Unit 5 · Decimal

STUDY NOTES

Key terms

Decimal fraction: a fraction with 10, 100, 1000, … at the bottom: 23/100 = 0.23.

Dividend: the number being divided; **divisor**: the number you divide by; **quotient**: the answer.

Rounding off: writing a number as the nearest simpler number; ≈ means "is about".

Adding and subtracting (review)

- same form first: both decimals (quicker) or both decimal fractions
- line up the points; fill empty places with 0: 23.97 + 1.237 = 23.970 + 1.237 = **25.207**
- decimal fraction → decimal: as many digits after the point as zeros at the bottom: 191/100 = 1.91, 3471/100 = 34.71

Multiplying

Decimal × whole number or decimal

1. multiply as if there were no points
2. count the digits after the point in **both** numbers together
3. the answer has that many digits after its point

- 0.25 × 3: 25 hundredths × 3 = 75 hundredths = 0.75
- 2.45 × 5: 245 × 5 = 1225 → **12.25** (check: 2.5 × 5 = 12.5)
- square handkerchief, side 0.62 m: $P = 4l = 4 \times 0.62 =$ **2.48 m**
- 0.25 × 0.2 = 25/100 × 2/10 = 50/1000 = 0.050 = **0.05**
- hundredths × tenths = thousandths (100 × 10 = 1000); tenths × tenths = hundredths: 0.3 × 0.4 = 12/100 = 0.12
- 0.6 × 2.47: 6 × 247 = 1482, 1 + 2 = 3 digits → **1.482**
- path 37.7 m by 2.8 m: $A = l \times b$: 377 × 28 = 10556 → **105.56 m²** (estimate 38 × 3 = 114)
- not enough digits: zeros in front: 0.04 × 2 = **0.08**
- a zero at the end after the point can go: 0.050 = 0.05
- × a number less than 1 → **smaller**: 8 × 0.5 = 4
- check with an estimate: is the answer about the right size?

× 10, 100, 1000

- every digit moves left as many places as there are zeros (the point moves right)
  - 10 × 0.6284 = 6.284
  - 100 × = 62.84
  - 1000 × = 628.4
  - 10,000 × = 6284
  - 1,00,000 × = 62,840 (empty places 0)

Dividing

Decimal ÷ whole number

- long division; **put the point in the quotient when you bring down the first digit after the point**
- doesn't come out? write zeros after the last digit and go on: 1229.4 = 1229.40
- 1229.4 kg ÷ 12 refrigerators = **102.45 kg**
- 17.40 ÷ 4 = **4.35**; 149.04 ÷ 12 = **12.42**
- 0.5850 ÷ 18 = **0.0325**: 5 tenths can't be shared among 18 → 0 in the tenths place
- side of a square = perimeter ÷ 4: 48.64 ÷ 4 = 12.16 m; breadth = area ÷ length: 248.64 ÷ 16 = 15.54 m
- **check**: divisor × quotient = dividend: 12 × 102.45 = 1229.4 ✓
- × both by the same number, answer unchanged: 17.40 ÷ 4 = 1740 ÷ 400 = 4.35

÷ 10, 100, 1000

- every digit moves right (the point moves left), one place for each zero
  - 232.59 ÷ 10 = 23.259
  - ÷ 100 = 2.3259
  - ÷ 1000 = 0.23259
  - ÷ 10,000 = 0.023259
- 3.6 ÷ 100 = 0.036

Dividing by a decimal

- multiply **both** by 10, 100, … until the divisor is a whole number
- 171 ÷ 2.85 = 17,100 ÷ 285 = **60** (cauliflower: Rs 60 a kg)
- 4.5 ÷ 0.75 = 450 ÷ 75 = **6** pieces of ribbon; 6.3 ÷ 0.7 = 63 ÷ 7 = 9

- ÷ a number less than 1 → **bigger** answer

Rounding off

- to the nearest
  - **whole number**
  - **tenth** (1 digit after the point)
  - **hundredth** (2 digits)
- look at **one digit**: the one just after the last digit kept
- **less than 5**: keep as it is; **5 or more**: add 1; drop the digits after
- halfway rounds up: 7.565 → 7.57

Number	Hundredth	Tenth	Whole
7.563	7.56	7.6	8
67.328	67.33	67.3	67

- 3.573 ≈ 3.57
- 92.637 ≈ 92.64
- 45.736 ≈ 45.7 (nearest tenth)
- 5.8 cm ≈ 6 cm; 7.3 cm ≈ 7 cm
- **round once, from the full number**: 2.46 ≈ 2, not 2.46 → 2.5 → 3
- "**to two decimal places**": keep two digits after the point: 7.563 ≈ 7.56
- "round off **the third decimal place**": that digit becomes 0: 7.563 ≈ 7.560, the same number as 7.56
- "to the nearest hundredth" can't be misread

Money

- 1 rupee = 100 paisa: two decimal places
- scale shows Rs 346.72 → in cash Rs **347** (nearest rupee)
- apples: 175 × 2.5 = Rs 437.50; ÷ 4 = Rs 109.375 ≈ **Rs 109.38** (next digit 5: up); in cash about Rs 109
- 4 × 109.38 = 437.52 (2 paisa over); 4 × 109 = 436 (Rs 1.50 short): rounding one way adds up
- cut off instead of rounded: Vancouver index 524.811 instead of 1098.892 (1983)

COMMON MISTAKES

✗ 0.04 × 2 = 0.8
✓ 2 digits after the point: 0.08.

✗ 0.6 × 2.47: digits of one number only counted
✓ count both: 3 digits, 1.482.

✗ 0.5850 ÷ 18 = 0.325
✓ keep the 0 for no tenths: 0.0325 (check: 18 × 0.325 = 5.85).

✗ point put in the quotient at the end
✓ put it when the first digit after the point is brought down.

✗ 171 ÷ 2.85: only the divisor × 100
✓ multiply both numbers by 100.

✗ 2.46 → 2.5 → 3
✓ round once: 2.46 ≈ 2.

✗ multiplying always makes bigger
✓ × 0.5 halves it.

✗ a decimal and a fraction added as they are
✓ same form first.