Question ID 3f5398a6

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

ID: 3f5398a6

1.1

For a person *m* miles from a flash of lightning, the length of the time interval from the moment the person sees the lightning to the moment the person hears the thunder is *k* seconds. The ratio of *m* to *k* can be estimated to be 1 to 5. According to this estimate, the person is how many miles from a flash of lightning if the time interval is 25 seconds?

A. 10

B. 9

C. 6

D. 5

ID: 3f5398a6 Answer

Rationale

Choice D is correct. It's given that the ratio of m to k is estimated to be 1 to 5. Therefore, when $k = 25$, the relationship between these ratios can be expressed by the proportion $\frac{m}{25} = \frac{1}{5}$. Multiplying both sides of this equation by 25 yields $m = 5$.

Choices A, B, and C are incorrect and may result from calculation errors.

Question Difficulty: Easy

Question ID 000259aa

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

ID: 000259aa 1.2

A group of monarch butterflies migrated from Chicago, Illinois, to Michoacán, Mexico, flying a total of 2,100 miles. It took a single butterfly in the group 120 days to travel this route one way. On average, how many miles did the butterfly travel per day?

A. 0.057

B. 0.729

C. 17.5

D. 24

ID: 000259aa Answer

Rationale

Choice C is correct. If the butterfly traveled 2,100 miles in 120 days, then it traveled, on average, $\frac{2{,}100 \text{ miles}}{120 \text{ days}} = 17.5$ miles per day.

Choice A is incorrect. This is approximately the average amount of time, in days, it took the butterfly to fly one mile: $\frac{120 \text{ days}}{2{,}100 \text{ miles}} = 0.057$ days per mile. Choice B is incorrect and may result from an arithmetic error.

Choice D is incorrect. This is the number of hours in a day rather than the number of miles flown per day.

Question Difficulty: Easy

Question ID 312ba47c

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

ID: 312ba47c 1.3

In a box of pens, the ratio of black pens to red pens is 8 to 1. There are 40 black pens in the box. How many red pens are in the box?

A. 5

B. 8

C. 40

D. 320

ID: 312ba47c Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the ratio of black pens to red pens is 8 to 1. Therefore, there are $\frac{1}{8}$ as many red pens as black pens in the box. It's also given that there are 40 black pens in the box. Therefore, the number of red pens is $\frac{1}{8}$ of the 40 black pens. Thus, the number of red pens is $40\left(\frac{1}{8}\right)$, or 5.

Choice B is incorrect. This is the number of black pens in the box for every red pen.

Choice C is incorrect. This is the number of black pens in the box.

Choice D is incorrect. This is the number of red pens in the box if the ratio of black pens to red pens is 1 to 8.

Question Difficulty: Easy

Question ID 15617f62

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

ID: 15617f62

1.4

The population density of Worthington is 290 people per square mile. Worthington has a population of $92{,}800$ people. What is the area, in square miles, of Worthington?

A. $102{,}400$

B. $93{,}090$

C. 320

D. 32

ID: 15617f62 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that the population density of Worthington is 290 people per square mile and Worthington has a population of $92{,}800$ people. Therefore, the area of Worthington is $92{,}800 \text{ people} \left(\frac{1 \text{ square mile}}{290 \text{ people}} \right)$, which is equivalent to $\frac{92{,}800 \text{ square miles}}{290}$, or 320 square miles.

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

Question Difficulty: Easy

Question ID be35c117

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

ID: be35c117

1.5

A wind turbine completes 900 revolutions in 50 minutes. At this rate, how many revolutions per minute does this turbine complete?

A. 18

B. 850

C. 950

D. $1{,}400$

ID: be35c117 Answer

Correct Answer: A

Rationale

Choice A is correct. Dividing the number of revolutions by the number of minutes gives the number of revolutions the turbine completes per minute. It's given that the wind turbine completes 900 revolutions in 50 minutes. Therefore, at this rate, this turbine completes $\frac{900}{50}$, or 18, revolutions per minute.

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: Easy

Question ID 3f236a64

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

ID: 3f236a64

1.6

x	y
1	4
3	12
5	20
40	k

In the table above, the ratio of y to x for each ordered pair is constant. What is the value of k ?

A. 28

B. 36

C. 80

D. 160

ID: 3f236a64 Answer

Correct Answer: D

Rationale

Choice D is correct. Since the ratio of y to x is constant for each ordered pair in the table, the first row can be used to determine that the ratio of y to x is 4 to 1. The proportion $\frac{4}{1} = \frac{k}{40}$ can be used to solve for k. Multiplying each side of the equation by 40 yields $160 = k$.

Choice A is incorrect. This is the value of y when the value of x is 7, not 40. Choice B is incorrect and may result from subtracting 4 from 40 instead of multiplying 40 by 4. Choice C is incorrect and may result from incorrectly setting up the proportion.

Question Difficulty: Easy

Question ID 6310adbc

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

ID: 6310adbc

1.7

The ratio of *t* to *u* is 1 to 2, and $t = 10$.

What is the value of *u* ?

A. 2

B. 5

C. 10

D. 20

ID: 6310adbc Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the ratio of t to u is 1 to 2. Since $t = 10$, it follows that the ratio of 10 to u is also 1 to 2. The relationship between these ratios can be represented by the proportion $\frac{10}{u} = \frac{1}{2}$. Multiplying both sides of this equation by 2 and then by u yields $20 = u$.

Choice A is incorrect. This is the value of u when $t = 1$. Choice B is incorrect. This would be the value of u if the ratio of t to u were 2 to 1. Choice C is incorrect. This is the value of t, not u.

Question Difficulty: Easy

Question ID aeeaec96

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

ID: aeeaec96 1.8

How many yards are equivalent to 612 inches? $(1 \text{ yard} = 36 \text{ inches})$

A. 0.059

B. 17

C. 576

D. $22{,}032$

ID: aeeaec96 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that $1 \text{ yard} = 36 \text{ inches}$. Therefore, 612 inches is equivalent to $612 \text{ inches}\left(\frac{1 \text{ yard}}{36 \text{ inches}}\right)$, which can be rewritten as $\frac{612 \text{ yards}}{36}$, or 17 yards.

Choice A is incorrect. This is the number of yards that are equivalent to 2.124 inches.

Choice C is incorrect. This is the number of yards that are equivalent to $20{,}736$ inches.

Choice D is incorrect. This is the number of yards that are equivalent to $793{,}152$ inches.

Question Difficulty: Easy

Question ID e9841407

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

ID: e9841407

1.9

Shaquan has 7 red cards and 28 blue cards. What is the ratio of red cards to blue cards that Shaquan has?

A. 1 to 4

B. 4 to 1

C. 1 to 7

D. 7 to 1

ID: e9841407 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that Shaquan has 7 red cards and 28 blue cards. Therefore, the ratio of red cards to blue cards that Shaquan has is 7 to 28. This ratio can be reduced by dividing both parts of the ratio by 7, which yields the ratio 1 to 4.

Choice B is incorrect. This is the ratio of blue cards to red cards that Shaquan has. Choice C is incorrect and may result from a calculation error when reducing the ratio. Choice D is incorrect. This may result from finding the ratio of blue cards to red cards, or 28 to 7, and then making a calculation error when reducing the ratio.

Question Difficulty: Easy

Question ID ba62b0b0

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

ID: ba62b0b0 1.10

A kangaroo has a mass of 28 kilograms. What is the kangaroo's mass, in grams? $(1 \text{ kilogram} = 1{,}000 \text{ grams})$

A. $28{,}000$

B. $1{,}028$

C. 972

D. 784

ID: ba62b0b0 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that a kangaroo has a mass of 28 kilograms and that 1 kilogram is equal to $1{,}000$ grams. Therefore, the kangaroo's mass, in grams, is $28 \text{ kilograms}\left(\frac{1{,}000 \text{ grams}}{1 \text{ kilogram}}\right)$, which is equivalent to $28{,}000$ grams.

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: Easy

Question ID 24ad9dcb

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

ID: 24ad9dcb

1.11

The weight of an object on Venus is approximately $\frac{9}{10}$ of its weight on Earth. The weight of an object on Jupiter is approximately $\frac{23}{10}$ of its weight on Earth. If an object weighs 100 pounds on Earth, approximately how many more pounds does it weigh on Jupiter than it weighs on Venus?

A. 90

B. 111

C. 140

D. 230

ID: 24ad9dcb Answer

Correct Answer: C

Rationale

Choice C is correct. The weight of an object on Venus is approximately $\frac{9}{10}$ of its weight on Earth. If an object weighs 100 pounds on Earth, then the object's weight on Venus is approximately $\frac{9}{10}(100)=90$ pounds. The same object's weight on Jupiter is approximately $\frac{23}{10}$ of its weight on Earth; therefore, the object weighs approximately $\frac{23}{10}(100)=230$ pounds on Jupiter. The difference between the object's weight on Jupiter and the object's weight on Venus is approximately $230-90=140$ pounds. Therefore, an object that weighs 100 pounds on Earth weighs 140 more pounds on Jupiter than it weighs on Venus.

Choice A is incorrect because it is the weight, in pounds, of the object on Venus. Choice B is incorrect because it is the weight, in pounds, of an object on Earth if it weighs 100 pounds on Venus. Choice D is incorrect because it is the weight, in pounds, of the object on Jupiter.

Question Difficulty: Easy

Question ID d0d9ede4

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

ID: d0d9ede4

1.12

How many feet are equivalent to 34 yards? $(1 \text{ yard} = 3 \text{ feet})$

ID: d0d9ede4 Answer

Correct Answer: 102

Rationale

The correct answer is 102. It's given that 1 yard is equivalent to 3 feet. Therefore, 34 yards is equivalent to $(34 \text{ yards})\left(\frac{3 \text{ feet}}{1 \text{ yard}}\right)$, or 102 feet.

Question Difficulty: Easy

Question ID 06a152cd

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

ID: 06a152cd 1.13

To make a bakery's signature chocolate muffins, a baker needs 2.5 ounces of chocolate for each muffin. How many pounds of chocolate are needed to make 48 signature chocolate muffins? (1 pound = 16 ounces)

A. 7.5

B. 10

C. 50.5

D. 120

ID: 06a152cd Answer

Correct Answer: A

Rationale

Choice A is correct. If 2.5 ounces of chocolate are needed for each muffin, then the number of ounces of chocolate needed to make 48 muffins is $48 \times 2.5 = 120$ ounces. Since 1 pound = 16 ounces, the number of pounds that is equivalent to 120 ounces is $\frac{120}{16} = 7.5$ pounds. Therefore, 7.5 pounds of chocolate are needed to make the 48 muffins.

Choice B is incorrect. If 10 pounds of chocolate were needed to make 48 muffins, then the total number of ounces of chocolate needed would be $10 \times 16 = 160$ ounces. The number of ounces of chocolate per muffin would then be $\frac{160}{48} = 3.33$ ounces per muffin, not 2.5 ounces per muffin. Choices C and D are also incorrect. Following the same procedures as used to test choice B gives 16.8 ounces per muffin for choice C and 40 ounces per muffin for choice D, not 2.5 ounces per muffin. Therefore, 50.5 and 120 pounds cannot be the number of pounds needed to make 48 signature chocolate muffins.

Question Difficulty: Easy

Question ID 3ac09984

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

ID: 3ac09984

1.14

Marta has 7,500 pesos she will convert to US dollars using a currency exchange service. At this time, the currency exchange rate is 1 peso = 0.075 US dollars. The exchange service will charge Marta a 2% fee on the converted US dollar amount. How many US dollars will Marta receive from the currency exchange after the 2% fee is applied?

A. $551
.25

B. $562
.50

C. $5,625
.00

D. $98,000
.00

ID: 3ac09984 Answer

Correct Answer: A

Rationale

Choice A is correct. At the exchange rate of 1 peso = 0.075 US dollars, 7,500 pesos would be converted to 7,500 × 0.075 = $562.50. However, since Maria pays a 2% fee on the converted US dollar amount, she receives only (100 – 2)%, or 98%, of the converted US dollars, and 562.50 × 0.98 = $551.25.

Choice B is incorrect. This is the number of US dollars Maria would receive if the exchange service did not charge a 2% fee. Choice C is incorrect and may result from a decimal point error made when calculating the conversion to US dollars and from not assessing the 2% fee. Choice D is incorrect and may result from reversing the units of the exchange rate.

Question Difficulty: Easy

Question ID 99550621

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

ID: 99550621

1.15

Makayla is planning an event in a 5,400-square-foot room. If there should be at least 8 square feet per person, what is the maximum number of people that could attend this event?

A. 588

B. 675

C. 15,274

D. 43,200

ID: 99550621 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the event will be in a 5,400-square-foot room and that there should be at least 8 square feet per person. The maximum number of people that could attend the event can be found by dividing the total square feet in the room by the minimum number of square feet needed per person, which gives $\frac{5,400}{8}=675$.

Choices A and C are incorrect and may result from conceptual or computational errors. Choice D is incorrect and may result from multiplying, rather than dividing, 5,400 by 8.

Question Difficulty: Easy

Question ID 808f7d6c

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

ID: 808f7d6c

1.16

If $t = 4u$, which of the following is equivalent to $2t$?

A. $8u$

B. $2u$

C. u

D. $\frac{1}{2}u$

ID: 808f7d6c Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that $t = 4u$. Multiplying both sides of this equation by 2 yields $2t = 2(4u)$, or $2t = 8u$.

Choice B is incorrect and may result from dividing, instead of multiplying, the right-hand side of the equation by 2. Choices C and D are incorrect and may result from calculation errors.

Question Difficulty: Easy

Question ID 4347a032

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

ID: 4347a032 1.17

How many teaspoons are equivalent to 44 tablespoons? $(3 \text{ teaspoons} = 1 \text{ tablespoon})$

A. 47

B. 88

C. 132

D. 176

ID: 4347a032 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that 3 teaspoons is equivalent to 1 tablespoon. Therefore, 44 tablespoons is equivalent to $(44 \text{ tablespoons})\left(\frac{3 \text{ teaspoons}}{1 \text{ tablespoon}}\right)$, or 132 teaspoons.

Choice A is incorrect. This is equivalent to approximately 15.66 tablespoons, not 44 tablespoons.

Choice B is incorrect. This is equivalent to approximately 29.33 tablespoons, not 44 tablespoons.

Choice D is incorrect. This is equivalent to approximately 58.66 tablespoons, not 44 tablespoons.

Question Difficulty: Easy

Question ID d7a3179d

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

ID: d7a3179d

1.18

How many yards are equivalent to $1{,}116$ inches? $(1\ \text{yard} = 36\ \text{inches})$

ID: d7a3179d Answer

Correct Answer: 31

Rationale

The correct answer is 31. It's given that 1 yard is equal to 36 inches. Therefore, $1{,}116$ inches is equivalent to $1{,}116\ \text{inches}\frac{1\ \text{yard}}{36\ \text{inches}}$, or 31 yards.

Question Difficulty: Easy

Question ID 3318d37b

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

ID: 3318d37b

1.19

A product costs 11.00 dollars per pound. What is the cost, in dollars, for 6 pounds of the product?

ID: 3318d37b Answer

Correct Answer: 66

Rationale

The correct answer is 66. It's given that a product costs 11.00 dollars per pound. Therefore, the cost for 6 pounds of the product is $\frac{11.00 \text{ dollars}}{1 \text{ pound}} 6 \text{ pounds}$, which is equivalent to 66.00, or 66, dollars.

Question Difficulty: Easy

Question ID 4837406c

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

ID: 4837406c

1.20

An object travels at a constant speed of 6 centimeters per second. At this speed, what is the time, in seconds, that it would take for the object to travel 24 centimeters?

ID: 4837406c Answer

Correct Answer: 4

Rationale

The correct answer is 4. It's given that the object travels at a constant speed of 6 centimeters per second. The speed of the object can be written as $\frac{6 \text{ centimeters}}{1 \text{ second}}$. Let x represent the time, in seconds, it would take for the object to travel 24 centimeters. The value of x can be calculated by solving the equation $\frac{6 \text{ centimeters}}{1 \text{ second}} = \frac{24 \text{ centimeters}}{x \text{ seconds}}$, which can be written as $\frac{6}{1} = \frac{24}{x}$, or $6 = \frac{24}{x}$. Multiplying each side of this equation by x yields $6x = 24$. Dividing each side of this equation by 6 yields $x = 4$. Therefore, it would take the object 4 seconds to travel 24 centimeters.

Question Difficulty: Easy

Question ID 94660ba8

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

ID: 94660ba8

1.21

A participant in a bicycle race completes the race with an average speed of $24{,}816$ yards per hour. What is this average speed, in miles per hour? $(1 \text{ mile} = 1{,}760 \text{ yards})$

ID: 94660ba8 Answer

Correct Answer: 14.1

Rationale

The correct answer is 14.1. It's given that a participant completes the bicycle race with an average speed of $24{,}816$ yards per hour and $1 \text{ mile} = 1{,}760 \text{ yards}$. It follows that this average speed is equivalent to $\frac{24{,}816 \text{ yards}}{1 \text{ hour}} \frac{1 \text{ mile}}{1{,}760 \text{ yards}}$, which yields $\frac{14.1 \text{ miles}}{1 \text{ hour}}$, or 14.1 miles per hour.

Question Difficulty: Easy

Question ID da9ffcf6

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

ID: da9ffcf6

1.22

The ratio of the length of line segment XY to the length of line segment ZV is 6 to 1. If the length of line segment XY is 102 inches, what is the length, in inches, of line segment ZV?

A. 17

B. 96

C. 102

D. 612

ID: da9ffcf6 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the ratio of the length of line segment XY to the length of line segment ZV is 6 to 1, which means $\frac{XY}{ZV} = \frac{6}{1}$. It's given that the length of line segment XY is 102 inches. If the length, in inches, of line segment ZV is represented by l, the value of l can be calculated by solving the equation $\frac{102}{l} = \frac{6}{1}$, or $\frac{102}{l} = 6$. Multiplying each side of this equation by l yields $102 = 6l$. Dividing each side of this equation by 6 yields $17 = l$. Therefore, the length of line segment ZV is 17 inches.

Choice B is incorrect. This is the length, in inches, of line segment ZV if the length of line segment XY is 576, not 102, inches.

Choice C is incorrect. This is the length, in inches, of line segment XY, not line segment ZV.

Choice D is incorrect. This is the length, in inches, of line segment ZV if the ratio of the length of line segment XY to the length of line segment ZV is 1 to 6, not 6 to 1.

Question Difficulty: Easy