

Name: _____

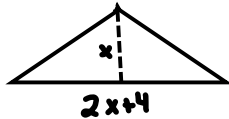
Show work needed to justify your answer.

Date: _____

HW: # 13: Math IBSL - Standard 13 - Applications of Quadratics

5 points

- 1 The length of the base of a triangle is four more than twice the height. The area of the triangle is 24 m^2 . Find the lengths of the base and height of the triangle.



$$A = \frac{1}{2}bh$$

$$\frac{1}{2}(2x+4)(x) = 24$$

$$x(x+2) = 24$$

$$x^2 + 2x - 24 = 0$$

$$(x+6)(x-4) = 0$$

$$x = \cancel{6} \quad x = 4$$

$$b = 12$$

$$h = 4$$

- 3 A bus transports people from an airport to a city centre. It transports 800 people a day at a cost of €5.50 per person. Research has shown that for every decrease of €0.05 in the fare, 10 more people will ride the bus.

Suppose there have been x decreases of €0.05 below the initial cost of €5.50.

- Find an expression, in terms of x , for the bus fare.
- Find an expression, in terms of x , for the number of people who ride the bus in a day.
- Find an expression, in terms of x , for the daily revenue generated by people riding the bus.
- Find the number of fare decreases that result in a revenue of €4500.
- Find an appropriate domain for this context.

a. $5.5 - 0.05x$

b. $800 + 10x$

c. $r(x) = (5.5 - 0.05x)(800 + 10x)$
 $r(x) = 4400 + 15x - 0.5x^2$

d. $4500 = 4400 + 15x - 0.5x^2$
 $0.5x^2 - 15x + 100 = 0$

$$x = \frac{15 \pm \sqrt{15^2 - 4(0.5)(100)}}{2(0.5)}$$

$$x = \frac{15 \pm \sqrt{225 - 200}}{1} \rightarrow x = 15 \pm 5 \rightarrow \boxed{x=10} \text{ or } \boxed{x=20}$$

e. $-0.5x^2 + 15x + 4400 = 0$

$$x = \frac{-15 \pm \sqrt{225 + 8800}}{-1} \rightarrow x = \frac{-15 \pm 95}{-1} \rightarrow \begin{matrix} x = 110 \\ x = \cancel{25} \end{matrix}$$

$$\text{Domain: } [0, 110]$$

