1.5 The Tortoise and The Hare

A Solidify Understanding Task

In the children's story of the tortoise and the hare, the hare mocks the tortoise for being slow. The tortoise replies, "Slow and steady wins the race." The hare says, "We'll just see about that," and challenges the tortoise to a race. The distance from the starting line of the hare is given by the function:

$$d = t^2 \; (d \text{ in meters and } t \text{ in seconds})$$

Because the hare is so confident that he can beat the tortoise, he gives the tortoise a 1 meter head start. The distance from the starting line of the tortoise including the head start is given by the function:

$$d = 2^t \; (d \text{ in meters and } t \text{ in seconds})$$

1. At what time does the hare catch up to the tortoise?

2. If the racecourse is very long, who wins: the tortoise or the hare? Why?

3. At what time(s) are they tied?

4. If the racecourse were 15 meters long who wins, the tortoise or the hare? Why?

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5.   Use the properties $d = 2^t$ and $d = t^2$ to explain the **speeds** of the tortoise and the hare in the following time intervals:

Interval	Tortoise $d = 2^t$	Hare $d = t^2$
[0, 2)		
[2, 4)		
[4 ,∞)		