Question ID 10fd67a3

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: 10fd67a3

An object has a mass of 168 grams and a volume of 24 cubic centimeters. What is the density, in grams per cubic centimeter, of the object?

A. 7

B. 144

C. 192

D. $4,032$

ID: 10fd67a3 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the object has a mass of 168 grams and a volume of 24 cubic centimeters. Dividing the mass, in grams, of the object by the volume, in cubic centimeters, of the object gives the density, in grams per cubic centimeter, of the object. It follows that the density of the object is $\frac{168 \text{ grams}}{24 \text{ cubic centimeters}}$, which is equivalent to $\frac{168}{24}$ grams per cubic centimeter, or 7 grams per cubic centimeter.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 34f7cb5d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

A distance of 354 furlongs is equivalent to how many <u>feet</u>?
$(1 \text{ furlong} = 220 \text{ yards and } 1 \text{ yard} = 3 \text{ feet})$

A. 306

B. 402

C. $25{,}960$

D. $233{,}640$

Correct Answer: D

Rationale

Choice D is correct. It's given that $1 \text{ furlong} = 220 \text{ yards}$ and $1 \text{ yard} = 3 \text{ feet}$. It follows that a distance of 354 furlongs is equivalent to $(354 \text{ furlongs})\left(\frac{220 \text{ yards}}{1 \text{ furlong}}\right)\left(\frac{3 \text{ feet}}{1 \text{ yard}}\right)$, or $233{,}640$ feet.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 8ce82ad5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: 8ce82ad5

At a particular track meet, the ratio of coaches to athletes is 1 to 26. If there are x coaches at the track meet, which of the following expressions represents the number of athletes at the track meet?

A. $\frac{x}{26}$

B. $26x$

C. $x + 26$

D. $\frac{26}{x}$

ID: 8ce82ad5 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that at a particular track meet, the ratio of coaches to athletes is 1 to 26. If one number in a ratio is multiplied by a value, the other number must be multiplied by the same value in order to maintain the same ratio. If there are x coaches at the track meet, multiplying both numbers in the ratio by x yields $1(x)$ to $26(x)$, or x to $26x$. Therefore, the expression $26x$ represents the number of athletes at the track meet.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 77c4a10b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: 77c4a10b

One of a planet's moons orbits the planet every 252 days. A second moon orbits the planet every 287 days. How many more days does it take the second moon to orbit the planet 29 times than it takes the first moon to orbit the planet 29 times?

ID: 77c4a10b Answer

Correct Answer: 1015

Rationale

The correct answer is $1,015$. It's given that the first moon orbits the planet every 252 days. Therefore, it takes the first moon $252(29)$, or $7,308$, days to orbit the planet 29 times. It's also given that the second moon orbits the planet every 287 days. Therefore, it takes the second moon $287(29)$, or $8,323$, days to orbit the planet 29 times. Since it takes the first moon $7,308$ days and the second moon $8,323$ days, it takes the second moon $8,323 - 7,308$, or $1,015$, more days than it takes the first moon to orbit the planet 29 times.

Question Difficulty: Medium

Question ID 8dd9d75e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

How many <u>fluid ounces</u> are equivalent to 76 quarts? $(8 \text{ fluid ounces} = 1 \text{ cup and } 4 \text{ cups} = 1 \text{ quart})$

Correct Answer: 2432

Rationale

The correct answer is $2,432$. It's given that $4 \text{ cups} = 1 \text{ quart}$. It follows that 76 quarts is equivalent to $(76 \text{ quarts})\left(\frac{4 \text{ cups}}{1 \text{ quart}}\right)$, or 304 cups. It's also given that $8 \text{ fluid ounces} = 1 \text{ cup}$. It follows that 304 cups is equivalent to $(304 \text{ cups})\left(\frac{8 \text{ fluid ounces}}{1 \text{ cup}}\right)$, or $2,432$ fluid ounces.

Question Difficulty: Medium

Question ID b6843bc7

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: b6843bc7

A triathlon is a multisport race consisting of three different legs. A triathlon participant completed the cycling leg with an average speed of 19.700 miles per hour. What was the average speed, in <u>yards</u> per hour, of the participant during the cycling leg? $(1 \text{ mile} = 1{,}760 \text{ yards})$

ID: b6843bc7 Answer

Correct Answer: 34672

Rationale

The correct answer is $34{,}672$. It's given that $1 \text{ mile} = 1{,}760 \text{ yards}$. It follows that an average speed of 19.700 miles per hour is equivalent to $\left(\frac{19.700 \text{ miles}}{1 \text{ hour}}\right)\left(\frac{1{,}760 \text{ yards}}{1 \text{ mile}}\right)$, or $34{,}672$ yards per hour.

Question Difficulty: Medium

Question ID 664315f9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: 664315f9

For the values j and k, the ratio of j to k is 11 to 12. If j is multiplied by 17, what is k multiplied by in order to maintain the same ratio?

ID: 664315f9 Answer

Correct Answer: 17

Rationale

The correct answer is 17. If one value is multiplied by a number, then the other value must be multiplied by the same number in order to maintain the same ratio. It's given that j is multiplied by 17. Therefore, in order to maintain the same ratio, k must also be multiplied by 17.

Question Difficulty: Medium

Question ID 58f4cf97

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

An insect moves at a speed of $\frac{3}{20}$ feet per second. What is this speed, in <u>yards</u> per second? $(3 \text{ feet} = 1 \text{ yard})$

A. $\frac{1}{20}$

B. $\frac{9}{20}$

C. 6

D. 20

Correct Answer: A

Rationale

Choice A is correct. It's given that $3 \text{ feet} = 1 \text{ yard}$. It follows that a speed of $\frac{3}{20}$ feet per second is equivalent to $\left(\frac{\frac{3}{20} \text{ feet}}{1 \text{ second}} \right) \left(\frac{1 \text{ yard}}{3 \text{ feet}} \right)$, which is equivalent to $\left(\frac{3}{20} \right) \left(\frac{1}{3} \right)$, or $\frac{1}{20}$, yards per second.

Choice B is incorrect. This is the speed, in feet per second, that's equivalent to $\frac{3}{20}$ yards per second.

Choice C is incorrect. This is the speed, in yards per second, that's equivalent to 18, not $\frac{3}{20}$, feet per second.

Choice D is incorrect. This is the speed, in yards per second, that's equivalent to 60, not $\frac{3}{20}$, feet per second.

Question Difficulty: Medium

Question ID e9fe7acd

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: e9fe7acd

A competition consisted of four different events. One participant completed the first event with an average speed of 20.300 miles per hour. What was this average speed, in <u>yards</u> per hour? $(1 \text{ mile} = 1{,}760 \text{ yards})$

ID: e9fe7acd Answer

Correct Answer: 35728

Rationale

The correct answer is $35{,}728$. It's given that $1 \text{ mile} = 1{,}760 \text{ yards}$. It follows that an average speed of 20.300 miles per hour is equivalent to $\left(\frac{20.300 \text{ miles}}{1 \text{ hour}}\right)\left(\frac{1{,}760 \text{ yards}}{1 \text{ mile}}\right)$, or $35{,}728$ yards per hour.

Question Difficulty: Medium

Question ID bf75726f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: bf75726f

The population density of Cedar County is 230 people per square mile. The county has a population of $85,100$ people. What is the area, in square miles, of Cedar County?

ID: bf75726f Answer

Correct Answer: 370

Rationale

The correct answer is 370. It's given that the population density of Cedar County is 230 people per square mile and the county has a population of $85,100$ people. Based on the population density, it follows that the area of Cedar County is $(85,100 \text{ people}) \left(\frac{1 \text{ square mile}}{230 \text{ people}} \right)$, or 370 square miles.

Question Difficulty: Medium

Question ID adf742ae

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: adf742ae

If $\frac{x}{y} = 4$ and $\frac{24x}{ny} = 4$, what is the value of n?

ID: adf742ae Answer

Correct Answer: 24

Rationale

The correct answer is 24. The equation $\frac{24x}{ny} = 4$ can be rewritten as $\left(\frac{24}{n}\right)\left(\frac{x}{y}\right) = 4$. It's given that $\frac{x}{y} = 4$. Substituting 4 for $\frac{x}{y}$ in the equation $\left(\frac{24}{n}\right)\left(\frac{x}{y}\right) = 4$ yields $\left(\frac{24}{n}\right)(4) = 4$. Multiplying both sides of this equation by n yields $(24)(4) = 4n$. Dividing both sides of this equation by 4 yields $24 = n$. Therefore, the value of n is 24.

Question Difficulty: Medium

Question ID 213aaab1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: 213aaab1

A distance of 61 furlongs is equivalent to how many feet? $(1 \text{ furlong} = 220 \text{ yards and } 1 \text{ yard} = 3 \text{ feet})$

ID: 213aaab1 Answer

Correct Answer: 40260

Rationale

The correct answer is $40{,}260$. It's given that $1 \text{ furlong} = 220 \text{ yards}$ and $1 \text{ yard} = 3 \text{ feet}$. It follows that a distance of 61 furlongs is equivalent to $(61 \text{ furlongs})\left(\frac{220 \text{ yards}}{1 \text{ furlong}}\right)\left(\frac{3 \text{ feet}}{1 \text{ yard}}\right)$, or $40{,}260$ feet.

Question Difficulty: Medium

Question ID 3e19942b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: 3e19942b

A distance of 112 furlongs is equivalent to how many feet?
$(1 \text{ furlong} = 220 \text{ yards and } 1 \text{ yard} = 3 \text{ feet})$

ID: 3e19942b Answer

Correct Answer: 73920

Rationale

The correct answer is $73{,}920$. It's given that $1 \text{ furlong} = 220 \text{ yards}$ and $1 \text{ yard} = 3 \text{ feet}$. It follows that a distance of 112 furlongs is equivalent to $(112 \text{ furlongs})\left(\frac{220 \text{ yards}}{1 \text{ furlong}}\right)\left(\frac{3 \text{ feet}}{1 \text{ yard}}\right)$, or $73{,}920$ feet.

Question Difficulty: Medium

Question ID f9c3e6a3

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: f9c3e6a3

One side of a flat board has an area of 874 square inches. If a pressure of 19 pounds per square inch of area is exerted on this side of the board, what is the total force, in pounds, exerted on this side of the board?

ID: f9c3e6a3 Answer

Correct Answer: 16606

Rationale

The correct answer is $16,606$. It's given that one side of a flat board has an area of 874 square inches. If a pressure of 19 pounds per square inch of area is exerted on this side of the board, the total force exerted on this side of the board is $(874 \text{ square inches})\left(\frac{19 \text{ pounds}}{1 \text{ square inch}}\right)$, or $16,606$ pounds.

Question Difficulty: Medium

Question ID d1c59f81

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: d1c59f81

The ratio x to y is equivalent to the ratio 9 to 5. If the value of x is 162, what is the value of y?

ID: d1c59f81 Answer

Correct Answer: 90

Rationale

The correct answer is 90. It's given that the ratio of x to y is equivalent to the ratio 9 to 5. It follows that $\frac{x}{y} = \frac{9}{5}$. Multiplying each side of this equation by $5y$ yields $\frac{(5y)x}{y} = \frac{9(5y)}{5}$, or $5x = 9y$. Dividing each side of this equation by 9 yields $\frac{5x}{9} = y$. Substituting 162 for x in this equation yields $\frac{5(162)}{9} = y$, which is equivalent to $\frac{810}{9} = y$, or $90 = y$. Therefore, if the value of x is 162, the value of y is 90.

Question Difficulty: Medium

Question ID 128d0947

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: 128d0947

How many <u>tablespoons</u> are equivalent to 14 teaspoons? $(3 \text{ teaspoons} = 1 \text{ tablespoon})$

ID: 128d0947 Answer

Correct Answer: 14/3, 4.666, 4.667

Rationale

The correct answer is $\frac{14}{3}$. It's given that 3 teaspoons is equivalent to 1 tablespoon. Therefore, 14 teaspoons is equivalent to $(14 \text{ teaspoons})\left(\frac{1 \text{ tablespoon}}{3 \text{ teaspoons}}\right)$, or $\frac{14}{3}$ tablespoons. Note that 14/3, 4.666, and 4.667 are examples of ways to enter a correct answer.

Question Difficulty: Medium

Question ID ce901565

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: ce901565

The ratio 140 to m is equivalent to the ratio 4 to 28. What is the value of m?

ID: ce901565 Answer

Correct Answer: 980

Rationale

The correct answer is 980. It's given that the ratio 140 to m is equivalent to the ratio 4 to 28. Therefore, the value of m can be found by solving the equation $\frac{140}{m} = \frac{4}{28}$. Multiplying each side of this equation by m yields $140 = \frac{4m}{28}$. Multiplying each side of this equation by 28 yields $3{,}920 = 4m$. Dividing each side of this equation by 4 yields $980 = m$. Therefore, the value of m is 980.

Question Difficulty: Medium

Question ID 04943c5d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	Medium

ID: 04943c5d

For a certain rectangular region, the ratio of its length to its width is 35 to 10. If the width of the rectangular region increases by 7 units, how must the length change to maintain this ratio?

A. It must decrease by 24.5 units.

B. It must increase by 24.5 units.

C. It must decrease by 7 units.

D. It must increase by 7 units.

ID: 04943c5d Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the ratio of the rectangular region's length to its width is 35 to 10. This can be written as a proportion: $\frac{\text{length}}{\text{width}} = \frac{35}{10}$, or $\frac{\ell}{w} = \frac{35}{10}$. This proportion can be rewritten as $10\ell = 35w$, or $\ell = 3.5w$. If the width of the rectangular region increases by 7, then the length will increase by some number x in order to maintain this ratio. The value of x can be found by replacing ℓ with $\ell + x$ and w with $w + 7$ in the equation, which gives $\ell + x = 3.5(w + 7)$. This equation can be rewritten using the distributive property as $\ell + x = 3.5w + 24.5$. Since $\ell = 3.5w$, the right-hand side of this equation can be rewritten by substituting ℓ for $3.5w$, which gives $\ell + x = \ell + 24.5$, or $x = 24.5$. Therefore, if the width of the rectangular region increases by 7 units, the length must increase by 24.5 units in order to maintain the given ratio.

Choice A is incorrect. If the width of the rectangular region increases, the length must also increase, not decrease.

Choice C is incorrect. If the width of the rectangular region increases, the length must also increase, not decrease.

Choice D is incorrect. Since the ratio of the length to the width of the rectangular region is 35 to 10, if the width of the rectangular region increases by 7 units, the length would have to increase by a proportional amount, which would have to be greater than 7 units.

Question Difficulty: Medium