1 *A wire is bent into the shape of a circle. Express the area of the circle as a function of the length of the wire. (Hint: If r is the radius of a circle, then the distance around the circle (its perimeter or circumference) is $2\pi r$, while the area is πr^2.)*

Let x be the length of the wire. Then the circumference of the circle is also x, so $x = 2\pi r$, which means that $r = \frac{x}{2\pi}$. Therefore, the area is $\pi\left(\frac{x}{2\pi}\right)^2 = \frac{x^2}{4\pi}$. If A is this area, then

$$A = \frac{x^2}{4\pi}.$$

2 *Consider the points $(3, -4)$ and $(5, 4)$ in the cartesian real number plane.*

a *What is the distance between these points? (Show what numerical calculation you make.)*

The distance is

$$\sqrt{\Big((5) - (3)\Big)^2 + \Big((4) - (-4)\Big)^2} = \sqrt{(2)^2 + (8)^2} = \sqrt{(4) + (64)} = \sqrt{68} = 2\sqrt{17}.$$

b *What is the midpoint between these points? (Show what numerical calculation you make.)*

The midpoint is

$$\left(\frac{(3) + (5)}{2}, \frac{(-4) + (4)}{2}\right) = \left(\frac{8}{2}, \frac{0}{2}\right) = (4, 0).$$