

Algebra 1 · Units, Quantities and Modeling · Worksheet

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

Name: _____ Date: ____/____/____ Score: _____

These problems practice unit conversions, dimensional analysis, defining quantities, choosing graph scales and origins, and reporting answers with a sensible level of accuracy (N-Q.A.1, N-Q.A.2 and N-Q.A.3). They start with single conversions and finish with multi-step word problems. Show the units in every step.

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

Problem 1: Miles to feet

Convert 5 mi to feet. Use $1 \text{ mi} = 5280 \text{ ft}$.

Problem 2: Hours to seconds

Convert 3.5 h to seconds.

Problem 3: Inches to yards

Convert 72 in to yards. Use $1 \text{ yd} = 36 \text{ in}$.

Problem 4: Miles per hour to feet per second

Convert 45 mi/h to feet per second.

Problem 5: Gallons to cups

Convert 2.5 gal to cups. Use $1 \text{ gal} = 4 \text{ qt}$ and $1 \text{ qt} = 4 \text{ cups}$.

Problem 6: Units of a product

Maya earns \$14 per hour and works 18 hours per week for 6 weeks. Write the product with units, cancel the units, and find the total she earns.

Problem 7: Cost per mile

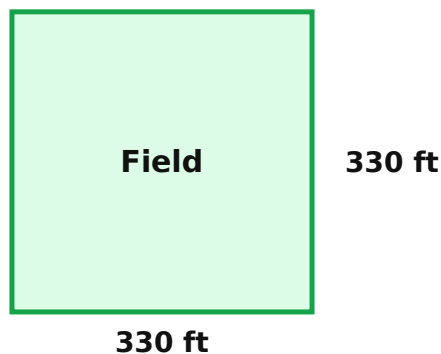
A car gets 28 mi/gal and gas costs \$3.50 per gallon. Find the cost of gas per mile.

Problem 8: Weight of water

Fresh water weighs about 62.4 lb/ft³. Find the weight of 8 ft³ of water.

Problem 9: Acres of a field

A square field measures 330 ft on each side. Find its area in acres. Use $1 \text{ acre} = 43,560 \text{ ft}^2$.



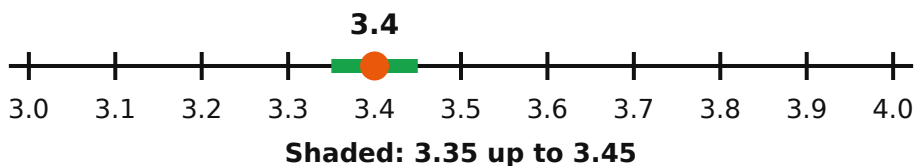
Square field, 330 ft by 330 ft.

Problem 10: Square feet to square yards

Convert 540 ft^2 to square yards.

Problem 11: Reading a measurement

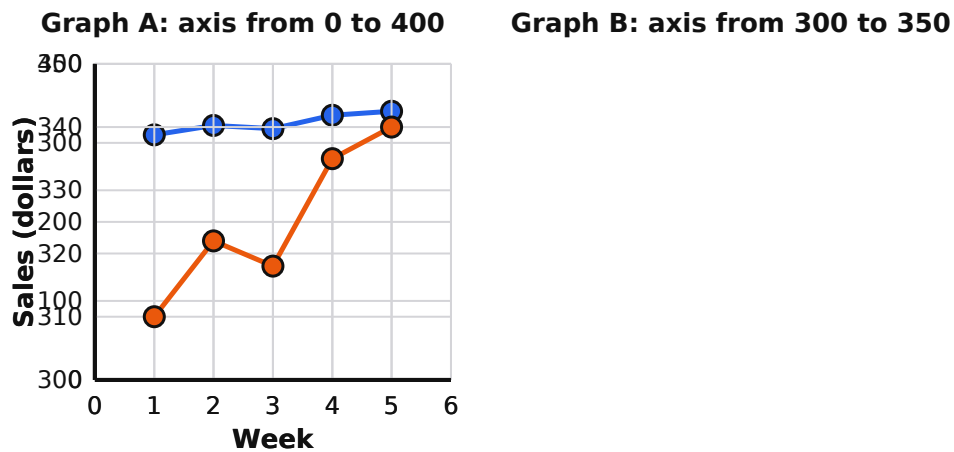
A ruler marked in tenths of an inch shows a pencil's length as 3.4 in, as in the figure. Write an inequality for the actual length L .



The reading is 3.4 inches.

Problem 12: Choosing a vertical scale

Diego tracks weekly school-store sales in dollars: 310, 322, 318, 335 and 340. Graph A uses a vertical axis from 0 to 400, and Graph B uses a vertical axis from 300 to 350. For each graph, find what percent of the axis height the data range covers.



Same sales, two different scales.

Problem 13: Choosing an origin

A town's population P is measured in thousands, and x is the number of years since 2010. (a) Find x for the year 2026. (b) Explain what $P = 48.3$ means. (c) Find the year when $x = 22$.

Problem 14: Defining a quantity

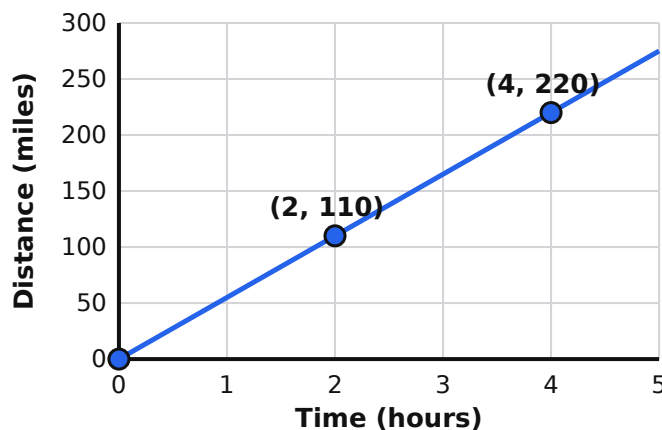
A kayak rental charges an \$8 fee plus \$12 per hour. Define variables with units, write an equation for the total cost, and find the cost for 3 hours and the hours possible with \$80.

Problem 15: Rounding a product

Aisha measures a rectangle as 7.3 in by 4.8 in, each to the nearest tenth of an inch. Her calculator shows an area of 35.04 in^2 . Report the area with an appropriate level of accuracy.

Problem 16: Units of a slope

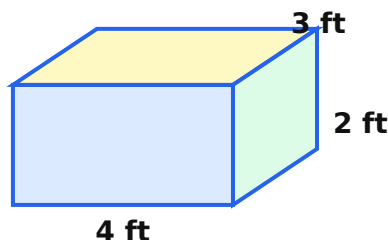
The graph shows the distance d a delivery truck travels in t hours. (a) Find the slope. (b) State its units and meaning. (c) Find the distance traveled in 3.5 hours.



A distance-time graph.

Problem 17: Gallons in a tank

A tank is 4 ft long, 3 ft wide and 2 ft tall. One cubic foot holds about 7.48 gallons. Find the number of gallons the tank holds.



Rectangular tank.

Problem 18: Percent error of a length

A board is measured as 12.5 ft to the nearest tenth of a foot. Find the greatest possible error in the measurement and write it as a percent of 12.5 ft.

Problem 19: Speed of sound

Sound travels about 1125 ft/s in air. Convert this speed to miles per hour and round to the nearest whole number.

Problem 20: Walking time

Liam walks at 3.2 mi/h. Find how long he needs to walk 8 mi, in hours and in hours and minutes.

Problem 21: Filling the gas tank

Priya's car gets 32 mi/gal and has a 12-gallon tank. Gas costs \$3.80 per gallon. Find (a) the cost to fill an empty tank, (b) the distance on a full tank, and (c) the gas cost per 100 miles, to the nearest cent.

Problem 22: Filling a pool

A hose delivers 12 gal/min to a pool that needs 6,000 gallons. Water costs \$4.50 per 1,000 gallons. Find the fill time in hours and minutes and the cost of the water.

Problem 23: Printing a packet

Noah must print 2,700 pages on a printer that prints 18 pages per minute, double-sided (two pages per sheet). A ream holds 500 sheets and costs \$6.25. Find the printing time in hours, and the cost of the reams he must buy.