

7 MUST KNOW QUESTIONS TO CONQUER

APPROXIMATION & ESTIMATION

1	Estimate the value of $\frac{5.78 \times \sqrt{35}}{\sqrt[3]{29}}$, giving your answer correct to 1 significant figure.	[2]
2	(a) Calculate $\frac{13.6^2 - 4}{\sqrt{3.5} + 3}$. Write down the first 5 digits on your calculator display. (b) Write your answer to part (a) correct to 3 decimal places.	[1] [1]
3	By rounding off each number to 2 significant figures, estimate the value of $51323 \div 9.96$. You must show your working clearly.	[2]
4	(a) Round off 3025.378 to (i) 2 decimal places, (ii) 2 significant figures. (b) Round off 0.03288345 to 3 significant figures. (c) Without the use of calculator, estimate the value of (i) $\frac{\sqrt[3]{999}}{9.8} \times 5.01$, (ii) $\frac{\sqrt{65}}{\sqrt[3]{9}} \times 19.9$.	[1] [1] [1] [1] [1]
5	(a) Calculate $\frac{(-21)^2 - \sqrt[3]{3.2}}{8.74 + (2.5)^3}$. Write down the first six digits on the calculator display of your answer. (b) Write down your answer to part (a) correct to 4 significant figures.	[1] [1]
6	The diameter of the earth at the equator is 12700 kilometres. This value has been rounded to 3 significant figures. Find the largest and the smallest possible value of the diameter of the earth.	[2]
7	(a) By rounding the numbers to 1 significant figure, estimate the value of $\frac{\sqrt{101.3} \times 64.231}{(1.98)^3}$. Show your working clearly. (b) Without using the calculator, determine whether the value found in (a) is an over or under estimation. Give a reason for your answer.	[2] [1]

Answer Key

1	Solution: $\frac{5.78 \times \sqrt{35}}{\sqrt[3]{29}} \approx \frac{6 \times \sqrt{36}}{\sqrt[3]{27}}$ $= 12$ Ans: 12
2	Ans: (a) 37.151, (b) 37.152
3	Solution: $541000 \div 10$ $= 5100$ Ans: 5100
4	Solutions: (c)(i) $\frac{\sqrt[3]{999}}{9.8} \times 5.01$ (ii) $\frac{\sqrt{65}}{\sqrt[3]{9}} \times 19.9$ $\approx \frac{\sqrt[3]{1000}}{10} \times 5$ $\approx \frac{\sqrt{64}}{\sqrt[3]{8}} \times 20$ $= \frac{10}{10} \times 5$ $= \frac{8}{2} \times 20$ $= 5$ $= 80$ Ans: (ai) 3025.38(2d.p) (a ii) 3000 (2s.f) (b) 0.0329 (2s.f) (ci) 5 (cii) 80
5	Ans: (a) 18.0392 (b) 18.04
6	Ans: Largest = 12749 km, Smallest = 12650 km
7	Solution: (a) $\frac{\sqrt{101.3 \times 64.231}}{(1.98)^3} = \frac{10 \times 60}{8}$ $= 75$ Ans: (a) 75, (b) Underestimate. The numbers in the numerator have been rounded down and the number in the denominator has been rounded up, making the final answer smaller than the actual value.