What is the gradient of 'The Summit'? Page 1

The historic Mansfield and Pinxton Railway had to go uphill and downhill between Mansfield and Pinxton. At Kirkby there is a place called "The Summit", the highest point along the railway. When the horses had to pull the trucks all the way up the hill from Pinxton to The Summit, they would be very tired, but then, when they went down the hill, into Mansfield, it would have been very easy for them. In fact, the man walking at the side of the horses and wagons would probably have to keep putting the brakes on the wagons so that they didn't go too fast for the horses.

The steepness of the hill is measured in gradients. If you moved forward 100 metres up a hill and found that you were now 15 metres higher than when you started, the gradient would be written as: 15/100 or written as a decimal: 0.15. This means that you have climbed 15 metres high, but you had to walk 100 metres forward to get to that height.

What is the gradient of 'The Summit'? Page 2

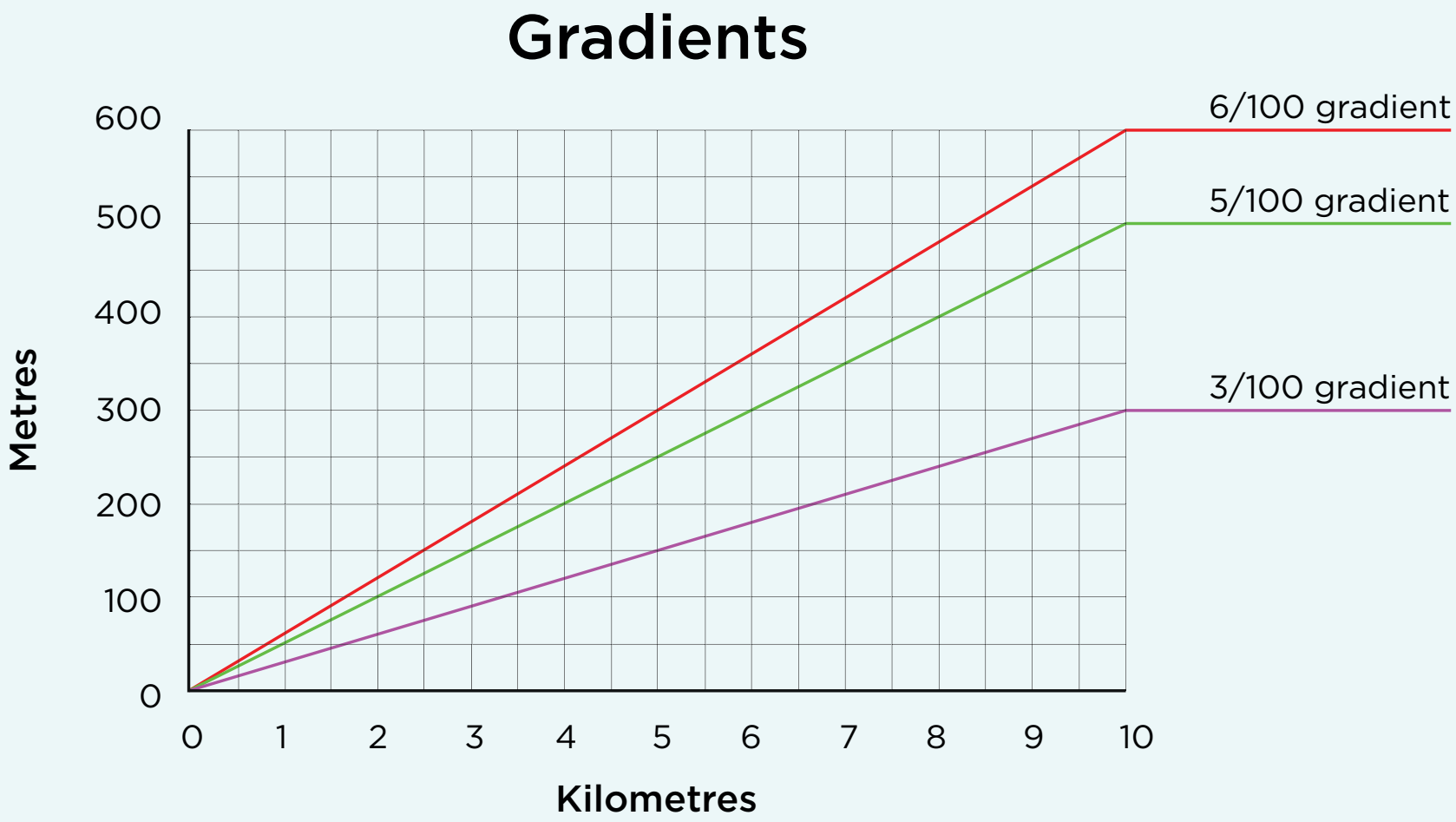
Now, try and answer the following questions:

A. If you are going up one hill and your friend is going up another hill, who will be the highest after walking 100 metres if your hill has a gradient of 3/100 (0.03) and your friend's hill has a gradient of 5/100 (0.05)?

B. You and your friend were at the top of a hill, but one side was steeper than the other. You both rolled a ball down the hill at the same time, one on one side of the hill and the other ball on the other side, whose ball should reach the bottom first if: the gradient on your side was 20/100 (0.2) but the gradient on your friend's side was 5/100 (0.05)?

C. If you walked up a hill that had a gradient of 5/100 (0.05) and the distance that you walked forward was 300 metres, how much higher would you now be than when you started?

What is the gradient of 'The Summit'? Page 3



What is the gradient of 'The Summit'? Page 4

D. Using the graph on the previous page, work out how much higher you would be from when you first started after travelling:

1. 7 kilometres if the gradient was 3/100 (0.03)

2. 3 kilometres if the gradient was 5/100 (0.05)

3. 9 kilometres if the gradient was 6/100 (0.06)

E. Now we are going to work out the gradient on the Mansfield and Pinxton Railway by using the sketch on the next page:

1. What is the gradient of the railway when going from Pinxton to The Summit?
i.80 metres high and 8,000 long = 80/8,000 = 8/800

2. What is the gradient of the railway when going from The Summit to Mansfield?
i.40 metres high and 5,000 long = 40/5,000 = 4/500

What is the gradient of 'The Summit'? Page 5