**1** Use approximations to estimate the answer to $\dfrac{\sqrt{97} + 2.014^3}{0.49}$

**[3 marks]**

$\sqrt{97} = \sqrt{100} = 10$

$2.014^3 = 2^3 = 8$ (1)

$0.49 = 0.5 = \frac{1}{2}$ (1)

$\dfrac{10+8}{\frac{1}{2}} = 18(2) = 36$ (1)

Answer 36

**2** Millie is estimating the value of $\dfrac{1}{\left(\sqrt[3]{8.34}\right)^2 \times 10.21}$

She rounds each decimal number to 1 significant figure.

**2 (a)** Work out Millie's estimate.

You **must** show your working.

**[2 marks]**

$\dfrac{1}{(\sqrt[3]{8})^2 \times 10} = \dfrac{1}{2^2 \times 10} = \dfrac{1}{40}$

(1) (1)

Answer $\dfrac{1}{40}$

**2 (b)** Millie says,

"My estimate must be more than the exact value."

**Without working out the exact value**, give a reason how she can know this.

**[1 mark]**

Both numbers are rounded down.

(1)

**3 (a)** Here are two calculations, A and B.

| A | B |
|---|---|
| $1.92^7 + 6.9^3$ | $5 \times \sqrt[3]{1\,000\,350}$ |

Use approximations to show that answer to A < answer to B

**[3 marks]**

Approximation of A : $2^7 + 7^3$ ✓ (1)

$= 128 + 343$

$= 471$

$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 128$

$7 \times 7 = 49 \times 7 = 343$

Approximation of B : $5 \times \sqrt[3]{1\,000\,000}$ ✓ (1)

$5 \times (1 \times 10^6)^{1/3}$

$5 \times (1 \times 10^2) = 500$

$\therefore \quad 500 > 471$ ✓ (1)