

Proportions and Ratios

Hope Chinese School Fall Week 2

August 26, 2017

Problems

★ means difficult.

1. Two identical blue boxes together weigh the same as three identical red boxes together. Each red box weighs 10 ounces. How much does one blue box weigh?
2. Spending at a rate of 100 dollars per minute, how many weeks will it take Janelle to spend 1 million dollars? Express your answer to the nearest whole number.
3. Each side of square $ABCD$ is doubled in length to form square $EFGH$. The perimeter of square $EFGH$ is 40 cm. What is the area of square $ABCD$?
4. If the ratio of a to b is $\frac{7}{3}$, what is the ratio of $2a$ to b ?
5. Bob wants to buy a \$100 item. He wants to first apply his 25% off coupon before his 20% off coupon on the item. However, the cashier says, after doing some calculations, that he saves more if he applies the 20% off coupon first. How much *more* does Bob save if he accepts the cashier's suggestion than if he doesn't? (Give a negative answer if Bob's original method actually saves more.)
6. Penny has $4x$ apples and $7y$ oranges. If she has the same number of apples and oranges, what is the ratio of x and y ?
7. The same amount of steel used to create eight solid steel balls, each with a radius of 1 inch, is used to create one larger steel ball. What is the radius of the larger ball?
8. A railroad trestle spans a gorge 80 feet wide and connects two cliffs at heights of 112 and 172 feet above the bottom of the gorge. A train is crossing this gorge from the higher cliff to the lower. When the front of the train has traveled $\frac{3}{4}$ of the trestle's length, how many feet is it above the bottom of the gorge?
9. If one quart of paint is exactly enough for two coats of paint on a 9 foot by 10 foot wall, how many quarts of paint are needed to apply one coat of paint on a 10 foot by 12 foot wall?

10. 4 quas can be traded for 8 quabs, 2 quabs can be traded for 3 quacs, and 12 quads can be traded for 9 quacs. (Fractional quas, quabs, quacs, and quads are allowed). How many quads can 17 quas be traded for?
11. Pat's Pizza decides to increase the circumference of its pizzas by 20%. By what percent does the area of its pizzas increase?
12. Eric is a professional cube painter. He notices that he uses exactly one can of neon green paint to completely paint a cube of volume 5 cubic meters. Then he notices that he used exactly four cans of neon green paint to completely paint a larger cube. What is the volume of the larger cube?
13. The area of a rectangle is 6000 square centimeters. What would be the new area if the length of the rectangle was increased by 10% and the width of the rectangle was decreased by 10%?
14. ★ What two palindromes on a 12-hour digital clock are 2 minutes apart?
Note: a palindrome is a number that is the same if you read it in reverse. For example, 12321 and 77 are palindromes. This clock does not show leading zeros: for example, when the clock displays 1:01 it should be read as "101", not "0101".
15. ★ Anastasia runs at a steady speed of 12 miles per hour, while Kristina runs at a steady speed of 10 miles per hour. They both start at the same spot on a circular track $\frac{1}{4}$ -mile long and run in opposite directions. How many miles will Anastasia have run when they meet for the 30th time?