BONUS CHALLENGE QUESTIONS

1. You are a famous baker, and you have been hired by a mountaineering couple to create a beautiful wedding cake. The cake will be four stacked layers, with each layer a cylinder that is 20 cm smaller in diameter than the layer underneath it. The top of the cake will have a cone with the same height to represent the mountain where the couple met. Here is some info:
* The base layer has a diameter of 1 m
* Each layer has a height of 22 cm
* The material and labour to make the cake costs $5 per cubic inch.
* The icing costs $0.68 per square inch.
* The figurines, dressed as mountain climbers climbing the cone, cost $6.36 each.
* You want to make 40% profit

How much will you charge the client? Extra marks for a realistic diagram.

1. Navigation was one of the first main uses of trigonometry. **Bearings** are used in navigation as a number that represents a direction of travel. A bearing measures the acute angle and direction from a fixed north-south line:

N N N

 20°

 W E W E W E

 40° 30°

 S S S

  **S40°W N20°E S30°E**

Two lighthouses are 30 km apart, with lighthouse *A* directly north of lighthouse *B*. A ship is spotted by lighthouse *A* at S20°E, and by lighthouse *B* at N25°E. How far is the ship from lighthouse *A*?

1. Factor the following polynomials:

$$x^{2}\left(x+10\right)-2x\left(x-8\right)$$

$$8a^{2}x^{3}y-2b^{2}xy$$

$$x^{2}y^{2}-4x^{2}-y^{2}+4$$

$$a^{2n+2}-a^{2}, where n>0$$