

Using Units to Solve Multi-Step Problems

Grade 9 – Algebra 1 math · Test Answer Key · Standards: N-Q.A.1, N-Q.A.2, N-Q.A.3

Use this answer key to score the test. Award points for correct setups as well as for correct final answers, and give credit for equivalent forms such as 1.5 h or 90 minutes when the unit is stated.

Standards: N-Q.A.1, N-Q.A.2, N-Q.A.3 · **Level:** Grade 9 Algebra 1

Question 1 Miles to feet (2 points)

$$5.5 \text{ mi} \times \frac{(5,280 \text{ ft})}{(1 \text{ mi})} = 29,040 \text{ ft.}$$

29,040 feet

Scoring: 1 point for a correct factor with miles cancelling, 1 point for the answer.

Question 2 Feet per second to miles per hour (2 points)

$$22 \text{ ft/s} \times 3,600 \text{ s/h} = 79,200 \text{ ft/h. Then } 79,200 \div 5,280 = 15.$$

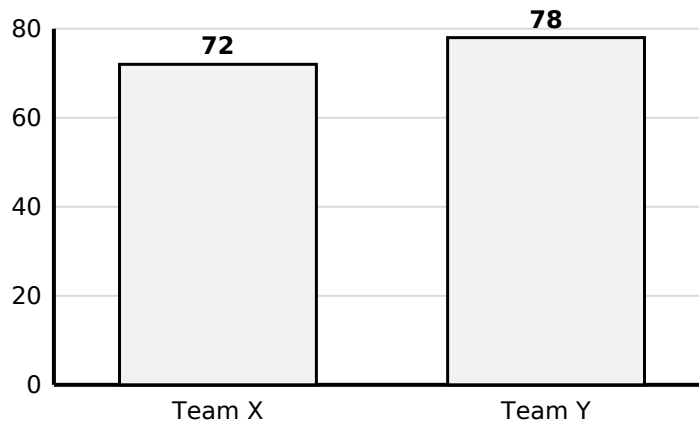
15 mi/h

Scoring: 1 point for converting seconds to hours, 1 point for converting feet to miles and the answer.

Question 3 Reading a graph scale (2 points)

(a) Bar heights from 70: $72 - 70 = 2$ and $78 - 70 = 8$. Ratio $8 \div 2 = \mathbf{4 \text{ times}}$.

(b) $78 \div 72 = 13/12 \approx \mathbf{1.08}$.



Same data with the axis starting at 0.

Scoring: 1 point for each part. The graph exaggerates the gap because the axis starts at 70.

Question 4 Earnings (2 points)

3 h 45 min = 3.75 h. Pay: $\$15.60 \times 3.75 = \$58.50$.

\$58.50

Scoring: 1 point for converting the time to 3.75 hours, 1 point for the pay.

Question 5 Area of a rug (2 points)

Length 2.5 yd = 7.5 ft, width 3 yd = 9 ft. Area: $7.5 \times 9 = 67.5 \text{ ft}^2$.

Check: $7.5 \text{ yd}^2 \times 9 = 67.5$.

67.5 ft²

Scoring: 1 point for converting both dimensions (or using 9 ft² per yd²), 1 point for the area.

Question 6 Draining a tank (3 points)

(a) $2,400 \div 6.4 = 375$ minutes.

(b) $375 \div 60 = 6.25$ hours.

375 minutes = 6.25 hours

Scoring: (a) 1 point for dividing volume by rate, 1 for 375; (b) 1 point.

Question 7 Better cereal buy (3 points)

A: $\$4.14 \div 18 = \$0.23$ per oz. B: $1.25 \times 16 = 20$ oz, $\$4.50 \div 20 = \$0.225$ per oz.

Cereal B is the better buy.

Scoring: 1 point for 20 ounces, 1 point for both unit prices, 1 point for the conclusion.

Question 8 Accuracy of a measurement (2 points)

$4.6 \times 2.3 = 10.58 \text{ ft}^2$. With two significant figures: 11 ft^2 .

11 ft^2

Scoring: 1 point for the product, 1 point for rounding to two significant figures.

Question 9 Choosing an axis (2 points)

(a) Ticks at 1,200, 1,300, ..., 2,000: **9 ticks**.

(b) Data range: $1,980 - 1,240 = 740$ ft. Axis length: 800 ft. $740 \div 800 = 0.925 = \mathbf{92.5\%}$.

Scoring: 1 point for each part.