

Notes

Precision and Accuracy

The *precision* of a measurement is determined by the smallest unit or fraction of a unit used.

Choose the more precise measurement in each pair.

a. 16.7 kg; 16.66 kg

Compare the two measurements: 16.7 kg is to the nearest tenth.

16.66 kg is to the nearest hundredth.

Because a hundredth of a kilogram is smaller than a tenth of a kilogram, 16.66 kg is more precise.

b. 8.5 km; 8532 m

Note that the units are different, but they can easily be converted:

8532 m = 8.532 km

[1000 m = 1 km]

Compare the two measurements: 8.5 km is to the nearest tenth.

8.532 km is to the nearest thousandth.

Because a thousandth of a meter is smaller than a tenth of a meter, 8532 m is more precise.

Choose the more precise measurement in each pair.

1. 73.71 cm; 736.2 cm

73.71 cm is to the nearest _____ of a centimeter.

736.2 cm is to the nearest _____ of a centimeter.

_____ cm is more precise.

2. 4732 mL; 4.73 L

4732 mL = _____ L, which is to the nearest _____ of a liter.

4.73 L is to the nearest _____ of a liter.

_____ is more precise.

3. An object is weighed on three different scales. The results are shown in the table. Which scale is the most precise?

Scale	Measurement (lb)
1	44.9
2	45.105
3	45.01

Scale 1 measures to the nearest _____ of a pound.

Scale 2 measures to the nearest _____ of a pound.

Scale 3 measures to the nearest _____ of a pound.

Scale _____ is the most precise.

Precision and Accuracy continued

Tolerance describes how much a measurement may vary from a specified value.

A bolt can be $50 \text{ mm} \pm 1.5 \text{ mm}$. Write the possible range of the measurement.

$50 - 1.5 = 48.5$ The bolt cannot be smaller than 48.5 mm.

$50 + 1.5 = 51.5$ The bolt cannot be larger than 51.5 mm.

Written as a range, the bolt can be 48.5 mm–51.5 mm.

Tolerance can also be expressed as a percent.

A bolt can be $50 \text{ mm} \pm 5\%$. Write the possible range of the measurement.

5% of 50 is $0.05 \cdot 50 = 2.5$.

$50 - 2.5 = 47.5$ The bolt cannot be smaller than 47.5 mm.

$50 + 2.5 = 52.5$ The bolt cannot be larger than 52.5 mm.

Written as a range, the bolt can be 47.5 mm–52.5 mm.

Write the possible range of each measurement.

4. $42 \text{ g} \pm 5 \text{ g}$

$42 - 5 = \underline{\hspace{2cm}}$

$42 + 5 = \underline{\hspace{2cm}}$

The range is $\underline{\hspace{1cm}}$ g – $\underline{\hspace{1cm}}$ g.

5. $3.2 \text{ mi} \pm 0.01 \text{ mi}$

$3.2 - 0.01 = \underline{\hspace{2cm}}$

$3.2 + 0.01 = \underline{\hspace{2cm}}$

The range is $\underline{\hspace{1cm}}$ mi – $\underline{\hspace{1cm}}$ mi.

6. $25 \text{ L} \pm 5\%$

5% of 25 is $\underline{\hspace{1cm}}$ • $25 = \underline{\hspace{1cm}}$

$25 - \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$

$25 + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$

The range is $\underline{\hspace{1cm}}$ L– $\underline{\hspace{1cm}}$ L.

7. $40 \text{ m} \pm 2\%$

2% of 40 is $\underline{\hspace{1cm}}$ • $40 = \underline{\hspace{1cm}}$

$40 - \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$

$40 + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$

The range is $\underline{\hspace{1cm}}$ m– $\underline{\hspace{1cm}}$ m.

9. 21.38 mg–23.63 mg
 10. 120 lb \pm 4%
 11. 300 cm \pm 7.5%
 12. 210 ft \pm 9.1%
 13. Baseball #2

11. $y = -3$
 12. $d = -1$
 13. -8
 14. $7x + 6 + 5x = 90$
 15. $x = 7$

Review for Mastery

- hundredth; tenth; 73.71
- 4.732; thousandth; hundredth; 4732 mL
- tenth, thousandth; hundredth; 2
- 37; 47; 37; 47
- 3.19; 3.21; 3.19; 3.21
- 0.05; 1.25; 1.25; 23.75; 1.25; 26.25; 23.75; 26.25
- 0.02; 0.8; 0.8; 39.2; 0.8; 40.8; 39.2; 40.8

Challenge

- 0.19°
- 4.6°
- 3000 km

Problem Solving

- 864 in.; Rolondo's foot
- No; it is too long
- 1, 2, 3, 4, 5, 6, 9, 10, 11, 13
- D
- G
- C
- H

Reading Strategies

- 7.0–9.0
- 2.4–4.0
- ± 3
- ± 2.5
- B
- A

Answer Key for Unit 2

SOLVING TWO-STEP AND MULTI-STEP EQUATIONS

Practice A

- 2; 10; 2
- 3; 8; 4
- 21; 9; 3
- $t = -2$
- $x = 5.4$
- $r = -23$
- $y = 3$
- $b = 24$
- $m = \frac{1}{8}$
- $x = 6$

Practice B

- $x = -1$
- $y = 4$
- $p = -7$
- $m = -1$
- $g = 8$
- $h = 6$
- $y = -50$
- $n = \frac{1}{3}$
- $t = -\frac{1}{3}$
- $x = 3$
- $b = -2$
- $q = 3$
- -4
- -5
- $3x - 5 + 2x = 90$; 19
- 20 minutes

Practice C

- $r = 3$
- $w = -14$
- $y = -4$
- $f = 5$
- $p = 10$
- $r = 7$
- $y = 27$
- $h = \frac{7}{8}$
- $m = 3$
- $v = -\frac{1}{2}$
- $b = -7$
- $n = -\frac{5}{8}$
- -10
- -12
- 30
- $0.75x - 18.50 = 24.25$, 57 cookies

Review for Mastery

- 4
- 60
- $\frac{5}{3}$
- 5
- $\frac{5}{4}$
- -1
- $\frac{25}{2}$

Challenge

1. 4 inches
3. 1 inch

2. 8 inches
4. 9 inches