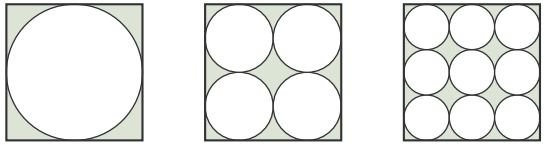
Take $\pi = 3.14$, or use the π key. Give answers to one decimal place.

1 A square of side 12 cm is packed with touching discs.



(a) **One** disc: write down its radius and the area it covers (2)

(b) **Four** discs: write down the radius of one and the total area covered (2)

(c) **Nine** discs: write down the radius of one and the total area covered (2)

(d) **Write down what you notice.** (2)

(8 marks)

2 For the square in question 1:

(a) Find the area of the square (1)

(b) Find the percentage covered by the discs (2)

(c) **Write down the percentage covered when nine discs are used, and explain.** (2)

(5 marks)

3 **Explain, using algebra**, why n^2 touching discs in a square always cover the same area.

A square of side $2r$ packed with $n \times n$ discs has discs of radius $\frac{r}{n}$.

(a) Write down the area of one disc (2)

(b) Write down the total area of all n^2 discs, and simplify (3)

(5 marks)