

Algebra 1 · Units, Quantities and Modeling · Test Answer Key

Common Core N-Q.A.1, N-Q.A.2, N-Q.A.3 · mathovore.fr

Use this key to grade the test. Each solution lists the work and a scoring guide, so partial credit can be given when the setup is correct but the arithmetic slips. Total possible score is 20 points.

Algebra 1 Common Core: N-Q.A.1 · N-Q.A.2 · N-Q.A.3

Question 1: Two conversions (2 points)

a. $3.25 \times 5280 = 17,160 \text{ ft.}$

b. $252 \div 60 = 4.2 \text{ h.}$

Scoring: 1 point for each correct converted value with its unit.

Question 2: Speed in feet per second (3 points)

$$55 \frac{\text{mi}}{\text{h}} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{1 \text{ h}}{3600 \text{ s}} = \frac{290,400 \text{ ft}}{3600 \text{ s}} \approx 80.7 \frac{\text{ft}}{\text{s}}.$$



Conversion chain.

About 80.7 ft/s

Scoring: 1 point for each correct conversion factor (2), 1 point for the value rounded correctly.

Question 3: Units of a quotient (2 points)

$$\frac{60 \text{ mi}}{1 \text{ h}} \times \frac{1 \text{ gal}}{30 \text{ mi}} = 2 \frac{\text{gal}}{\text{h}}.$$

The truck uses 2 gallons of fuel per hour.

Scoring: 1 point for the value 2 with units gal/h, 1 point for the interpretation.

Question 4: Filling a container (3 points)

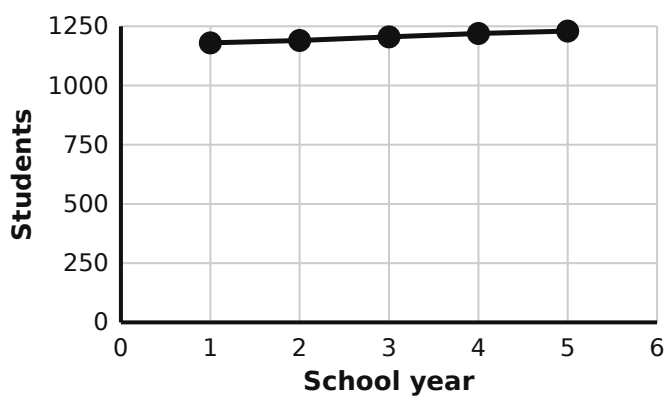
- a. $3 \times 2 \times 1.5 = 9 \text{ ft}^3$.
- b. $9 \times 7.48 = 67.32 \text{ gal}$.
- c. $67.32 \div 8 = 8.415 \approx 8.4 \text{ min}$.

9 ft³; 67.32 gal; about 8.4 min

Scoring: 1 point for each part, with units.

Question 5: Scale of a graph (3 points)

- a. $1230 - 1180 = 50$ students.
- b. Axis height: $1250 - 1150 = 100$. $\frac{50}{100} = 50\%$.
- c. $\frac{50}{1250} = 0.04 = 4\%$. The graph that starts at 1150 makes the change look larger.



The same data with the axis starting at 0.

50 students; 50%; 4%

Scoring: 1 point per part.

Question 6: Defining a quantity (2 points)

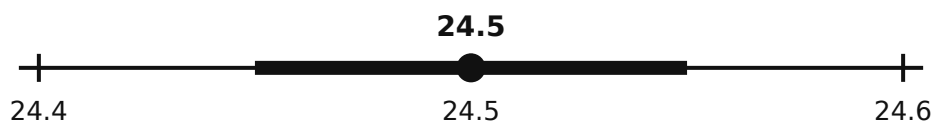
Let m be the distance in miles and C the cost in dollars: $C = 20 + 0.5m$. For $m = 18$:
 $C = 20 + 9 = 29$.

$$C = 20 + 0.5m; \$29$$

Scoring: 1 point for variables with units and the equation, 1 point for the cost.

Question 7: Accuracy of a poster (3 points)

- a. $24.5 \times 18.2 = 445.9$. Each measurement has three significant digits, so the area is reported as 446 in^2 .
- b. The measurement is within 0.05 of 24.5: $24.45 \leq w < 24.55$.



Shaded: 24.45 up to 24.55

The actual width is in the shaded interval.

Scoring: (a) 1 point for 445.9, 1 point for rounding to 3 digits; (b) 1 point for both bounds with correct inequality signs.

Question 8: Trip planning (2 points)

Gallons: $350 \div 25 = 14$. Cost: $14 \times \$4.00 = \$56$. Per mile: $\$56 \div 350 = \$0.16$.

14 gal; \$56; \$0.16 per mile

Scoring: 1 point for the gallons and cost, 1 point for the cost per mile with units.

Total
20 points