

Unit 0- Mathematics and Problem Solving

(AP Physics 1;2019)

FACT: You will be responsible for the content discussed in the Unit 0 (Unit₀) podcasts before starting AP Physics 1. These problems will help to ensure your understanding of the prerequisite knowledge and skills. Pay attention to significant figures in your final answers.

Q1. Perform the following computation and pay attention to significant figures: $3340 \times 1.2 = \underline{\hspace{2cm}}$

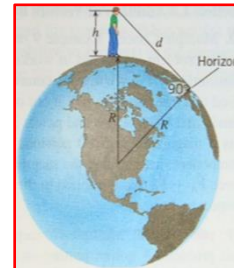
Q2. Round the following numbers to 3 significant figures:

a. 234,555,359 **b.** 0.090035 **c.** 939.25 **d.** 14,090 **e.** 0.008499 **f.** 11.1111

Q3. Sophia walks 90 m due east and then 50 m due north. What is the resultant vector for this motion?

Q4. Sophia rides her bike 25.0 m 49.0° north of east. Then, she then walks 23.0 m heading at 15° north of east. Finally, she turns and runs 32.0 m in a direction 68.0° south of east. What is the resultant vector for her motion?

Q5. Mr. Pedersen is standing at the edge of the water and looking out at the ocean. The height of my eyes above the water is 1.6 m ($h = 1.6$ m), and the radius of the earth is $R = 6.38 \times 10^6$ m. How far is it to the horizon? In other words, what is the distance d from the person's eyes to the horizon?



Q6. A jogger travels a route that has two parts. The first is a displacement \vec{A} of 2.50 km due south, and the second involves a displacement \vec{B} that points due east. The resultant displacement $\vec{A} + \vec{B}$ has a magnitude of 3.75 km. What is the magnitude of \vec{B} , and what is the direction of $\vec{A} + \vec{B}$ relative to due south?

Q7. Sophia kicks a soccer ball with an initial velocity of 8.0 m/s at 10° above the horizontal. What are the x- and y- components of the velocity?