Chapter 1: Units, Physical Quantities, and Vectors

scalar:

vector:

What is the main difference between a scalar quantity and a vector quantity?

List all of the scalar and vector quantities you know in the table below.

scalar quantities	**vector quantities**

Give the equation for vector addition.

unit vector:

Give the equation for the scalar product.

Give the equation for the vector product.

Ex: 1

$$\boldsymbol{A} = 4\hat{\boldsymbol{\imath}} + 2\hat{\boldsymbol{\jmath}}$$
$$\boldsymbol{B} = 1\hat{\boldsymbol{\jmath}} - 2\hat{\boldsymbol{z}}$$

a. $Ax =$

$Ay =$

$Az =$

$Bx =$

$By =$

$Bz =$

b. $|7\boldsymbol{B}| =$

c. $2\boldsymbol{A} - \boldsymbol{B} =$

d. $\boldsymbol{A} \cdot 2\boldsymbol{B} =$

e. $5\boldsymbol{A} \times (-3\boldsymbol{A}) =$

Chapter 2: Motion Along a Straight Line

List the constant acceleration equations.

In physics, what is meant by free-fall?

Ex: 2 A physics teacher performing an outdoor demonstration suddenly falls from rest off a high cliff and simultaneously shouts, "Help!" When she has fallen for 3.0 s, she hears the echo of her shout from the valley floor below. The speed of sound is 340 m/s.

a. How tall is the cliff?

b. If we ignore air resistance, how fast will she be moving just before she hits the ground? (Her actual speed will be less than this, due to air resistance.)

Chapter 3: Motion in Two or Three Dimensions

What does the component of acceleration *parallel* to a particle's path tell us with regard to the particle's velocity?

What does the component of acceleration *perpendicular* to a particle's path tell us with regard to the particle's velocity?

Give the equation for relative velocity in space.

Ex: 3 Win the Prize. In a carnival booth, you can win a stuffed giraffe if you toss a quarter into a small dish. The dish is on a shelf above the point where the quarter leaves your hand and is a horizontal distance of 2.1 m from this point. If you toss the coin with a velocity of 6.4 m/s at an angle of 60° above the horizontal, the coin will land in the dish. Ignore air resistance.

a. What is the height of the shelf above the point where the quarter leaves your hand?

b. What is the vertical component of the velocity of the quarter just before it lands in the dish?