

Measurement and Data: practice solutions, Grade 4 – download the PDF

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

1 Customary conversions



- a. 1 ft = 12 in, so $3 \times 12 = 36$. Answer: 36 in.
- b. 1 yd = 3 ft, so $5 \times 3 = 15$. Answer: 15 ft.
- c. 1 mi = 5,280 ft, so $2 \times 5,280 = 10,560$. Answer: 10,560 ft.

2 Metric length conversions



- a. $4 \times 100 = 400$ cm.
- b. $7 \times 10 = 70$ mm.
- c. $6 \times 1,000 = 6,000$ m.

3 Weight and capacity



- a. $3 \times 16 = 48$ oz.
- b. $5 \times 1,000 = 5,000$ g.
- c. $4 \times 4 = 16$ qt.
- d. $6 \times 1,000 = 6,000$ mL.

4 Choose the best unit



- a. Inches: a pencil is about 7 inches long, far too short for miles.
- b. Kilograms: a bicycle is about 12 kg; in grams the number would be huge.
- c. Gallons: a pool holds thousands of gallons, so cups would be silly.
- d. Kilometers: cities are far apart, so kilometers keep the number small.

5 A movie at the theater



From 4:10 to 5:00 is 50 minutes. From 5:00 to 6:00 is 1 hour. Total:

$$50 \text{ min} + 1 \text{ h} = 1 \text{ h } 50 \text{ min.}$$

The movie lasts 1 hour 50 minutes.

6 Perimeter and area of a card



Perimeter: $2 \times (12 + 7) = 2 \times 19 = 38$ cm.

Area: $12 \times 7 = 84$ square centimeters.

7 Change at the store



Total cost: $2.75 + 1.40 = 4.15$ dollars. Change: $5.00 - 4.15 = 0.85$ dollars.

Maya gets \$0.85 back.

8 True or false?



- a. False. $2 \times 1,000 = 2,000$ mL.
- b. True. $3 \times 3 = 9$ ft.
- c. False. 1 m = 100 cm.
- d. True. 16 oz is 1 lb, and $24 - 16 = 8$ oz are left.

9 Mixed units



- a. $2 \times 12 = 24$, then $24 + 5 = 29$ in.
- b. $3 \times 100 = 300$, then $300 + 40 = 340$ cm.
- c. $4 \times 16 = 64$, then $64 + 6 = 70$ oz.

10 Swim practice



- a. From 5:35 to 6:00 is 25 min. From 6:00 to 7:00 is 1 h. From 7:00 to 7:10 is 10 min.
Total: $25 + 10 = 35$ min and 1 h, so 1 h 35 min.
- b. Go back 45 minutes from 3:20: back 20 min gives 3:00, back 25 more min gives 2:35.
The lesson started at 2:35 pm.

11 The missing side



Length: $72 \div 8 = 9$ ft, since $8 \times 9 = 72$.

Perimeter: $2 \times (9 + 8) = 2 \times 17 = 34$ ft.

12 Reading a line plot



a. Add the marks: $2 + 3 + 4 + 1 + 2 = 12$ plants.

b. There are 4 marks above $2\frac{1}{2}$: 4 plants.

c. Taller means to the right of $2\frac{1}{2}$: $1 + 2 = 3$ plants.

d. $3 - 2 = 1$ inch.

13 Cutting a rope



Convert first: $3 \text{ m} = 300$ cm. Then divide: $300 \div 25 = 12$.

There are 12 pieces.

14 At the movie snack bar



Tickets: $4 \times 6.50 = 26.00$ dollars. With popcorn: $26.00 + 3.75 = 29.75$ dollars.

Change: $30.00 - 29.75 = 0.25$. They get \$0.25 back.

15 Fencing a garden



Perimeter: $2 \times (14 + 9) = 46$ ft.

Panels: $46 \div 3 = 15$ remainder 1, so 15 panels leave 1 ft uncovered. Sam needs 16 panels.

Cost: $16 \times 12 = 192$ dollars. The panels cost \$192.

16 An L-shaped room



- a. Big rectangle: $10 \times 6 = 60$ sq m. Removed corner: $4 \times 3 = 12$ sq m. Area:
 $60 - 12 = 48$ sq m.
- b. Add all the sides: $6 + 3 + 4 + 3 + 10 + 6 = 32$ m. It is the same as the big rectangle: $2 \times (10 + 6) = 32$ m.
- c. $48 \times 9 = 432$ dollars. The carpet costs \$432.

17 Same perimeter, different areas



Length plus width must be $24 \div 2 = 12$ cm.

Length	Width	Area
11 cm	1 cm	11 sq cm
10 cm	2 cm	20 sq cm
9 cm	3 cm	27 sq cm
8 cm	4 cm	32 sq cm
7 cm	5 cm	35 sq cm
6 cm	6 cm	36 sq cm

The greatest area is 36 square centimeters, for the 6 cm by 6 cm square.

18 Same area, different perimeters



Look for pairs of factors of 24, then use $P = 2 \times (\ell + w)$.

- $24 \times 1: P = 2 \times 25 = 50$
- $12 \times 2: P = 2 \times 14 = 28$
- $8 \times 3: P = 2 \times 11 = 22$
- $6 \times 4: P = 2 \times 10 = 20$

The 6 by 4 rectangle has the least perimeter, 20 units.

19 Punch for a party



(a) $3 \text{ gal} = 3 \times 4 = 12 \text{ qt} = 12 \times 2 = 24 \text{ pt} = 24 \times 2 = 48 \text{ c}$. Jordan can pour 48 servings.

(b) $48 - 35 = 13$ cups left. Since $1 \text{ qt} = 4 \text{ c}$, $13 = 3 \times 4 + 1$, so 3 quarts and 1 cup remain.

20 Ribbon line plot



(a) Add the marks above $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$: $3 + 2 + 5 = 10$ ribbons.

(b) $3 \times \frac{1}{4} = \frac{3}{4}$; $2 \times \frac{1}{2} = 1$; $5 \times \frac{3}{4} = \frac{15}{4}$; $4 \times 1 = 4$. Sum in fourths:
 $\frac{3}{4} + \frac{4}{4} + \frac{15}{4} + \frac{16}{4} = \frac{38}{4} = 9\frac{2}{4}$. The total is $9\frac{1}{2}$ yards.

21 Train trip



(a) 9:48 to 10:00 is 12 min. 10:00 am to 1:00 pm is 3 h. 1:00 to 1:15 is 15 min. Total: 3 h and $12 + 15 = 27$ min, so 3 h 27 min.

(b) Half of 18.50 is 9.25. Adults: $2 \times 18.50 = 37.00$. Total: $37.00 + 9.25 = 46.25$. They pay \$46.25.



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