

2. A harbour ferry service has about 240 000 riders per day for a fare of \$2. The port authority wants to increase the fare to help with increasing operational costs. Research has shown that for every \$0.10 increase in the fare the number of riders will drop by 10 000.
- What increase in the fare will maximize the revenue?
 - What is the new fare?
 - What is the revenue that will be received from the new fare?
12. A rectangle's length is 4 m more than double its width. Find the length and the width if the diagonal of the rectangle measures 26 m.
13. The area of the front cover of a book is 273 cm^2 and the length is 8 cm greater than the width. What are the dimensions of the cover?
15. The height of a triangle is 2 cm more than the base. The area of the triangle is 10 cm^2 . Find the base, to the nearest hundredth of a centimetre.
16. A garden against the wall of a house is to be surrounded on three sides by a total of 336 m of fencing. What dimensions of the garden will result in an area of $14\,112 \text{ m}^2$?
19. Need-a-Ride is a car rental agency that rents 400 cars a week at \$80 per car. Industry research has shown that for every \$2 increase in rental price, an agency will rent eight fewer cars.
- Total revenue is the product of the price per rental and the number of vehicles rented. Write an expression to represent the revenue for the rental agency.
 - Find the maximum revenue.
 - For this revenue, how many cars are rented and how much is the rental price per car?

#2. let x rep # of \$0.10 increases

$$R = \text{cost} \times \# \text{ of rides}$$

$$R = (2 + 0.10x)(240000 - 10000x)$$

Find x -ints to find AOS:

$$0 = (2 + 0.10x)(240000 - 10000x)$$

$$\textcircled{1} 2 + 0.10x = 0$$

$$2 = -0.10x$$

$$-20 = x$$

$$\textcircled{2} 240000 - 10000x = 0$$

$$240000 = 10000x$$

$$24 = x$$

$$\text{AOS: } x = \frac{-20 + 24}{2}$$

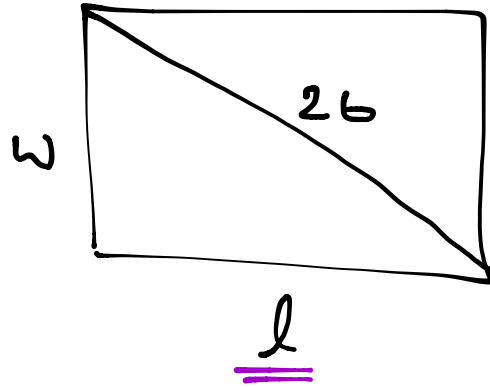
$$x = 2 \leftarrow \# \text{ of increases}$$

\therefore a) 2 increases of \$0.10, \therefore \$0.20

$$\text{b) New fare } 2 + 0.10(2) \\ = 2.20$$

$$\text{c) } R = (2 + 0.10(2))(240000 - 10000(2)) \\ = \$484000$$

$$\#12. \quad \underline{l} = 2w + 4$$



$$l^2 + w^2 = 26^2$$

$$(2w + 4)^2 + w^2 = 676$$

$$4w^2 + 16w + 16 + w^2 = 676$$

$$5w^2 + 16w + 16 - 676 = 0$$

$$5w^2 + 16w - 660 = 0 \quad \underline{\text{Quad. Formula}}$$

$$\cancel{w = -13.2} \quad \text{or } w = 10 \quad \therefore w = 10$$

$$\begin{aligned} \& l &= 2(10) + 4 \\ & &= 24. \end{aligned}$$

$$\#13 \quad A = l \times w \quad \& \quad l = w + 8$$

$$\therefore 273 = (w+8)w$$

↑
not 0 \therefore expand.



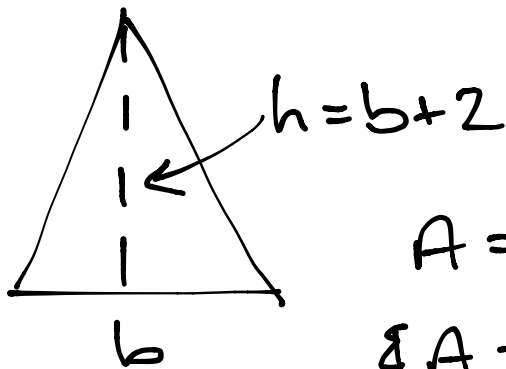
$$273 = w^2 + 8w$$

$$0 = w^2 + 8w - 273 \leftarrow \text{Quad. Form.}$$

$$~~w = -21~~ \quad \text{or } w = 13 \quad \therefore \underline{\underline{w = 13}}$$

$$\& \quad \begin{aligned} l &= 13 + 8 \\ &= \underline{\underline{21}} \end{aligned}$$

#15.



$$A = 10$$

$$A = \frac{b \times h}{2}$$

$$10 = \frac{b(b+2)}{2}$$

$$10 = \frac{b^2 + 2b}{2}$$

$$20 = b^2 + 2b$$

$$0 = b^2 + 2b - 20$$

Quadratic Formula

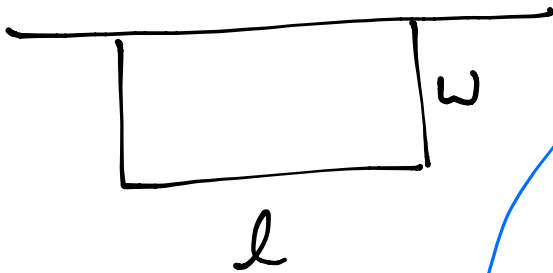
$$~~b = -5.58~~ \text{ or } b = 3.58$$

$$\therefore \text{base is } 3.58$$

$$\& \ h = 3.58 + 2$$

$$\therefore \text{height is } 5.58.$$

#16



$$l \times w = 14112$$

$$2w + l = 336$$

$$\rightarrow l = 336 - 2w$$

$$\rightarrow (336 - 2w) \cdot w = 14112$$

$$336w - 2w^2 = 14112$$

$$-2w^2 + 336w - 14112 = 0$$

$$\text{Quad Form : } \underline{\underline{w = 84m}}$$

$$\& \quad l = 336 - 2w$$

$$= 336 - 2(84)$$

$$\underline{\underline{l = 168m}}$$

↑
not 0
∴ expand.

#19 let x rep # of \$2 increases

a)

$$R = (80 + 2x)(400 - 8x)$$

cost # of cars.

b)

To find max need x -ints.

$$0 = (80 + 2x)(400 - 8x)$$

$$80 + 2x = 0$$

$$x = -40$$

$$400 - 8x = 0$$

$$x = 50$$

Ans: $x = \frac{-40 + 50}{2}$

$$x = 5 \quad \therefore 5 \text{ increases}$$

of \$2 each

$$\& R = (80 + 2(5))(400 - 8(5))$$

$$= (90)(360)$$

$$= 32400 \leftarrow \text{max revenue}$$

c) cars: $400 - 8(5)$ price: $80 + 2(5)$

$$= 360$$

$$= \$90$$