Math 098 Worksheet7.5B_ApplicationsFindingMaxMinOfQuadraticFunctions_v02
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 $C(x) = 3x^2 - 24x + 112$. 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 $C(x) = 3x^2 - 18x + 81$. 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 $P(x) = -0.002x^2 + 1.6x - 350$. 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 $P(x) = -0.002x^2 + 1.4x - 50$. Find the number of pretzels that must be sold to maximize profit.

5) A projectile is fired from a cliff 500 feet above the water. The height h of the projectile above the water is given by $h = -\dfrac{32x^2}{(50)^2} + x + 500$, where x is the horizontal distance of the projectile from the base of the cliff. Find the maximum height of the projectile.

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 $h = -\dfrac{32x^2}{(150)^2} + x + 500$, 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 96 feet per second. The formula
$$y = -16x^2 + 96x$$
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 $h = -13t^2 + 312t$. What is its maximum height?

10) A projectile is thrown upward so that its distance, in feet, above the ground after t seconds is $h = -11t^2 + 440t$. What is its maximum height?

11) A projectile is thrown upward so that its distance above the ground after t seconds is $h = -14t^2 + 532t$. 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 $h = -12t^2 + 336t$. 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 $P = -x^2 + 52x + 75$, 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 $c = 3x^2 - 264x + 46$, 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 90 has the largest product?

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

18) The length and width of a rectangle have a sum of 74. What dimensions give the maximum area?

19) The length and width of a rectangle have a sum of 90. What dimensions give the maximum area?

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

21) What is the maximum product of two positive numbers whose sum is 6?

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

23) What is the maximum product of two positive numbers whose sum is 100?

24) What is the maximum product of two positive numbers whose sum is 30?

25) What is the minimum product of two numbers whose difference is 88?

26) What is the minimum product of two numbers whose difference is 76?

27) A gardener is fencing off a rectangular area with a fixed perimeter of 120 ft. What is the maximum area?

28) A gardener is fencing off a rectangular area with a fixed perimeter of 20 ft. What is the maximum area?

29) Which of the pairs of numbers whose sum is 70 has the largest product?

30) The length and width of a rectangle have a sum of 80. What dimensions give the maximum area?

31) What is the minimum product of two numbers whose difference is 72?

32) What is the maximum product of two positive numbers whose sum is 80?

33) What is the minimum product of two numbers whose difference is 70?

34) A gardener is fencing off a rectangular area with a fixed perimeter of 56 ft. What is the maximum area?

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

36) A projectile is thrown upward so that its distance above the ground after t seconds is $h = -12t^2 + 432t$. 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 $P = -x^2 + 70x + 76$, 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) 4 thousand automobiles
2) 3 thousand automobiles
3) 400 pretzels
4) 350 pretzels
5) 519.5 ft
6) 675.8 ft
7) 3 seconds; 144 feet
8) 4 seconds; 256 feet
9) 1872 ft
10) 4400 ft
11) 19 sec
12) 14 sec
13) 26 hotdogs
14) 44 watches
15) 37 and 37
16) 45 and 45
17) 37 and 37
18) Length 37 and width 37
19) Length 45 and width 45
20) Length 39 and width 39
21) 9
22) 256
23) 2500
24) 225
25) –1936
26) –1444
27) 900 ft^2
28) 25 ft^2
29) 35 and 35
30) Length 40 and width 40
31) –1296
32) 1600
33) –1225
34) 196 ft^2
35) Length 42 and width 42
36) 18 sec
37) 35 hotdogs