Heritage High School

Algebra 1

Week 8: 5/26-6/1

Included in this packet:

Directions on Accessing Illuminate

Unit 9 Applications Assignment

Assignments to be submitted by 9:00 am on Monday, June 1:

Unit 9 Applications Assignment

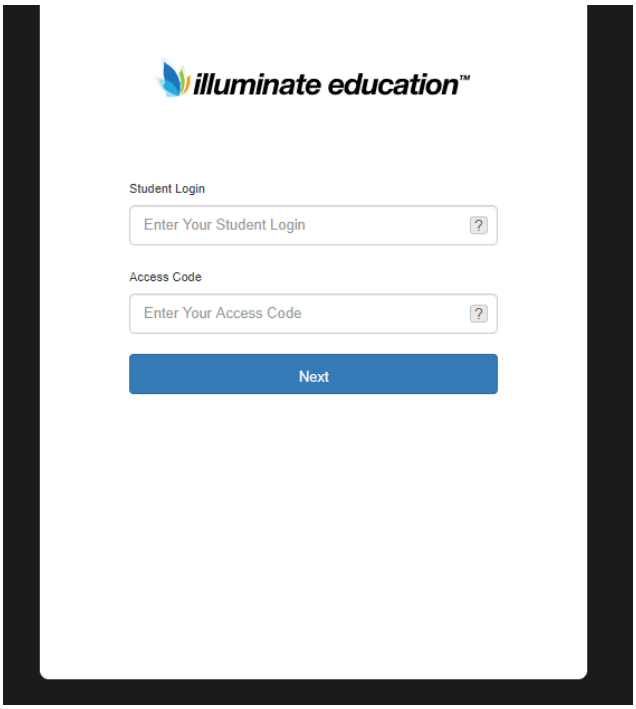
Little to No Technology Access- You may take a pic/scan your assignment and email it to your Algebra 1 teacher or drop it off at the Main Administration office.

Access to Technology- Please see directions on "Accessing Illuminate." The preferred method to complete your assignment is electronically through Illuminate.

Accessing Illuminate

In order to access the Unit 9 Applications Assignment please follow the steps below:

1) In your address bar type: illuminate.online
2) You should see the following:

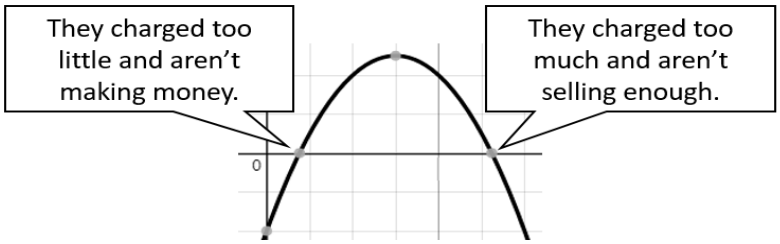


3) In “Student Login” enter your student ID number
4) In “Access Code” enter the code provided by your teacher
5) This will take you to the assignment- You can pause and return to the assignment up to 3 times
6) Be sure to click “Finish” when you are ready to submit

Unit 9 Distance Learning Applications

The profit, P (in thousands of dollars), that a company makes selling an item is a quadratic function of the price, x (in dollars), that they charge for the item. The following expressions for P(x) are equivalent:

$$P(x) = -3x^2 + 432x - 1680$$
$$P(x) = -3(x - 4)(x - 140)$$
$$P(x) = -3(x - 72)^2 + 13872$$



1) Which of the equivalent expressions for P(x) reveals *the price which gives a profit of zero* without changing the form of the expression?

a) $P(x) = -3x^2 + 432x - 1680$

b) $P(x) = -3(x - 4)(x - 140)$

c) $P(x) = -3(x - 72)^2 + 13872$

2) Find a price, which gives a profit of zero. _____

3) Which of the equivalent expressions for P(x) reveals *the profit when the price is zero* without changing the form of the expression?

a) $P(x) = -3x^2 + 432x - 1680$

b) $P(x) = -3(x - 4)(x - 140)$

c) $P(x) = -3(x - 72)^2 + 13872$

4) Find the profit when the price is zero. _____

5) Which of the equivalent expressions for P(x) reveals *the price which produces the highest possible profit* without changing the form of the expression?

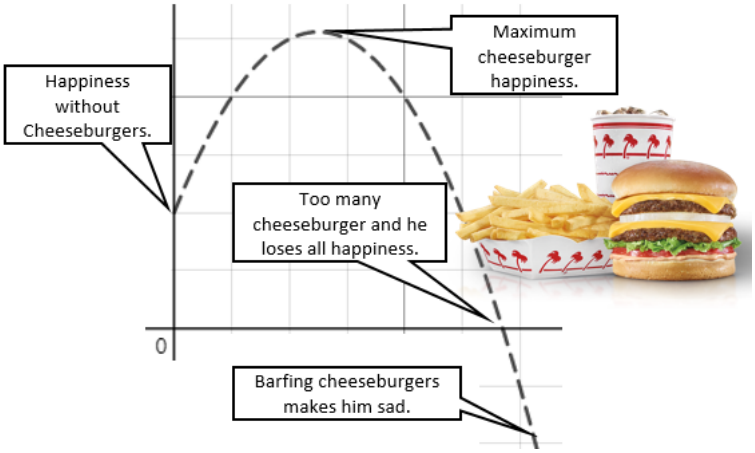
a) $P(x) = -3x^2 + 432x - 1680$

b) $P(x) = -3(x - 4)(x - 140)$

c) $P(x) = -3(x - 72)^2 + 13872$

6) Find the price, which gives the highest possible profit. _____

Your friend can eat a lot! Cheeseburgers from In-N-Out are his favorite, so he gets happy when he eats them, that is, until he eats too many! If you measured his happiness, h(x), based on how many cheeseburgers from In-N-Out he eats, x, you would get a curve modeled by the function: $h(x) = -1x^2 + 6x + 16$



7. Your friend wants to be as happy as possible. Which form of the equation would help you to identify how many cheeseburgers he should eat?
    a. Standard Form
    b. Vertex Form
    c. Factored (x-intercept) Form

Put it in that form and find out how many cheeseburgers he should eat to be the most happy.

8. Equation in that form: $h(x) =$ _____

9. Number of Cheeseburgers: _____

10. Which form shows you what the y-intercept of this graph is?
    a. Standard Form
    b. Vertex Form
    c. Factored (x-intercept) Form

11. What is the y-intercept? _____

12. What does the y-intercept mean in context of this scenario? _____

13. Your friend does not want to become unhappy. What form of the equation would help you identify where he would be unhappy?
    a. Standard Form
    b. Vertex Form
    c. Factored (x-intercept) Form

14. Put it in that form to find out when your friend should stop eating cheeseburgers.
    $h(x) =$ _____

What would your friend's level of happiness be if he ate 10 cheeseburgers?

15. The happiness level is: _____

16. Explain how you figured it out. _____

The braking distance, in feet, of a car traveling at v miles per hour is given by

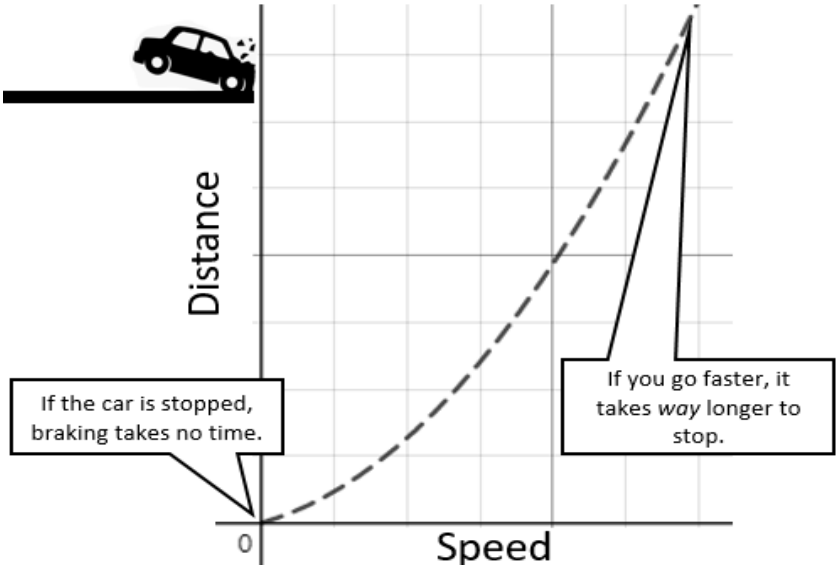
$$d = \frac{1}{20}v^2 + 2.2v$$

What is the braking distance, in feet, if the car is going:

17. 30 mph? _____

18. 60 mph? _____

19. 90 mph? _____



20. Suppose that the car took 500 feet to brake. Use your computations in questions 1 to make a **prediction** (estimate) about how fast it was going when the brakes were applied.

_____

21. Let us see how close your prediction is by solving this quadratic more precisely. Use any solving method you want (hint: plug 500 in for d and then solve using factoring, completing the square or the quadratic formula). Round your answer to 2 decimal places.

_____

Suppose $h(t) = -5t^2 + 10t + 3$ is the height of a diver above the water (in meters), t seconds after the diver leaves the springboard.

22. How high above the water is the springboard?

23. Explain how you know this.

24. When does the diver hit the water? (round answer to two decimal places)

25. At what time on the diver's descent toward the water is the diver again at the same height as the springboard?

26. When does the diver reach the peak of the dive?