Calculating Resulting Magnitude and Direction of Applied Forces

Activity Overview:
You will solve the calculations in the provided scenarios.

Directions:

1. Solve the following calculations.

2. Turn in your completed activity to your instructor.

Scenario 1:
A quadcopter is flying due east at 20 mph. A sudden 6 mph wind begins blowing due south. Find the resulting magnitude and direction of the drone caused by the action of these two forces.

Magnitude Calculations:

The resulting magnitude is approximately _____ mph

Direction Calculations:

Using the tan^{-1} function (inverse tangent) on a calculator: _____°

The resulting angle is _____°

The drone's direction (or heading) is _____° southeast

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Scenario 2:
A quadcopter is flying due west at 32 mph. A sudden 12 mph wind begins blowing due south. Find the resulting magnitude and direction of the drone caused by the action of these two forces.

Magnitude Calculations:

The resulting magnitude is approximately _____ mph

Direction Calculations:

Using the tan^{-1} function (inverse tangent) on a calculator: _____°

The resulting angle is _____°

The drone's direction (or heading) is _____° southwest

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Scenario 3:

A drone weighs 10 pounds so the vertical thrust to keep it hovering is also 10 pounds. Determine the amount of horizontal thrust applied as well as the additional vertical thrust needed to keep it at the same altitude during a maneuver if the assigned tilt angle value is 30°.

Horizontal Thrust:

The horizontal thrust in this scenario is _____ pounds

Additional Vertical Thrust:

An additional _____ pounds of thrust is required to maintain altitude during the roll maneuver

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Scenario 4:

A drone weighs 8.2 pounds so the vertical thrust to keep it hovering is also 8.2 pounds. Determine the amount of horizontal thrust applied as well as the additional vertical thrust needed to keep it at the same altitude during the roll maneuver if the assigned tilt angle value is 17°.

Horizontal Thrust:

The horizontal thrust in this scenario is _____ pounds

Additional Vertical Thrust:

An additional _____ pounds of thrust is required to maintain altitude during the roll maneuver