

Place Value and Decimals: practice solutions, Grade 5 – download the PDF

Written solutions to the chapter problems. Check each step, then correct yourself.

1 Value of each digit



- (a) The 8 is in the tens place: its value is **80**.
- (b) The 3 is in the tenths place: its value is **0.3**.
- (c) The 1 is in the hundredths place: its value is **0.01**.
- (d) The 7 is in the thousandths place: its value is **0.007**.

2 Ten times and one tenth



- (a) $7 = 10 \times 0.7$. To go one place right, divide by 10.
- (b) $0.08 = 10 \times 0.008$.
- (c) 0.4 is $\frac{1}{10}$ of 4, because $4 \div 10 = 0.4$.
- (d) 600 is $\frac{1}{10}$ of 6,000, because $6,000 \div 10 = 600$.

3 Powers of ten



(a) **100** has 2 zeros, so $100 = 10^2$. **100,000** has 5 zeros, so it is 10^5 . And $10 = 10^1$.

(b) $10^4 = 10 \times 10 \times 10 \times 10 = 10,000$ and $10^6 = 1,000,000$.

4 Words to numbers



(a) **9.427**

(b) **0.63**

(c) **0.005**: two placeholder zeros hold the tenths and hundredths places.

(d) **12.8**

5 Numbers to words



(a) thirty and two hundred five thousandths.

(b) nine hundredths.

(c) seven and eighteen thousandths.

6 Greater, less or equal



(a) $0.80 > 0.79$, since $8 > 7$ in the hundredths place: $>$.

(b) A zero at the end changes nothing: $=$.

(c) $0.099 < 0.100$: $<$.

(d) The tenths give $0 < 6$, so $12.06 < 12.6$: $<$.

7 Round to the nearest tenth



6.37: the hundredths digit is 7, so round up: **6.4**.

0.82: the hundredths digit is 2, so keep: **0.8**.

2.04: the hundredths digit is 4, so keep: **2.0**.

9.96: the hundredths digit is 6, so round up and carry: **10.0**.

8 Expanded form



(a)

$$73.406 = 7 \times 10 + 3 \times 1 + 4 \times 0.1 + 0 \times 0.01 + 6 \times 0.001 = 70 + 3 + 0.4 + 0.006.$$

(b) $200 + 0.5 + 0.009 = 200.509$; the tens, ones and hundredths places hold zeros.

(c) $6 + 0.8 + 0.03 = 6.83$.

9 Order from least to greatest



Write all with three decimal places: **4.052**, **4.250**, **4.500**, **4.205**, **4.025**. Compare tenths first: **4.052** and **4.025** have tenths 0, then **4.205** has 2, **4.250** has 2, and **4.500** has 5.

Among the two with tenths 0: **4.025** < **4.052**. Among the two with tenths 2:

$$4.205 < 4.250.$$

Answer: **4.025** < **4.052** < **4.205** < **4.25** < **4.5**.

10 Reading a number line



(a) The ticks go **4.20**, **4.21**, **4.22**, ... **A** = **4.22**, **B** = **4.26** (one tick after the halfway mark **4.25**), **C** = **4.29** (one tick before **4.30**).

(b) **4.22** $\approx$ **4.2** (hundredths digit 2, keep); **4.26** $\approx$ **4.3** (digit 6, round up); **4.29** $\approx$ **4.3** (digit 9, round up).

11 Multiplying by powers of 10



- (a) One place right: **34.2**.
- (b) Two places right: **6.8**.
- (c) Three places right, with two placeholder zeros: **5,700**.
- (d) $10^2 = 100$, so $0.4 \times 100 = 40$.
- (e) $10^3 = 1,000$, so $12.5 \times 1,000 = 12,500$.

12 Dividing by powers of 10



- (a) One place left: **0.45**.
- (b) The decimal point of 62 is after the 2; two places left gives **0.62**.
- (c) Three places left with placeholder zeros: **0.0083**.
- (d) $730 \div 100 = 7.3$.
- (e) $0.9 \div 100 = 0.009$.

13 Sprint times



The smallest time wins. Write every time with three decimals: **11.480**, **11.400**, **11.520**, **11.399**. The ones and tens match, so compare tenths: three times have tenths 4 and one has 5 (Cleo, last).

Among **11.480**, **11.400** and **11.399**: hundredths of **11.399** are 9... but tenths of **11.399** are 3, which is less than 4, so it is the smallest. Then **11.400 < 11.480**.

Order: Dev (**11.399**), Ben (**11.4**), Ava (**11.48**), Cleo (**11.52**). Dev won.

14 Rounding to different places



- (a) The tenths digit is 4, so keep: **7**.
- (b) The hundredths digit is 9, so round up: **7.5**.
- (c) The thousandths digit is 6, so round up: **$7.49 + 0.01 = 7.50$** .
- (d) The ten-thousandths digit is 8, so round up: **7.497**.

15 Metric conversions



- (a) **1 m = 100 cm**, so **$3.5 \times 100 = 350$ cm**.
- (b) **1 L = 1,000 mL**, so **$2,450 \div 1,000 = 2.45$ L**.
- (c) **$7.2 \div 100 = 0.072$ kg**. Since **1 kg = 1,000 g**, that is **$0.072 \times 1,000 = 72$ g**. Each packet holds **0.072 kg**, or **72 g**.

16 True or false?



- (a) False. **$0.30 = 0.3$** (equivalent decimals).
- (b) False. **$5.6 \times 100 = 560$** , not **5,600** (that would be **5.6×10^3**).
- (c) True. Each place to the left is worth 10 times as much: **$0.007 \times 10 = 0.07$** .
- (d) False. **$3.09 < 3.10$** , because the tenths are **$0 < 1$** .

17 Mystery number



- (a) Tens 2, ones 7, tenths **$7 - 3 = 4$** , hundredths 0, thousandths **$4 + 1 = 5$** : the number is **27.405**.
- (b) Twenty-seven and four hundred five thousandths.
- (c) The hundredths digit is 0, so keep the tenths digit: **27.4**.
- (d) **$27.405 \times 100 = 2,740.5$** .

18 Find the mistake



First mistake: Leo thought that multiplying by 10^3 means adding three zeros after the number. Zeros at the end of a decimal change nothing, so $2.5000 = 2.5$, which cannot be 1,000 times larger. The digits must move 3 places left: $2.5 \times 1,000 = 2,500$.

Second mistake: dividing by 10 makes the number **smaller**, but **4.5** is larger than **0.45**. Leo moved the point the wrong way. Correct: $0.45 \div 10 = 0.045$.

19 Digits and numbers in between



(a) Greatest: put the largest digits in the highest places: **7.530**. Least: **0.357** (the 0 goes in the ones place, then 3, 5, 7 in order).

(b) Write both as thousandths: **0.470** and **0.480**. For example **0.471, 0.475, 0.479**.

(c) They are **0.471, 0.472, ..., 0.479**: that makes **9** numbers.

20 Under the microscope



(a) $0.0042 \times 10^3 = 0.0042 \times 1,000 = 4.2$ cm.

(b) $0.0042 \times 100 = 0.42$ cm.

(c) **4.2** is **10** times **0.42** (one place to the left), since $10^3 \div 10^2 = 10$.

21 Capsule factory



(a) $4.6 \times 1,000 = 4,600$ g. Dividing by **1,000** to get kilograms: $4,600 \div 1,000 = 4.6$ kg.

(b) $4,600 \div 100 = 46$ g in each jar.

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Comparing places

(a) 500 and 50: $500 = 10 \times 50$, so 10 times.

(b) $50 = \frac{1}{10} \times 500$, so $\frac{1}{10}$.

(c) The hundredths 5 is worth 0.05. $500 \div 0.05 = 10,000 = 10^4$: the hundreds 5 is worth 10^4 times as much (four places to the left).

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