Functions and Graphs

Age 11+ Level ★
Worksheet 1 - Solutions

1. **Bucket of Water**
   The weight of the empty bucket is 3 kg
   nrich.maths.org/4730/solution

2. **Paper Weight**
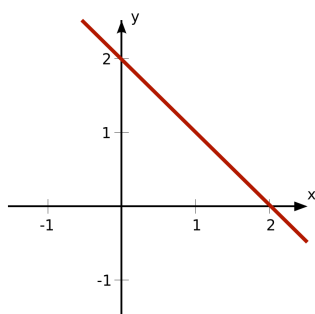   The weight of a single sheet of paper is 5 grams
   nrich.maths.org/6213/solution

3. **Circumference and Diameter**
   Graph A - a straight line through (0,0):

   nrich.maths.org/5758/solution
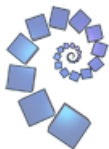
4. **Straight Line Spin**

   nrich.maths.org/10136/solution

5. **Spiral Snail**
   The snail finishes at (6,5)
   nrich.maths.org/2441/solution

These problems are adapted from UKMT (ukmt.org.uk) and SEAMC (seamc.asia) problems.

Age 14+ Level ★★★
Worksheet 1 - Solutions

1. **Triangular Slope**
   The gradient of OA is $\frac{4}{3}$
   The gradient of AB is $-\frac{3}{4}$
   nrich.maths.org/13592/solution

2. **Graph Triangles**
   Point P is at (4,4)
   nrich.maths.org/13641/solution

3. **Inside a Parabola**
   $k = 4$
   nrich.maths.org/13036/solution

4. **Closer to Home**
   $y = x - 6$ comes closer to the origin
   The shortest distance to the origin is $\sqrt{18} = 3\sqrt{2} = 4.243$
   nrich.maths.org/13835/solution

5. **Quadratic Rotation**
   The equation of the new curve is
   $y = -x^2 - 6x - 11$ or $y = -(x + 3)^2 - 2$
   nrich.maths.org/9435/solution

These problems are adapted from UKMT (ukmt.org.uk) and SEAMC (seamc.asia) problems.