

UNIT 14 *Estimation and Approximation*

Overhead Slides

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- 14.1 Rounding
- 14.2 Estimating
- 14.3 Using Estimation in Calculations
- 14.4 Calculator Use
- 14.5 Error Propagation
- 14.6 Upper and Lower Bounds

OS 14.1*Rounding*

Complete the table:

<i>Number</i>	<i>Correct to 3 Significant Figures</i>	<i>Correct to 1 Decimal Place</i>
46.32		
137.49		
0.8247		
1.234		
9.8765		
0.08213		
0.009115		
1.0048		
13.7215		
110.045		

OS 14.2*Estimating*

Use 1-significant-figure approximations to estimate:

1. $3.72 \times 18.47 \approx \quad \times \quad =$

2. $29.1 \times 122 \approx \quad \times$

3. $54.3 \times 1680 \approx \quad \times$

4. $\frac{2431}{5.427} \approx \frac{\quad}{\quad} =$

OS 14.3

Using Estimation in Calculations

Use 1-significant-figure approximations to estimate:

$$1. \quad \frac{3.74 \times 4.93}{3.76} \approx \frac{\quad \times \quad}{\quad} =$$

$$2. \quad \frac{16.4 + 31.9}{1.9 + 7.68} \approx \frac{\quad + \quad}{\quad + \quad}$$

$$= \quad \underline{\hspace{2cm}}$$

$$=$$

$$3. \quad \sqrt{\frac{4.65 \times 8.93}{2.76}} \approx \sqrt{\frac{\quad \times \quad}{\quad}}$$

$$= \sqrt{\quad \hspace{2cm}}$$

$$4. \quad \sqrt{\frac{8.24}{1.94}} + \sqrt{\frac{17.1}{4.5}} \approx \sqrt{\quad} + \sqrt{\quad}$$

$$= \sqrt{\quad} + \sqrt{\quad}$$

$$=$$

OS 14.4

Calculator Use

Obtain answers, correct to 2 significant figures, to the following:

1.
$$\frac{3.8}{72.4 - 32.19}$$

2.
$$\sqrt{\frac{3.6 \times 47.2}{19.6}}$$

3.
$$\frac{18.47}{3.61} + \frac{47.32}{11.47}$$

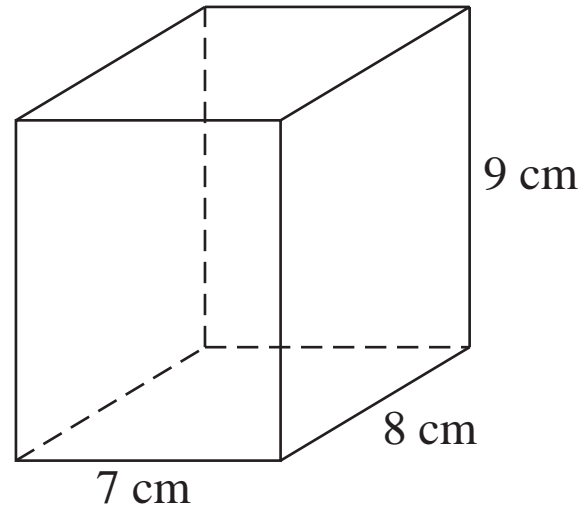
4.
$$\frac{44.61 - 33.72}{9.81 \times 3.61}$$

5.
$$\frac{42.8^2}{(19.7 + 14.75)^2}$$

OS 14.5

Error Propagation

The lengths of the sides of this cuboid are given correct to the nearest cm.



1. Calculate the maximum and minimum possible *volumes* of the cuboid.

Maximum volume =

=

Minimum volume =

=

2. Calculate the maximum possible *surface area*.

Maximum surface area =

=

OS 14.6*Upper and Lower Bounds*

The values of a and b , correct to 1 decimal place, are given below:

$$a = 8.1$$

$$b = 7.4$$

Complete the table:

<i>Expression</i>	<i>Lower Bound</i>	<i>Upper Bound</i>
$a + b$		
$a - b$		
ab		
$\frac{b}{a}$		
a^2		