

## Pennsylvania Grade 11 Open Response Sample Test

1.

A hot air balloon is 350 feet above the ground and 450 feet from the beach. It is descending at a  $35^\circ$  angle relative to the ground. With this angle of descent, will the hot air balloon land on the ground or in the water?

If the balloon lands on the ground, determine the distance it is from the water line. If the balloon lands in the water, find the measure, to the nearest degree, of the angle the balloon's path should have made with the ground.

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2.

New agents at H-1 Realty are allowed to choose between two different salary options. Option 1 offers a base salary of \$3000 per month and a 4% sales commission. Option 2 offers no base salary and an 8% sales commission.

1. For each plan, write an equation that represents an agent's total monthly pay.
2. Graph both equations on the same coordinate plane.
3. Determine which plan a new agent should choose if the agent plans to sell \$120,000 in property per month.

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3.

The formula for the power output  $P$  of a battery is  $P = VI - RI^2$ , where  $V$  is the electromotive force in volts,  $R$  is the resistance, and  $I$  is the current. Find the current (measured in amperes) that corresponds to a maximum value of  $P$  in a battery for which  $V = 16$  volts and  $R = 0.25$  ohms. Assume that a 40-ampere fuse bounds the current in the interval  $0 \leq I \leq 40$ .

Could replacing the 40-ampere fuse with a 60-ampere fuse increase the power output? Explain.