

1. John drops a stone out of his second story window which is 18 feet above the ground. How long will it take the stone to hit the ground?

$$h(t) = h_0 - 16t^2$$

$$0 = 18 - 16t^2$$

$$-18 = -16t^2$$

$$\sqrt{\frac{18}{16}} = \sqrt{t^2} \rightarrow 1.06 \text{ sec} = t$$

2. Burj Khalifa in Dubai is currently the tallest tower in the world. If you dropped a penny off the very top of this 2,717 foot sky scraper, how far above the ground will the penny be after 4 seconds? How long would it take to reach the ground? Round your answers to the nearest tenth.

$$h(t) = h_0 - 16t^2$$

$$h(4) = 2717 - 16(4)^2$$

$$h(4) = 2461 \text{ ft}$$

$$0 = 2717 - 16t^2$$

$$\sqrt{\frac{-2717}{-16}} = \sqrt{t^2}$$

$$13.03 \text{ sec} = t$$

3. Jane has 100 meters of fencing. She wants to enclose a rectangular exercise run for her dog. What dimensions will give the enclosure the maximum area? What is the maximum area?

$$P = 2x + 2y = 100$$

$$2y = 100 - 2x$$

$$y = 50 - x$$

$$A = xy$$

$$A = x(50 - x)$$

$$A = 50x - x^2$$

$$A = -x^2 + 50x$$

$$x = \frac{-b}{2a} = \frac{-50}{2(-1)} = 25$$

$$2(25) + 2y = 100$$

$$2y = 50$$

$$y = 25$$

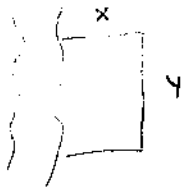
$$x = 25 \text{ ft}$$

$$y = 25 \text{ ft}$$

$$A = (25)(25)$$

$$A = 625 \text{ ft}^2$$

4. You have 120 feet of fencing to enclose a rectangular plot that borders on a river. If you do not fence the side along the river, find the length and width of the plot that will maximize the area. What is the largest area that can be enclosed?



$$P = 2x + y = 120$$

$$y = 120 - 2x$$

$$A = xy$$

$$A = x(120 - 2x)$$

$$A = 120x - 2x^2$$

$$A = -2x^2 + 120x$$

$$y = 120 - 2(30)$$

$$y = 60$$

$$x = \frac{-b}{2a} = \frac{-120}{2(-2)} = 30$$

$$x = 30 \text{ ft}$$

$$y = 60 \text{ ft}$$

$$A = 30(60) = 1800 \text{ ft}^2$$

5. Morgan's Department store wants to construct a rectangular parking lot on the land bordered on one side by a high way. They have budgeted for 280 feet of fencing that is to be used to fence off the other three sides. What should be the dimensions of the lot to maximize the area? What is the maximum area?



$$P = 2x + y = 280$$

$$y = 280 - 2x$$

$$A = xy$$

$$A = x(280 - 2x)$$

$$A = 280x - 2x^2$$

$$A = -2x^2 + 280x$$

$$y = 280 - 2(70)$$

$$y = 140$$

$$x = \frac{-b}{2a} = \frac{-280}{-2(2)} = 70$$

$$x = 70 \text{ ft}$$

$$y = 140 \text{ ft}$$

$$A = 9800 \text{ ft}^2$$