

**Question:** Every morning Aya goes for a \$9\$-kilometer-long walk and stops at a coffee shop afterwards. When she walks at a constant speed of  $s$  kilometers per hour, the walk takes her 4 hours, including  $t$  minutes spent in the coffee shop. When she walks  $s+2$  kilometers per hour, the walk takes her 2 hours and 24 minutes, including  $t$  minutes spent in the coffee shop. Suppose Aya walks at  $s+\frac{1}{2}$  kilometers per hour. Find the number of minutes the walk takes her, including the  $t$  minutes spent in the coffee shop.

Lower Probability After Fine-tuning

Similar Probability

Higher Probability After Fine-tuning

## SFT

<think> Okay, let's see. So Aya has a 9-kilometer walk every morning, and then she stops at a coffee shop for  $t$  minutes. The problem gives two different scenarios where her walking speed changes, and the total time (including the coffee shop break) is different. Then we need to find out how long it takes her when she walks at  $s + 1/2$  kilometers per hour, including the same  $t$  minutes in the coffee shop. First, let me parse the information given. When she walks at speed  $s$  km/h, the total time is 4 hours, which includes  $t$  minutes in the coffee shop. **Omit part of the output...** Therefore, her walking speed is 2.5 km/h. Then, the question is, when she walks at  $s + 1/2$  km/h, which is  $2.5 + 0.5 = 3$  km/h, how long does the walk take, including  $t$  minutes? So first, we need to find  $t$ . Once we have  $t$ , we can compute the total time as walking time +  $t$ . But we can find  $t$  from the first equation:  $9/s + t/60 = 4$ . We know  $s = 2.5$ , so:  $9/2.5 + t/60 = 4$ . Compute  $9/2.5$ :  $9$  divided by  $2.5$  is  $3.6$ . So  $3.6 + t/60 = 4$ . Subtract  $3.6$ :  $t/60 = 0.4$ . Multiply both sides by  $60$ :  $t = 24$  minutes. So  $t$  is 24 minutes. Therefore, when walking at 3 km/h, the walking time is  $9/3 = 3$  hours, which is 180 minutes. Then adding  $t$  minutes (24 minutes) gives total time of  $180 + 24 = 204$  minutes. But the question asks for the number of minutes the walk takes her, including  $t$  minutes spent in the coffee shop. So the answer is 204 minutes. Wait, but let me check with the second scenario to make sure. In the second scenario, walking speed  $s + 2 = 2.5 + 2 = 4.5$  km/h. So walking time is  $9/4.5 = 2$  hours. Then adding  $t = 24$  minutes gives 2 hours and 24 minutes, which is 2.4 hours, which matches the given total time. So that checks out. So when she walks at 3 km/h, walking time is  $9/3 = 3$  hours, which is 180 minutes. Adding 24 minutes gives 204 minutes total. So the answer is 204 minutes. But let me just verify the quadratic equation step again. When we set up  $9/s - 9/(s+2) = 1.6$ , which is the difference in walking time. Then solving gives  $s = 2.5$ . Then  $t$  is found from first equation:  $9/s + t/60 = 4$ .  $9/2.5$  is  $3.6$ , so  $t = (4 - 3.6)*60 = 0.4*60 = 24$ . Correct. Then  $9/(s+0.5) = 9/3 = 3$  hours = 180 minutes, plus  $t = 24$  minutes, total 204 minutes. So 204 minutes is the answer. But wait, the problem says "the number of minutes the walk takes her, including the  $t$  minutes spent in the coffee shop". So the answer is 204 minutes. So boxed answer would be  $\boxed{204}$ .

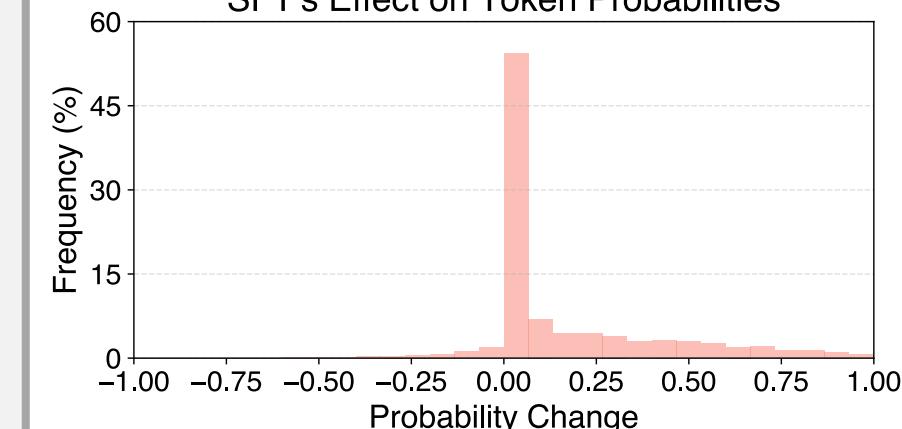
\*\*Final Answer\*\*  $\boxed{204}$  </think> Given that Aya walks 9 kilometers every morning and stops at a coffee shop for  $\langle t \rangle$  minutes, we need to find the total time taken when she walks at  $\langle s + \frac{1}{2} \rangle$  kilometers per hour, including the same  $\langle t \rangle$  minutes in the coffee shop. First, we set up the equations for the two scenarios given: 1. When walking at  $\langle s \rangle$  km/h, the total time (including  $\langle t \rangle$  minutes) is 4 hours:  $\langle \frac{9}{s} + \frac{t}{60} \rangle = 4$ . 2. When walking at  $\langle s + 2 \rangle$  km/h, the total time (including  $\langle t \rangle$  minutes) is 2 hours and 24 minutes (which is 2.4 hours):  $\langle \frac{9}{s+2} + \frac{t}{60} \rangle = 2.4$ . Subtracting the second equation from the first to eliminate  $\langle t \rangle$ :  $\langle \frac{9}{s} - \frac{9}{s+2} \rangle = 1.6$ . Simplifying this equation:  $\langle 9 \left( \frac{1}{s} - \frac{1}{s+2} \right) \rangle = 1.6$ .  $\langle 9 \left( \frac{2}{s(s+2)} \right) \rangle = 1.6$ .  $\langle \frac{18}{s(s+2)} \rangle = 1.6$ .  $\langle s(s+2) \rangle = \frac{18}{1.6} = 11.25$ . Solving the quadratic equation  $\langle s^2 + 2s - 11.25 = 0 \rangle$  using the quadratic formula:  $\langle s = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \rangle = \frac{-2 \pm \sqrt{4 + 45}}{2} = \frac{-2 \pm 7}{2}$ . Taking the positive root, we get  $\langle s = 2.5 \rangle$  km/h. Next, we find  $\langle t \rangle$  using the first equation:  $\langle \frac{9}{s} + \frac{t}{60} = 4 \rangle$ .  $\langle 3.6 + \frac{t}{60} = 4 \rangle$ .  $\langle \frac{t}{60} = 0.4 \rangle$ .  $\langle t = 24 \rangle$  minutes. When walking at  $\langle s + \frac{1}{2} \rangle = 3$  km/h, the walking time is:  $\langle \frac{9}{3} = 3 \rangle$  hours = 180 minutes. Adding the coffee shop time  $\langle t = 24 \rangle$  minutes, the total time is:  $\langle 180 + 24 = 204 \rangle$  minutes. Thus, the number of minutes the walk takes her, including the  $\langle t \rangle$  minutes spent in the coffee shop, is  $\langle \boxed{204} \rangle$ .

## RL

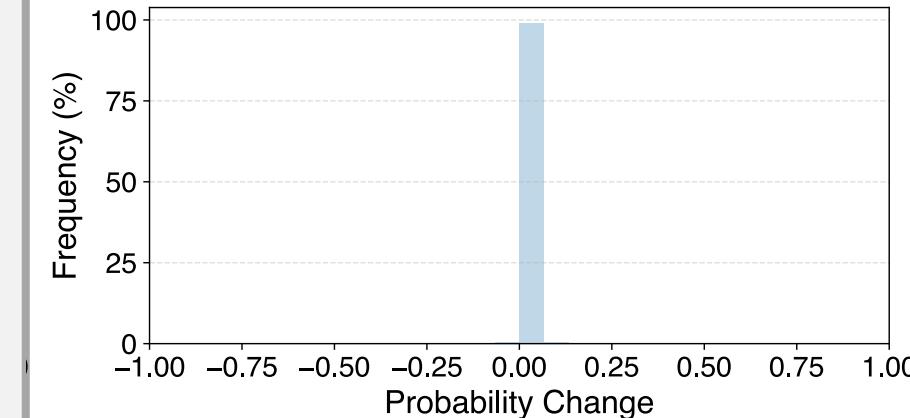
To solve this problem, we need to determine the values of  $\langle s \rangle$  and  $\langle t \rangle$  first. We know the following: 1. When Aya walks at a speed of  $\langle s \rangle$  km/h, the total time including the coffee shop is 4 hours. So, the time spent walking is  $\langle 4 - \frac{t}{60} \rangle$  hours. The distance walked is 9 km, so we can write the equation:  $\langle s \left( 4 - \frac{t}{60} \right) = 9 \rangle$ . 2. When Aya walks at a speed of  $\langle s + 2 \rangle$  km/h, the total time including the coffee shop is 2 hours and 24 minutes, which is 2.4 hours. So, the time spent walking is  $\langle 2.4 - \frac{t}{60} \rangle$  hours. The distance walked is still 9 km, so we can write the equation:  $\langle (s + 2) \left( 2.4 - \frac{t}{60} \right) = 9 \rangle$ . We now have a system of two equations:  $\langle s \left( 4 - \frac{t}{60} \right) = 9 \rangle$  and  $\langle (s + 2) \left( 2.4 - \frac{t}{60} \right) = 9 \rangle$ . Let's solve these equations step by step. First, we can express  $\langle t \rangle$  from equation (1):  $\langle t = 60 \left( 4 - \frac{9}{s} \right) \rangle$ . Next, we substitute  $\langle t \rangle$  into equation (2):  $\langle (s + 2) \left( 2.4 - \frac{60 \left( 4 - \frac{9}{s} \right)}{60} \right) = 9 \rangle$ .  $\langle (s + 2) \left( 2.4 - \frac{24 - \frac{144}{s}}{6} \right) = 9 \rangle$ .  $\langle (s + 2) \left( 2.4 - \frac{24 - 2.4s}{6} \right) = 9 \rangle$ .  $\langle (s + 2) \left( 2.4 - 4 + \frac{144}{s} \right) = 9 \rangle$ .  $\langle (s + 2) \left( -1.6s + 3.2 + \frac{144}{s} \right) = 9 \rangle$ .  $\langle -1.6s^2 + 3.2s + 144 = 9 \rangle$ .  $\langle -1.6s^2 + 3.2s - 135 = 0 \rangle$ . Multiplying through by  $\langle s \rangle$  to clear the fraction:  $\langle -1.6s^2 + 18 = 3.2s \rangle$ .  $\langle 1.6s^2 + 3.2s - 18 = 0 \rangle$ . Dividing the entire equation by 1.6:  $\langle s^2 + 2s - 11.25 = 0 \rangle$ . We can solve this quadratic equation using the quadratic formula  $\langle s = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \rangle$ , where  $\langle a = 1 \rangle$ ,  $\langle b = 2 \rangle$ , and  $\langle c = -11.25 \rangle$ :  $\langle s = \frac{-2 \pm \sqrt{4 + 45}}{2} = \frac{-2 \pm 7}{2} \rangle$ . This gives us two solutions:  $\langle s = \frac{5}{2} = 2.5 \rangle$  and  $\langle s = \frac{-9}{2} = -4.5 \rangle$ . Since speed cannot be negative, we have  $\langle s = 2.5 \rangle$  km/h. Now we can find  $\langle t \rangle$ :  $\langle t = 60 \left( 4 - \frac{9}{2.5} \right) / 2.5 = 60 \left( 10 - 9 \right) / 2.5 = 60 / 2.5 = 24 \rangle$  minutes. Now, we need to find the time it takes for Aya to walk at a speed of  $\langle s + \frac{1}{2} \rangle = 2.5 + 0.5 = 3$  km/h. The time spent walking is:  $\langle \frac{9}{3} = 3 \rangle$  hours. Including the 24 minutes spent in the coffee shop, the total time is:  $\langle 3 + 24 = 180 + 24 = 204 \rangle$  minutes. So, the number of minutes the walk takes her, including the  $\langle t \rangle$  minutes spent in the coffee shop, is  $\langle \boxed{204} \rangle$ .

(a)

SFT's Effect on Token Probabilities



RL's Effect on Token Probabilities



(b)