Math 098 Worksheet7.5B_ApplicationsFindingMaxMinOfQuadraticFunctions_v01
NO BOOK/ NO NOTES/YES CALCUATOR
Fall 2017 Dressler

Name_____

Use the coordinates of the vertex to solve the problem. Round your answer to the nearest tenth, if necessary.

1) The cost, in millions of dollars, for a company to manufacture x thousand automobiles is given by the function $C(x) = 3x^2 - 30x + 225$. Find the number of automobiles that must be produced to minimize cost.

2) The cost, in millions of dollars, for a company to manufacture x thousand automobiles is given by the function $C(x) = 4x^2 - 24x + 72$. Find the number of automobiles that must be produced to minimize cost.

3) The profit that the vendor makes per day by selling x pretzels is given by the function $P(x) = -0.004x^2 + 2.8x - 200$. Find the number of pretzels that must be sold to maximize profit.

4) The profit that the vendor makes per day by selling x pretzels is given by the function $P(x) = -0.004x^2 + 2.4x - 100$. Find the number of pretzels that must be sold to maximize profit.

5) A projectile is fired from a cliff 100 feet above the water. The height h of the projectile above the water is given by $h = -\frac{32x^2}{(360)^2} + x + 100$, where x is the horizontal distance of the projectile from the base of the cliff. Find the maximum height of the projectile.

6) A projectile is fired from a cliff 500 feet above the water. The height h of the projectile above the water is given by $h = -\frac{32x^2}{(200)^2} + x + 500$, where x is the horizontal distance of the projectile from the base of the cliff. Find the maximum height of the projectile.

7) An arrow is fired into the air with an initial velocity of 160 feet per second. The formula
$$y = -16x^2 + 160x$$
models the arrow's height above the ground, y, in feet, x seconds after it was shot into the air. When does the arrow reach its maximum height? What is that height?

8) An arrow is fired into the air with an initial velocity of 128 feet per second. The formula
$$y = -16x^2 + 128x$$
models the arrow's height above the ground, y, in feet, x seconds after it was shot into the air. When does the arrow reach its maximum height? What is that height?

Solve.

9) A projectile is thrown upward so that its distance, in feet, above the ground after t seconds is $h = -15t^2 + 450t$. What is its maximum height?

10) A projectile is thrown upward so that its distance, in feet, above the ground after t seconds is $h = -13t^2 + 520t$. What is its maximum height?

11) A projectile is thrown upward so that its distance above the ground after t seconds is $h = -13t^2 + 390t$. After how many seconds does it reach its maximum height?

12) A projectile is thrown upward so that its distance above the ground after t seconds is $h = -14t^2 + 448t$. After how many seconds does it reach its maximum height?

13) John owns a hotdog stand. He has found that his profit is represented by the equation $P = -x^2 + 64x + 82$, with P being the profit in dollars, and x the number of hotdogs sold. How many hotdogs must he sell to earn the most profit?

14) Bob owns a watch repair shop. He has found that the cost of operating his shop is given by $c = 4x^2 - 336x + 75$, where c is the cost in dollars, and x is the number of watches repaired. How many watches must he repair to have the lowest cost?

15) Which of the pairs of numbers whose sum is 74 has the largest product?

16) Which of the pairs of numbers whose sum is 86 has the largest product?

17) Which of the pairs of numbers whose sum is 72 has the largest product?

18) The length and width of a rectangle have a sum of 78. What dimensions give the maximum area?

19) The length and width of a rectangle have a sum of 72. What dimensions give the maximum area?

20) The length and width of a rectangle have a sum of 84. What dimensions give the maximum area?

21) What is the maximum product of two positive numbers whose sum is 48?

22) What is the maximum product of two positive numbers whose sum is 40?

23) What is the maximum product of two positive numbers whose sum is 18?

24) What is the maximum product of two positive numbers whose sum is 84?

25) What is the minimum product of two numbers whose difference is 58?

26) What is the minimum product of two numbers whose difference is 62?

27) A gardener is fencing off a rectangular area with a fixed perimeter of 64 ft. What is the maximum area?

28) A gardener is fencing off a rectangular area with a fixed perimeter of 84 ft. What is the maximum area?

29) Which of the pairs of numbers whose sum is 86 has the largest product?

30) The length and width of a rectangle have a sum of 82. What dimensions give the maximum area?

31) What is the minimum product of two numbers whose difference is 78?

32) What is the maximum product of two positive numbers whose sum is 70?

33) What is the minimum product of two numbers whose difference is 64?

34) A gardener is fencing off a rectangular area with a fixed perimeter of 112 ft. What is the maximum area?

35) The length and width of a rectangle have a sum of 70. What dimensions give the maximum area?

36) A projectile is thrown upward so that its distance above the ground after t seconds is $h = -14t^2 + 588t$. After how many seconds does it reach its maximum height?

37) John owns a hotdog stand. He has found that his profit is represented by the equation $P = -x^2 + 68x + 83$, with P being the profit in dollars, and x the number of hotdogs sold. How many hotdogs must he sell to earn the most profit?

1) 5 thousand automobiles
2) 3 thousand automobiles
3) 350 pretzels
4) 300 pretzels
5) 1112.5 ft
6) 812.5 ft
7) 5 seconds; 400 feet
8) 4 seconds; 256 feet
9) 3375 ft
10) 5200 ft
11) 15 sec
12) 16 sec
13) 32 hotdogs
14) 42 watches
15) 37 and 37
16) 43 and 43
17) 36 and 36
18) Length 39 and width 39
19) Length 36 and width 36
20) Length 42 and width 42
21) 576
22) 400
23) 81
24) 1764
25) –841
26) –961
27) 256 ft^2
28) 441 ft^2
29) 43 and 43
30) Length 41 and width 41
31) –1521
32) 1225
33) –1024
34) 784 ft^2
35) Length 35 and width 35
36) 21 sec
37) 34 hotdogs