24HourAnswers.com

Online Homework

Focused Exercises for Math SAT

Skill Set 22: Dimensional Analysis

Many of the problems in this exercise set came from The College Board, writers of the SAT exam.

1. Two companies charge different rates for painting lines on a road.

• Company *X* charges \$0.50 per foot of painted line and no base price.
• Company *Y* charges a \$100.00 base price plus \$0.30 per foot of line.

Which of the following expressions gives the charge, in dollars, for painting f feet of line if Company *X* does the job?

(A) $0.20f$

(B) $0.50f$

(C) $f + 0.50$

(D) $0.20f + 100$

(E) $\dfrac{f}{0.50}$

2. Tim had $2b$ books for sale at a price of k dollars each. If y is the number of books he did not sell, which of the following represents the total dollar amount he received in sales from the books.

(A) $k\left(2b - y\right)$
(B) $k\left(y - 2b\right)$
(C) $ky - 2b$
(D) $2b - ky$
(E) $2bk - y$

3. Maple syrup leaks out of a container at the rate of ℓ liters in h hours. If the maple syrup costs 8 dollars per liter, how many dollars' worth will be lost in x hours?

(A) $\frac{8\ell x}{h}$

(B) $\frac{\ell x}{8h}$

(C) $\frac{8h}{\ell x}$

(D) $\frac{\ell h}{8x}$

(E) $\frac{hx}{\ell}$

4. A group of s children has collected 650 bottle caps. If each child collects w more bottle caps per day for the next d days, which of the following represents the number of bottle caps that will be in the group's collection?

(A) $650sw$

(B) $650 + \frac{dw}{s}$

(C) $650 + \frac{ds}{w}$

(D) $650 + sw + d$

(E) $650 + dsw$

5. Pat has s grams of strawberries and uses 40 percent of the strawberries to make pies, each of which requires p grams. The rest of the strawberries are used to make pints of jam, each of which requires j grams. Which of the following gives the number of pints of jam Pat can make?

(A) $\frac{2s}{5p}$

(B) $\frac{2s}{5j}$

(C) $\frac{3s}{5j}$

(D) $\frac{3p}{5s}$

(E) $\frac{3sj}{5}$

6. In a certain school, there are k classes with n students in each class. If a total of p pencils are distributed equally among these students, how many pencils are there for each student?

(A) $\frac{p}{kn}$

(B) $\frac{kn}{p}$

(C) $\frac{kp}{n}$

(D) $\frac{np}{k}$

(E) npk

7. A total of k passengers went on a bus trip. Each of the n buses that were used to transport the passengers could seat a maximum of x passengers. If one bus had 3 empty seats and the remaining buses were filled, which of the following expresses the relationship among n, x, and k ?

(A) $nx - 3 = k$
(B) $nx + 3 = k$
(C) $n + x + 3 = k$
(D) $nk = x + 3$
(E) $nk = x - 3$

8. How many seconds are there in m minutes and s seconds?

(A) $60m + s$

(B) $m + 60s$

(C) $60(m + s)$

(D) $\frac{m + s}{60}$

(E) $\frac{m}{60} + s$

9. The price of ground coffee beans is d dollars for 8 ounces and each ounce makes c cups of brewed coffee. In terms of c and d, what is the dollar cost of the ground coffee beans required to make 1 cup of brewed coffee?

(A) $\frac{d}{8c}$

(B) $\frac{cd}{8}$

(C) $\frac{8c}{d}$

(D) $\frac{8d}{c}$

(E) $8cd$

10. During a sale, a customer can buy one shirt for x dollars. Each additional shirt the customer buys costs z dollars less than the first shirt. For example, the cost of the second shirt is $x - z$ dollars. Which of the following represents the customer's cost, in dollars, for n shirts bought during this sale?

(A) $x + (n - 1)(x - z)$

(B) $x + n(x - z)$

(C) $n(x - z)$

(D) $\dfrac{x + (x - z)}{n}$

(E) $(x - z) + \dfrac{(x - z)}{n}$

11. Dwayne has a newspaper route for which he collects k dollars each day. From this amount he pays out $\dfrac{k}{3}$ dollars per day for the cost of the papers, and he saves the rest of the money. In terms of k, how many days will it take Dwayne to save \$1,000 ?

(A) $\dfrac{k}{1{,}500}$

(B) $\dfrac{k}{1{,}000}$

(C) $\dfrac{1{,}000}{k}$

(D) $\dfrac{1{,}500}{k}$

(E) $1{,}500k$

12. Ahmad has containers of two different sizes. The total capacity of 16 containers of one size is x gallons, and the total capacity of 8 containers of the other size is also x gallons, and $x > 0$. In terms of x, what is the capacity, in gallons, of each of the larger containers?

(A) 4x

(B) 2x

(C) $\frac{x}{2}$

(D) $\frac{x}{8}$

(E) $\frac{x}{16}$

13. To celebrate a colleague's graduation, the m coworkers in an office agreed to contribute equally to a catered lunch that costs a total of y dollars. If p of the coworkers fail to contribute, which of the following represents the additional amount, in dollars, that each of the remaining coworkers must contribute to pay for the lunch?

(A) $\frac{y}{m}$

(B) $\frac{y}{m-p}$

(C) $\frac{py}{m-p}$

(D) $\frac{y(m-p)}{m}$

(E) $\frac{py}{m(m-p)}$

14. The cost of 3 sweatshirts is d dollars. At this rate, what is the cost, in dollars, of 30 sweatshirts?

(A) $\frac{10d}{3}$

(B) $\frac{d}{30}$

(C) $\frac{30}{d}$

(D) $10d$

(E) $30d$

15. The tip of a blade of an electric fan is 1.5 feet from the axis of rotation. If the fan spins at a full rate of 1,760 revolutions per minute, how many miles will a point at the tip of a blade travel in one hour? (1 mile = 5,280 feet)

(A) 30π
(B) 40π
(C) 45π
(D) 48π
(E) 60π

16. A machine mints coins at the rate of one coin per second. If it does this for 10 hours each day, approximately how many days will it take the machine to mint 360,000 coins?

(A) 10
(B) 100
(C) 1,000
(D) 10,000
(E) 100,000

17. If there is no waste, how many square yards of carpeting is needed to cover a rectangular floor that is 12 feet by 18 feet? (1 yard = 3 feet)

(A) 8
(B) 16
(C) 24
(D) 30
(E) 216

18. How many <u>minutes</u> are required for a car to go 10 miles at a constant speed of 60 miles per hour?

(A) 600
(B) 100
(C) 60
(D) 10
(E) 6

19. While driving on a 500-mile trip, Mr. Smith averages 60 miles per hour for the first t hours. In terms of t, where $t < 8$, how many miles remain to be traveled?

(A) $60t - 500$

(B) $500 - 60t$

(C) $30{,}000 - t$

(D) $500 - \frac{60}{t}$

(E) $\frac{500}{60t}$

20. If 14 milliliters of a certain liquid has a mass of 16 grams, what is the mass, in grams, of 28 liters of this liquid? (1 liter = 1,000 milliliters)

(A) 8
(B) 32
(C) 3,200
(D) 8,000
(E) 32,000

21. The price of 10 pounds of apples is d dollars. If the apples weigh an average of 1 pound for every 6 apples, which of the following is the average price, in cents, of a dozen such apples?

(A) $20d$

(B) $\frac{50d}{3}$

(C) $5d$

(D) $\frac{5d}{3}$

(E) $\frac{d}{20}$