

6. Linear function word problems



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1. Vendors at a craft fair pay \$45 to rent a table for the day. Benjamin rents a table at the craft fair and sells 8 ounce jars of jam for \$7.95 per jar. If it costs Benjamin \$2.75 to make each container of jam, which of the following equations best models his profit, p , from one day at the craft fair if he sells n jars of jam?

- A. $p = 5.20n$
- B. $p = 7.95n$
- C. $p = 5.20n - 45$
- D. $p = 7.95n - 45$

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2. John manufactures household furniture. His start-up costs, including tools, plans, and advertising, total \$5000. Labor and materials for each piece of furniture total \$350, and his production costs are the sum of his start-up costs plus the cost of labor and materials. If John makes f pieces of furniture, what will be his production costs, c , in dollars?

- A. $f = 350c + 5000$
- B. $c = 350f + 5000$
- C. $f = 5000c + 350$
- D. $c = 5000f + 350$

3. Imani's grandmother's house is 5 miles west of her own house down Main Street. While at her grandmother's, Imani decides to ride her bike farther west down Main Street at 10 miles per hour. Which equation best describes the distance, d , in miles, Imani is from home after t hours?

- A. $d = 5 + 10t$
- B. $d = 5 - 10t$
- C. $d = 5t + 10$
- D. $d = 5t - 10$

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4. From 2005 to 2013, the population of Belize has been increasing by approximately 7,500 people per year. The population of Belize in 2010 was 308,595. If t stands for years since 2005, which of the following functions best models the population, p , of Belize during this time period?

- A. $p(t) = 271,095 + 7,500t$
- B. $p(t) = 308,595 + 7,500t$
- C. $p(t) = 346,095 + 7,500t$
- D. $p(t) = -14,728,905 + 7,500t$

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5. A 300-room hotel collects \$75 per occupied room and does not collect any money for vacant rooms. Which of the following functions best represents how many dollars, d , the hotel generates given the number of vacant rooms in the hotel, v ?

- A. $d = 75(300 - v)$
- B. $d = 75(300 + v)$
- C. $d = 300(75 - v)$
- D. $d = 300(75 + v)$

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6. Dalia makes a cranberry apple punch that contains 20% real juice by mixing x gallons of a cranberry drink with y gallons of an apple drink. The cranberry drink contains 40% real juice and the apple drink contains 10% real juice. Which of the following equations represents the relationship between x and y ?

- A. $0.4x + 0.1y = 20$
- B. $0.4x + 0.1y = x + y$
- C. $0.20(x + y) = x + y$
- D. $0.2(x + y) = 0.4x + 0.1y$

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7. Between 2008 and 2012, the revenue obtained from digital music album downloads, r , in millions of dollars, in the United States increased by approximately 132 million dollars per year.

In 2010, the digital music revenue in the U.S. was about 872 million dollars. If t represents years since 2008, which of the following best models the situation for $0 \leq t \leq 4$?

- A. $r(t) = 132t$
- B. $r(t) = 132t + 608$
- C. $r(t) = 132t + 872$
- D. $r(t) = 132t + 1136$

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8. Mikayla is a waitress who makes a guaranteed \$50 per day in addition to tips of 20% of all her customer receipts, t . She works six days per week. Which of the following functions best represents the amount of money that Mikayla makes in one week?

- A. $f(t) = 50 + 20t$
- B. $f(t) = 300 + 20t$
- C. $f(t) = 50 + 0.2t$
- D. $f(t) = 300 + 0.2t$

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9. Maria burns about 600 calories per hour jogging and about 450 calories per hour biking. If Maria spends x hours per day biking, and $\frac{4}{5}$ as much time jogging, which of the following functions best models the amount of calories, C , that Maria burns in one day from jogging and biking?

- A. $C(x) = 840x$
- B. $C(x) = 930x$
- C. $C(x) = 960x$
- D. $C(x) = 1050x$

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10. Mikayla walked nine miles in three hours. She walked f miles during the first hour and $\frac{2}{3}$ of the remaining distance during the second hour. Which of the following functions best represents the number of miles in the third hour, t , she had to walk in terms of the number of miles she walked in the first hour, f ?

- A. $t=3$
- B. $t=3-\frac{1}{3}f$
- C. $t=3+\frac{2}{3}f$
- D. $t=3+f$

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11. The gas tank in Ms. Brown's car holds a total of 15 gallons. At any given time, how many gallons, g , will Ms. Brown have to pump into her car to fill her tank given the fraction of the tank, f , already filled?

- A. $g = 15f$
- B. $g = \frac{15}{f}$
- C. $g = 15 - 15f$
- D. $g = 15 - \frac{15}{f}$

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12. silver is an alloy of silver that is 92.5% pure silver. If x grams of sterling silver are mixed with y grams of an 88% silver alloy to produce a 91% silver alloy, which of the following equations correctly relates x and y ?

- A. $0.075x + .12y = 0$
- B. $0.015x - 0.03y = 0$
- C. $0.925x + 0.88y = 91$
- D. $0.925x + 0.88y = 0.91xy$

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