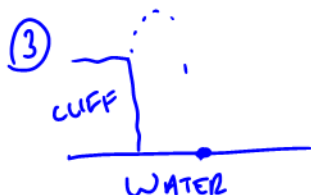
1. The height of a football kicked from the ground is given by the equation $h = -4t^2 + 20t$, where h is the height in metres and t is the time in seconds from its release.
 - a. When will the football hit the ground?
 - b. For how long is the ball above 16m?
2. The height of water, h , in metres, from a garden hose is given by $h = -5t^2 + 15t$, where t is time in seconds. Determine how long the water is in the air.
3. A ball is thrown into the water from a cliff that is 175m high. The height of the ball above the water after it is thrown is modelled by $h = -5t^2 + 10t + 175$, where h is the height in metres and t is in seconds.
 - a. When will the ball hit the water below the cliff?
 - b. When will the ball reach a ledge that is 100m above the water?

① a. $0 = -4t^2 + 20t$ GCF = $-4t$
 $0 = -4t(t-5)$
 $-4t = 0$ $t-5 = 0 \therefore 5 \text{ sec}$
 $t = 0$ $t = 5$

b. $16 = -4t^2 + 20t$
 $0 = -4t^2 + 20t - 16$ GCF = -4
 $0 = -4(t^2 - 5t + 4)$
 $0 = -4(t-1)(t-4)$
 $t = 1$ $t = 4$
 $\therefore 3 \text{ sec.}$



② $0 = -5t^2 + 15t$ GCF = $-5t$
 $0 = -5t(t-3)$
 $-5t = 0$ $t-3 = 0 \therefore 3 \text{ sec.}$
 $t = 0$ $t = 3$



a. $0 = -5t^2 + 10t + 175$ GCF = -5
 $0 = -5(t^2 - 2t - 35)$
 $0 = -5(t+5)(t-7)$
 $t+5 = 0$ $t-7 = 0$
 $t = -5$ $t = 7$

b. $100 = -5t^2 + 10t + 175$
 $0 = -5t^2 + 10t + 75$
 $0 = -5(t^2 - 2t - 15)$
 $0 = -5(t+3)(t-5)$
 $t+3 = 0$ $t-5 = 0$
 $t = -3$ $t = 5$
 $\therefore 5 \text{ sec.}$

4. A model rocket is launched from the ground. The height, h , in metres, at any time, t , in seconds, is described by $h = 30t - 5t^2$.
 - a. When will the rocket hit the ground?
 - b. At what times is the rocket at 25m?

5. The width of a rectangle is 16 feet less than 3 times the length. If the area is 35 square feet, find the dimensions of the rectangle.

6. The width of a rectangle is 15 cm. less than 3 times the length. If the area is 42 square cm. find the dimensions of the rectangle.

7. A garden measuring 12 meters by 16 meters is to have a pedestrian pathway installed all around it, increasing the total area to 285 square meters. What will be the width of the pathway?

8. Find the dimensions of a rectangle with an area of 10 square feet if its length is 8 feet more than 2 times its width.

4. a. $0 = 30t - 5t^2$ GCF = $-5t$

$$0 = -5t(-6 + t)$$

$$t = 0 \quad \boxed{t = 6}$$

$$\therefore 6 \text{ sec.}$$

b. $25 = 30t - 5t^2$

$$0 = -5t^2 + 30t - 25 \quad \text{GCF} = -5$$

$$0 = -5(t^2 - 6t + 5)$$

$$0 = -5(t-1)(t-5)$$

$$t = 1 \quad t = 5$$

$$\therefore 5 - 1 = 4 \text{ sec.}$$

5. $\boxed{A = 35} \quad 3x - 16$

$$35 = x(3x - 16)$$

$$35 = 3x^2 - 16x$$

$$0 = 3x^2 - 16x - 35$$

$$0 = 3x^2 - 21x + 5x - 35$$

$$0 = 3x(x-7) + 5(x-7)$$

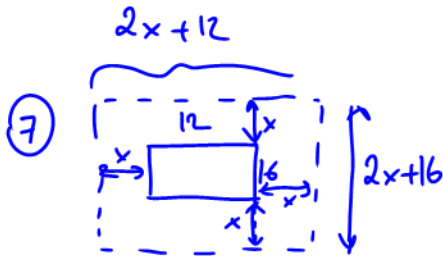
$$0 = (x-7)(3x+5)$$

$$\boxed{x = 7} \quad x = -5/3$$

M	A	N
-105	-16	+5, -21

$$\therefore \boxed{7} \quad 3(7) - 16 = 5$$

$$\boxed{7} \quad 5$$



$$285 = (2x+12)(2x+16)$$

$$0 = 4x^2 + 32x + 24x + 192 - 285$$

$$0 = 4x^2 + 56x - 93 \rightarrow \text{graph it}$$

$$\boxed{x = 1.5}$$