

## Second example

*In this activity we give a second example.*

Here we have a multi-part question with free-response.

**Question 1** Suppose you are standing on a bridge that is 60 meters above sea-level. You toss a ball up into the air with an initial velocity of 30 meters per second. If  $t$  is the time (in seconds) after we toss the ball, then the height at time  $t$  is approximately  $f(t) = -5t^2 + 30t + 60$ . What does  $f(2)$  mean in our context?

**Hint:** We want an answer in the context of the problem.

**Free Response:** The value  $f(2)$  is the height of the ball after 2 seconds.

Now suppose  $t$  is such that  $f(t) = 100$ . What does this mean in our context?

**Hint:** We want an answer in the context of the problem.

**Free Response:** These value of  $t$  are the times when the ball is at 100 meters above sea level.

Finally, if  $h$  is a small positive value what is the meaning of  $f(t+h)$ ? How does this compare to the meaning of  $f(t) + h$ ?

**Hint:** We want an answer in the context of the problem.

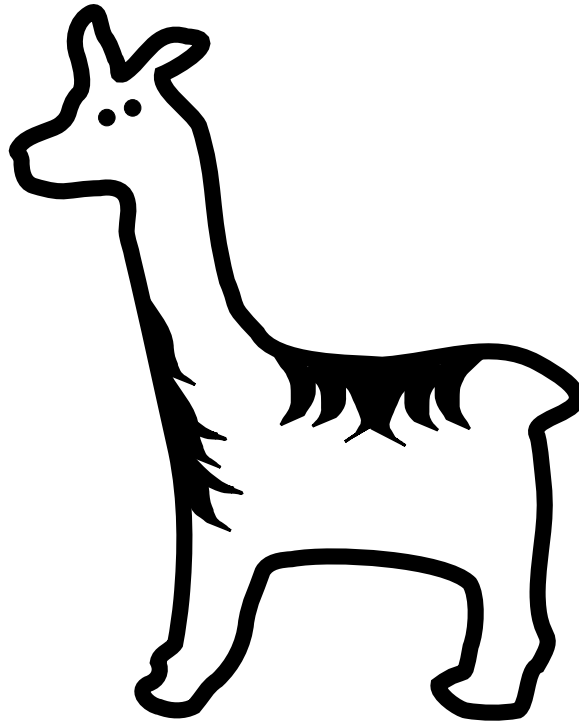
**Free Response:** The value  $f(t+h)$  gives the height of the ball slightly after time  $t$ . On the other hand, the value  $f(t) + h$  gives a height just higher than the ball at time  $t$ .

---

Here is a picture of a llama:

Learning outcomes: Understand a second example of the Ximera style. See how to include graphics.

Author(s):



If you like, check out this video YouTube link: <https://www.youtube.com/watch?v=0aQpLSu2fMs>.

Write a Python script that will compute factorial for you.

```
def honest_factorial(x):
    result = 1
    for i in range(1,x+1):
        result *= i
    return result

def verifier():
    for i in range(10,20):
        if factorial(i) != honest_factorial(i):
            raise "Your function failed for input " + str(i)
    return True
```