Problem of the Week is designed to provide students with an ongoing opportunity to solve mathematical problems. Each week, problems from various areas of mathematics are posted online and e-mailed to teachers for use with their students.

**Grade 9/10**

**Problem D: Blocked Numbers**

Twelve blocks are arranged as illustrated in the diagram. Each letter shown on the front of a block represents a number. The sum of the numbers on any four consecutive blocks is 25. Determine the value of B + F + K.

![Diagram showing the arrangement of blocks with letters and numbers]

**Grade 11/12**

**Problem E: Mixture of Three**

Kanza is making and selling trail mix. She makes three different blends, each consisting of a mixture of cashews, dark chocolate, and almonds. All of these blends are sold at the same price of $18 per kg.

If she mixes cashews, dark chocolate, and almonds in the ratio of 1 : 1 : 1, by mass, then she makes a profit of 20%.

If she mixes cashews, dark chocolate, and almonds in the ratio of 3 : 2 : 1, by mass, then she makes a profit of 8%.

If she mixes cashews, dark chocolate, and almonds in the ratio of 1 : 4 : 2, by mass, then she makes a profit of 26%.

(a) What price, in dollars per kg, does Kanza pay for each of the cashews, dark chocolate, and almonds?

(b) What percentage of a profit would she make if she mixes cashews, dark chocolate, and almonds in the ratio of 2 : 3 : 4, by mass?
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**Grade 9/10**

**Problem D: Cartesian Geocaching**

Geocaching is a kind of outdoor treasure hunt where people use GPS devices to look for hidden objects, called caches. In Cartesian Geocaching, instead of using a GPS device, locations are described using Cartesian coordinates.

Hilde sets up a large field for Cartesian Geocaching, measuring the distances in kilometres so that the point (1, 0) lies 1 km east of the point (0, 0), for example. Hilde starts at point A(0, 0), then walks northwest in a straight line to some point B, where she hides a cache. Then, from B, she walks northeast in a straight line to point C(0,4) where she hides another cache. Finally she walks straight back to point A. How far does Hilde walk in total?

**Grade 11/12**

**Problem E: Fold Once**

A rectangular piece of paper, PQRS, has PQ= 30 cm and PS= 40 cm. The paper has grey lines on one side and is plain white on the other.

The paper is folded so that the two diagonally opposite corners P and R coincide. This creates a crease along line segment AC, with A on PS and C on QR.

Determine the length of AC.