

As of this morning, there were no requests from the last problem set.

Finishing up the data analysis things from last Monday

Requested topics from last week

- More difficult triangle problems (two triangles overlapping)

- Sophisticated use of regression

Problem-Solving and Data Analysis is the "leftovers" category.

From the CB's description:

"Problem-Solving and Data Analysis measures the ability to apply quantitative reasoning about ratios, rates, and proportional relationships; understand and apply unit rate; and analyze and interpret one- and two-variable data...

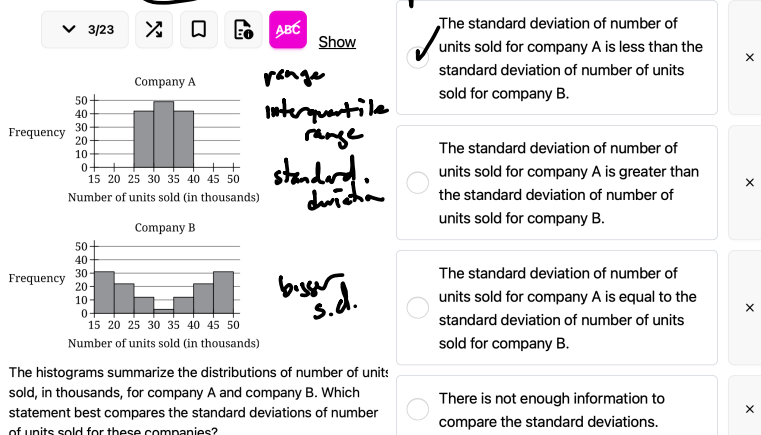
- Ratios, rates, proportional relationships, and units
- Percentages
- One-variable data: distributions and measures of center and spread
- Two-variable data: models and scatterplots
- Probability and conditional probability
- Inference from sample statistics and margin of error
- Evaluating statistical claims: observational studies and experiments"

<https://satsuite.collegeboard.org/sat/whats-on-the-test/math/types/problem-solving>

More center and spread

Question 17134d4d

Problem-Solving and Data Analysis - One-variable data: Distributions and measures of center and spread

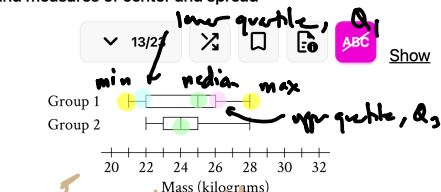


While one *could* calculate the standard deviation for each set, the frequencies (counts of each value) are challenging to deal with in Desmos. Just a basic idea of what standard deviation tells you about a set of data is enough to answer the question efficiently.

Choice A is correct. Standard deviation measures the spread of a given data set from its mean. In a data set with a smaller standard deviation, there are more values close to the mean. In a data set with a greater standard deviation, there are more values farther from the mean. The two histograms shown have the same scale on the horizontal axis. Therefore, their standard deviations can be compared by visually comparing the spreads of their histograms. The distribution summarized by each histogram is symmetric. Therefore, the mean of the data set for each histogram is a value in the middle bar of that histogram. The middle bar of each histogram has a value of at least 30 thousand units sold but less than 35 thousand units sold. Therefore, the mean of the data set for each histogram is at least 30 thousand and less than 35 thousand. The histogram for company A shows all the values in that data set are close to the mean. For company B, the histogram shows there are fewer values close to the mean and more values farther from the mean. Therefore, the standard deviation of number of units sold for company A is less than the standard deviation of number of units sold for company B.

Question 6047ae7b

Problem-Solving and Data Analysis - One-variable data: Distributions and measures of center and spread



The box plots summarize the masses, in kilograms, of two groups of gazelles. Based on the box plots, which of the following statements must be true?

- ☐ The mean mass of group 1 is greater than the mean mass of group 2.
- ☐ The mean mass of group 1 is less than the mean mass of group 2.
- ☒ The median mass of group 1 is greater than the median mass of group 2.
- ☐ The median mass of group 1 is less than the median mass of group 2.

$$IQR = Q_3 - Q_1$$

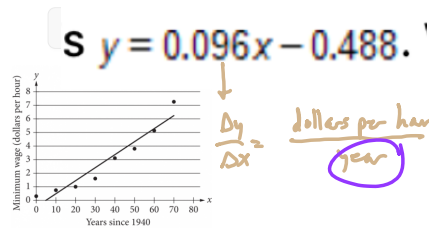
Choice C is correct. The median of a data set represented in a box plot is represented by the vertical line within the box. It follows that the median mass of the gazelles in group 1 is 25 kilograms, and the median mass of the gazelles in group 2 is 24 kilograms. Since 25 kilograms is greater than 24 kilograms, the median mass of group 1 is greater than the median mass of group 2.

Box plots show medians, quartiles, maximum, and minimum. You can calculate range and interquartile range (IQR) from them. You cannot calculate the mean — there's not enough information included.

Scatterplots and linear models

Question e06b79e

Problem-Solving and Data Analysis - Two-variable data: Models and scatterplots



The scatterplot above shows the federal-mandated minimum wage every 10 years between 1940 and 2010. A line of best fit is shown, and its equation is $y = 0.096x - 0.488$. What does the line of best fit predict about the increase in the minimum wage over the 70-year period?

☒ Each year between 1940 and 2010, the average increase in minimum wage was 0.096 dollars.

☐ Each year between 1940 and 2010, the average increase in minimum wage was 0.49 dollars.

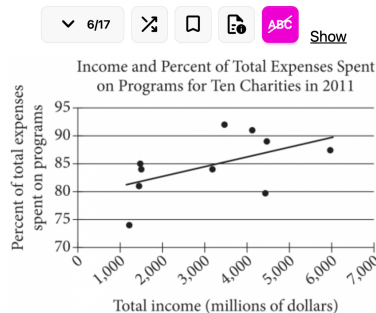
☐ Every 10 years between 1940 and 2010, the average increase in minimum wage was 0.096 dollars.

☐ Every 10 years between 1940 and 2010, the average increase in minimum wage was 0.488 dollars.

Choice A is correct. The given equation is in slope-intercept form, or $y = mx + b$, where m is the value of the slope of the line of best fit. Therefore, the slope of the line of best fit is 0.096. From the definition of slope, it follows that an increase of 1 in the x -value corresponds to an increase of 0.096 in the y -value. Therefore, the line of best fit predicts that for each year between 1940 and 2010, the minimum wage will increase by 0.096 dollar per hour.

Question 32b6daf7

Problem-Solving and Data Analysis - Two-variable data: Models and scatterplots



The scatterplot above shows data for ten charities along with the line of best fit. For the charity with the greatest percent of total expenses spent on programs, which of the following is closest to the difference of the actual percent and the percent predicted by the line of best fit?

The scatterplot above shows data for ten charities along with the line of best fit. For the charity with the greatest percent of total expenses spent on programs, which of the following is closest to the difference of the actual percent and the percent predicted by the line of best fit?

☐ 10%

☐ 7%

☐ 4%

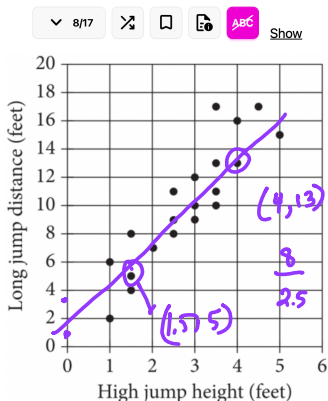
☐ 1%

Choice B is correct. The charity with the greatest percent of total expenses spent on programs is represented by the highest point on the scatterplot; this is the point that has a vertical coordinate slightly less than halfway between 90 and 95 and a horizontal coordinate slightly less than halfway between 3,000 and 4,000. Thus, the charity represented by this point has a total income of about \$3,400 million and spends about 92% of its total expenses on programs. The percent predicted by the line of best fit is the vertical coordinate of the point on the line of best fit with horizontal coordinate \$3,400 million; this vertical coordinate is very slightly more than 85. Thus, the line of best fit predicts that the charity with the greatest percent of total expenses spent on programs will spend slightly more than 85% on programs. Therefore, the difference between the actual percent (92%) and the prediction (slightly more than 85%) is slightly less than 7%.

More scatterplots and regression

Question 6b0f9f95

Problem-Solving and Data Analysis - Two-variable data: Models and scatterplots



Each dot in the scatterplot above represents the height x , in feet, in the high jump, and the distance y , in feet, in the long jump, made by each student in a group of twenty students. The graph of which of the following equations is a line that most closely fits the data?

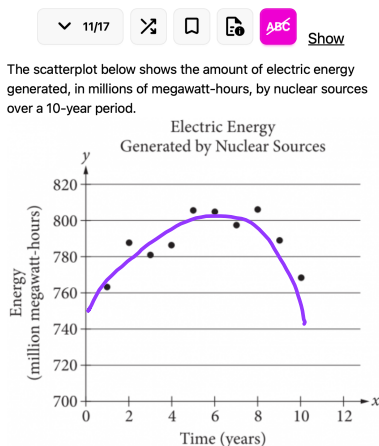
- ☐ $y = 0.82x + 3.30$ ×
- ☐ $y = 0.82x - 0.82$ ×
- ☒ $y = 3.30x + 0.82$ ×
- ☐ $y = 3.30x - 3.30$ ×

Could I approximate all those points and put them in a table to get a linear model from Desmos? Sure. Do I intend to? Surely not.

Choice C is correct. A line that most closely fits the data is a line with an approximately balanced number of data points above and below the line. Fitting a line to the data shown results in a line with an approximate slope of 3 and a y -intercept near the point $(0, 1)$. An equation for the line can be written in slope-intercept form, $y = mx + b$, where m is the slope and b is the y -coordinate of the y -intercept. The equation $y = 3.30x + 0.82$ in choice C fits the data most closely.

Question 82682ea2

Problem-Solving and Data Analysis - Two-variable data: Models and scatterplots



Of the following equations, which best models the data in the scatterplot?

- ☐ $y = 1.674x^2 + 19.76x - 745.73$ ×
- ☐ $y = -1.674x^2 - 19.76x - 745.73$ ×
- ☐ $y = 1.674x^2 + 19.76x + 745.73$ ×
- ☒ $y = -1.674x^2 + 19.76x + 745.73$ ×

Choice D is correct. The data in the scatterplot roughly fall in the shape of a downward-opening parabola; therefore, the coefficient for the x^2 term must be negative. Based on the location of the data points, the y -intercept of the parabola should be somewhere between 740 and 760. Therefore, of the equations given, the best model is $y = -1.674x^2 + 19.76x + 745.73$

One might choose to graph the choices (and potentially some or all of the points), but questions like this are usually simpler than that. Check to see if the quadratic opens up or down to decide if the x^2 term is positive or negative, then check the y -intercept (c) or the vertex x -coordinate $(-b/2a)$ to narrow the choices further.

Probability

Question 1e3791e1

Problem-Solving and Data Analysis - Probability and conditional probability

2/20

Show

At a conference, there are a total of 275 attendees. Each attendee is assigned to either group A, group B, or group C. If one of these attendees is selected at random, the probability of selecting an attendee who is assigned to group A is 0.44 and the probability of selecting an attendee who is assigned to group B is 0.24. How many attendees are assigned to group C?

Answer

$$(1 - 0.44 - 0.24) \cdot 275 = 88$$

$$.24 + .44 = 0.68$$

$$100\% - 68\% = 32\%$$

The correct answer is 88. It's given that there are a total of 275 attendees and each attendee is assigned to either group A, group B, or group C. It's also given that if one of these attendees is selected at random, the probability of selecting an attendee who is assigned to group A is 0.44 and the probability of selecting an attendee who is assigned to group B is 0.24. It follows that there are 0.44 (275), or 121, attendees who are assigned to group A and 0.24 (275), or 66, attendees who are assigned to group B. The number of attendees who are assigned to group C is the number of attendees who are not assigned to group A or group B. In other words, the number of attendees who are assigned to group C is the total number of attendees minus the number of attendees who are assigned to group A and group B. Therefore, the number of attendees who are assigned to group C is $275 - 121 - 66$, or 88.

Question 286915ee

Problem-Solving and Data Analysis - Probability and conditional probability

5/20

Show

Number of Contestants by Score and Day

	5 out of 5	4 out of 5	3 out of 5	2 out of 5	1 out of 5	0 out of 5	Total
Day 1	2	3	4	5	6	7	27
Day 2	2	3	4	5	6	7	27
Day 3	3	4	5	6	7	8	33
Total	7	10	13	16	19	22	87

The same 20 contestants, on each of 3 days, answered 5 questions in order to win a prize. Each contestant received 1 point for each correct answer. The number of contestants receiving a given score on each day is shown in the table above.

No contestant received the same score on two different days. If a contestant is selected at random, what is the probability that the selected contestant received a score of 5 on Day 2 or Day 3, given that the contestant received a score of 5 on one of the three days?

Answer

The correct answer is $\frac{5}{7}$. It is given that no contestant

received the same score on two different days, so each of the contestants who received a score of 5 is represented in the "5 out of 5" column of the table exactly once. Therefore, the probability of selecting a contestant who received a score of 5 on Day 2 or Day 3, given that the contestant received a score of 5 on one of the three days, is found by dividing the total number of contestants who received a score of 5 on Day 2 or Day 3 ($2 + 3 = 5$) by the total number of contestants who received a score of 5, which is given in the table as 7. So the probability is $\frac{5}{7}$. Note that 5/7, .7142, .7143, and

0.714 are examples of ways to enter a correct answer.

"conditional probability"
reduced sample space

More probability

Question 6f515d59 ☐ ☐ ☐

Problem-Solving and Data Analysis - Probability and conditional probability



Show

The table summarizes the distribution of age and assigned group for 90 participants in a study.

	0-9 years	10-19 years	20+ years	Total
Group A		14	9	
Group B		4	20	
Group C		12	1	
Total		30	30	

-23 in jump A

$\frac{23}{60}$

who are at least 10 y.o.

One of these participants will be selected at random. What is the probability of selecting a participant from group A, given that the participant is at least 10 years of age? (Express your answer as a decimal or fraction, not as a percent.)

Answer

The correct answer is $\frac{23}{60}$. It's given that one of the participants will be selected at random. The probability of selecting a participant from group A given that the participant is at least 10 years of age is the number of participants in group A who are at least 10 years of age divided by the total number of participants who are at least 10 years of age. The table shows that in group A, there are 14 participants who are 10–19 years of age and 9 participants who are 20+ years of age. Therefore, there are $14 + 9$, or 23, participants in group A who are at least 10 years of age. The table also shows that there are a total of 30 participants who are 10–19 years of age and 30 participants who are 20+ years of age. Therefore, there are a total of $30 + 30$, or 60, participants who are at least 10 years of age. It follows that the probability of selecting a participant from group A given that the participant is at least 10 years of age is $\frac{23}{60}$. Note that 23/60, 38/33, and 0.383 are examples of ways to write a correct answer.

Question 76c6be31

Problem-Solving and Data Analysis - Probability and conditional probability

▼ 10/20



Show

	Phone	Email
Dinner dinner	55%	80%
Football game	20%	10%
Picnic	20%	5%
Pool party	5%	5%
Total	100%	100%

An alumni association survey asked each high school graduate to select the one activity he or she preferred for the association's next event. Some of the people responded by phone, and the others responded by email. The table above shows the distribution of preferred activity, in percent, for each response type used. For the survey, the number of email responses was twice the number of phone responses. If a person who preferred a picnic is selected at random, what is the probability that the person responded by email?

Answer

The correct answer is $\frac{1}{3}$. It's given that the number of

email responses is twice the number of phone responses. Therefore, if the number of phone responses is p , then the number of email responses is $2p$. The table shows that 20% of people who responded by phone preferred a picnic. It follows that the expression $0.20p$ represents the number of these people. The table also shows that 5% of the people who responded by email preferred a picnic. The expression $0.05(2p)$, or $0.1p$, represents the number of these people. Therefore, a total of $0.20p + 0.1p$, or $0.3p$, people preferred a picnic. Thus, the probability of selecting at random a person who responded by email from the people who preferred a picnic is $\frac{0.1p}{0.3p}$, or $\frac{1}{3}$. Note that $1/3$, .3333, and 0.333 are examples of ways to enter a correct answer.

$$\frac{10}{20 + 10} = 0.3333333333$$

Inference and statistical claims

Question 308084c5

Problem-Solving and Data Analysis - Inference from sample statistics and margin of error

2/12



Show

Sample	Percent in favor	Margin of error
A	52%	4.2%
B	48%	1.6%

The results of two random samples of votes for a proposition are shown above. The samples were selected from the same population, and the margins of error were calculated using the same method. Which of the following is the most appropriate reason that the margin of error for sample A is greater than the margin of error for sample B?

☐ Sample A had a smaller number of votes that could not be recorded.

x

☐ Sample A had a higher percent of favorable responses.

Choice D is correct. Sample size is an appropriate reason for the margin of error to change. In general, a smaller sample size increases the margin of error because the sample may be less representative of the whole population.

☐ Sample A had a larger sample size.

☒ Sample A had a smaller sample size.

x

Question 374f75b9

Problem-Solving and Data Analysis - Inference from sample statistics and margin of error

3/12



Show

Views on Nuclear Energy Use

Response	Frequency
Strongly favor	56
Somewhat favor	214
Somewhat oppose	104
Strongly oppose	37

A researcher interviewed 411 randomly selected US residents and asked about their views on the use of nuclear energy. The table above summarizes the responses of the interviewees. If the population of the United States was 300 million when the survey was given, based on the sample data for the 411 US residents, what is the best estimate, in millions, of the difference between the number of US residents who somewhat favor or strongly favor the use of nuclear energy and the number of those who somewhat oppose or strongly oppose it? (Round your answer to the nearest whole number.)

Answer



The correct answer is 94. Of those interviewed, $56 + 214 = 270$ "strongly favor" or "somewhat favor" the use of nuclear energy, and $104 + 37 = 141$ interviewees "somewhat oppose" or "strongly oppose" the use of nuclear energy. The difference between the sizes of the two surveyed groups is $270 - 141 = 129$. The proportion of this difference among the entire group of interviewees is $\frac{129}{411}$. Because the sample of interviewees was selected at random from US residents, it is reasonable to assume that the proportion of this difference is the same among all US residents as in the sample. Therefore, the best estimate, in millions, of the difference between the number of US residents who somewhat favor or strongly favor the use of nuclear energy and the number of those who somewhat oppose or strongly oppose it is $\frac{129}{411} \times 300$, which to the nearest million is 94.

$$\begin{array}{l}
 1 \quad \frac{56 + 214}{411} \cdot 300 \\
 \quad \quad \quad = 197.080291971 \\
 2 \quad 300 - 197 \\
 \quad \quad \quad = 103 \\
 3 \quad 197 - 103 \\
 \quad \quad \quad = 94
 \end{array}$$

More inference and statistical claims

Question 4a422e3e

Problem-Solving and Data Analysis - Evaluating statistical claims:
Observational studies and experiments

4/12 Show

To determine the mean number of children per household in a community, Tabitha surveyed 20 families at a playground. For the 20 families surveyed, the mean number of children per household was 2.4. Which of the following statements must be true?

- | | |
|--|--|
| ☐ The mean number of children per household in the community is 2.4. | × Choice C is correct. In order to use a sample mean to estimate the mean for a population, the sample must be representative of the population (for example, a simple random sample). In this case, Tabitha surveyed 20 families in a playground. Families in the playground are more likely to have children than other households in the community. Therefore, the sample isn't representative of the population. Hence, the sampling method is flawed and may produce a biased estimate. |
| ☐ A determination about the mean number of children per household in the community should not be made because the sample size is too small. | × Choices A and D are incorrect because they incorrectly assume the sampling method is unbiased. Choice B is incorrect because a sample of size 20 could be large enough to make an estimate if the sample had been representative of all the families in the community. |
| ☒ The sampling method is flawed and may produce a biased estimate of the mean number of children per household in the community. | × |
| ☐ The sampling method is not flawed and is likely to produce an unbiased estimate of the mean number of children per household in the community. | × |

Question 6fca0144

Problem-Solving and Data Analysis - Evaluating statistical claims:
Observational studies and experiments

5/12 Show

For a baobab tree habitat in South Africa, a scientist randomly selected 50 baobab trees that were 17 years old and randomly assigned them to two groups. Each group was subjected to a different watering pattern for 2 consecutive years to observe whether the watering pattern affects the trees' growth rate. Based on the design of the study, what is the largest group to which these results can be applied?

- | | |
|--|---|
| ☐ All the 50 baobab trees that were selected in this habitat | Choice D is correct. When a study uses a randomly selected sample, the largest group to which the results of the study can be applied is the population from which the sample was selected. It's given that the scientist randomly selected the trees from the baobab trees in a certain habitat that were 17 years old. Therefore, the largest group to which the results of this study can be applied is all the baobab trees that were 17 years old in this habitat. |
| ☐ All the baobab trees that were 19 years old in this habitat | Choice A is incorrect. Since the sample was randomly selected from a population, the results can be applied to a larger group than the sample. |
| ☐ All the baobab trees that were 17 years old in South Africa | Choice B is incorrect. The sample was selected from a population of baobab trees that were 17 years old, not 19 years old. |
| ☒ All the baobab trees that were 17 years old in this habitat | Choice C is incorrect. The sample was selected from a certain tree habitat in South Africa, not from all the baobab trees that were 17 years old in South Africa. |

Still more inference and statistical claims

Question 6fd95a0a

Problem-Solving and Data Analysis - Inference from sample statistics
and margin of error

6/12

[Show](#)

A park ranger asked a random sample of visitors how far they hiked during their visit. Based on the responses, the estimated mean was found to be 4.5 miles, with an associated margin of error of 0.5 miles. Which of the following is the best conclusion from these data?



It is likely that all visitors hiked between 4 and 5 miles.

× Choice D is correct. The given estimated mean has an associated margin of error because from sample data, the population mean can't be determined precisely.



It is likely that most visitors hiked exactly 4.5 miles.

Rather, from the sample mean, an interval can be determined within which it's plausible that the population's mean is likely to lie. Since the estimated mean is 4.5 miles with an associated margin of error of 0.5 miles, it follows that between 4.5 - 0.5 miles and



It is not possible that any visitor hiked less than 3 miles.

× 4.5 + 0.5 miles, or between 4 and 5 miles, is plausibly the mean distance hiked for all visitors.



It is plausible that the mean distance hiked for all visitors is between 4 and 5 miles.

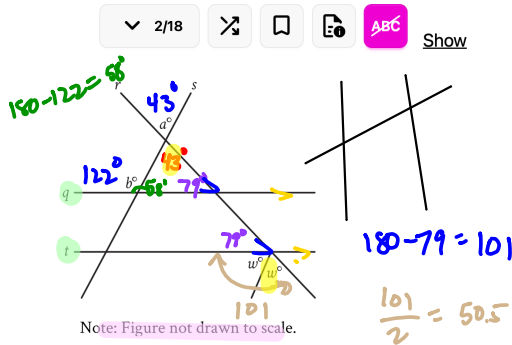
×

$$\frac{-q+t}{3} = \frac{1}{3}(-q+t) = \frac{1}{3}(t-q)$$

$$\frac{1}{3}(t-q) \text{ (answer choice)} = \text{long polynomial}$$

Question 476ccd6

Geometry and Trigonometry - Lines, angles, and triangles



In the figure, parallel lines q and t are intersected by lines r and s . If $a = 43$ and $b = 122$, what is the value of w ?

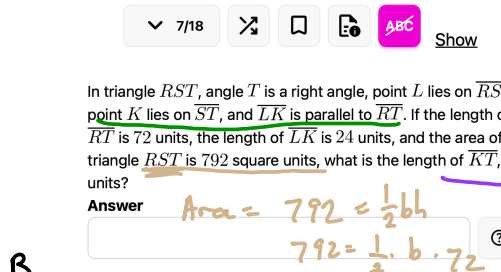
Answer

1	$180 - 122$	$\times$
	$= 58$	
2	$180 - (43 + 58)$	$\times$
	$= 79$	
3	$\frac{180 - 79}{2}$	$\times$
	$= 50.5$	

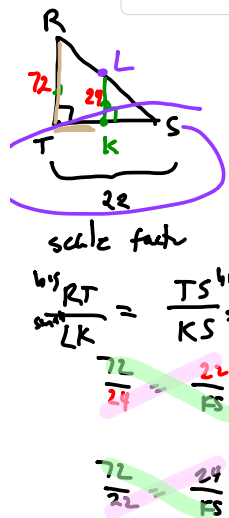
The correct answer is $\frac{101}{2}$. In the figure, lines q , r , and s form a triangle. One interior angle of this triangle is vertical to the angle marked a° ; therefore, the interior angle also has measure a° . It's given that $a = 43$. Therefore, the interior angle of the triangle has measure 43° . A second interior angle of the triangle forms a straight line, q , with the angle marked b° . Therefore, the sum of the measures of these two angles is 180° . It's given that $b = 122$. Therefore, the angle marked b° has measure 122° and the second interior angle of the triangle has measure $(180 - 122)^\circ$, or 58° . The sum of the interior angles of a triangle is 180° . Therefore, the measure of the third interior angle of the triangle is $(180 - 43 - 58)^\circ$, or 79° . It's given that parallel lines q and t are intersected by line r . It follows that the triangle's interior angle with measure 79° is congruent to the same side interior angle between lines q and t formed by lines t and r . Since this angle is supplementary to the two angles marked w° , the sum of 79° , w° , and w° is 180° . It follows that $79 + w + w = 180$, or $79 + 2w = 180$. Subtracting 79 from both sides of this equation yields $2w = 101$. Dividing both sides of this equation by 2 yields $w = \frac{101}{2}$. Note that $101/2$ and 50.5 are examples of ways to enter a correct answer.

Question 50266a50

Geometry and Trigonometry - Lines, angles, and triangles



Answer



1	$\frac{1}{2} \cdot b \cdot 72 = 792$	$\times$
	$b = 22$	
REGRESSION PARAMETERS		
STATISTICS	RESIDUALS	
RMSE = 0	e_1	
2	$\frac{a}{24} \sim \frac{22}{72}$	$\times$
	$a = 7.33333$	
REGRESSION PARAMETERS		
STATISTICS	RESIDUALS	
RMSE = 0	e_2	
3	$22 - a$	$\times$
	$= 14.6666666667$	

The correct answer is $\frac{44}{3}$. It's given that in triangle RST , angle T is a right angle. The area of a right triangle can be found using the formula $A = \frac{1}{2} \ell_1 \ell_2$, where A represents the area of the right triangle, ℓ_1 represents the length of one leg of the triangle, and ℓ_2 represents the length of the other leg of the triangle. In triangle RST , the two legs are RT and ST . Therefore, if the length of RT is 72 and the area of triangle RST is 792, then $792 = \frac{1}{2} (72) (ST)$, or $792 = (36) (ST)$. Dividing both sides of this equation by 36 yields $22 = ST$. Therefore, the length of ST is 22. It's also given that point L lies on RS , point K lies on ST , and LK is parallel to RT . It follows that angle LKS is a right angle. Since triangles RST and LSK share angle S and have right angles T and K , respectively, triangles RST and LSK are similar triangles. Therefore, the ratio of the length of RT to the length of LK is equal to the ratio of the length of ST to the length of SK . If the length of RT is 72 and the length of LK is 24, it follows that the ratio of the length of RT to the length of LK is $\frac{72}{24}$, or 3, so the ratio of the length of ST to the length of SK is 3. Therefore, $\frac{22}{SK} = 3$. Multiplying both sides of this equation by SK yields $22 = (3) (SK)$. Dividing both sides of this equation by 3 yields $\frac{22}{3} = SK$. Since the length of ST , 22, is the sum of the length of SK , $\frac{22}{3}$, and the length of KT , it follows that the length of KT is $22 - \frac{22}{3}$, or $\frac{44}{3}$. Note that $44/3$, 14.66, and 14.67 are examples of ways to enter a correct answer.

$$22 - 7.333 \approx 14.67$$

$$KS = 7.333$$

Question 58288e6e

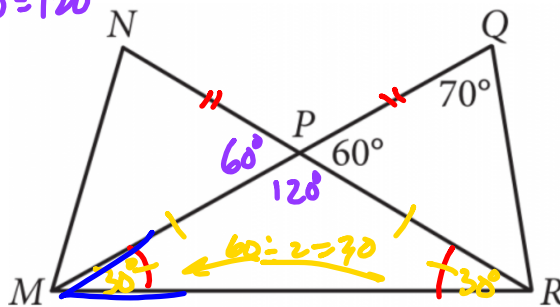
Geometry and Trigonometry - Lines, angles, and triangles

8/18



Show

$$180 - 60 = 120$$



In the figure above, $\overline{MQ}$ and $\overline{NR}$ intersect at point P, $NP = QP$, and $MP = PR$. What is the measure, in degrees, of $\angle QMR$? (Disregard the degree symbol when gridding your answer.)

Answer

The correct answer is 30. It is given that the measure of $\angle QPR$ is 60° . Angle MPR and $\angle QPR$ are collinear and therefore are supplementary angles. This means that the sum of the two angle measures is 180° , and so the measure of $\angle MPR$ is 120° . The sum of the angles in a triangle is 180° . Subtracting the measure of $\angle MPR$ from 180° yields the sum of the other angles in the triangle MPR . Since $180 - 120 = 60$, the sum of the measures of $\angle QMR$ and $\angle NRM$ is 60° . It is given that $MP = PR$, so it follows that triangle MPR is isosceles. Therefore $\angle QMR$ and $\angle NRM$ must be congruent. Since the sum of the measure of these two angles is 60° , it follows that the measure of each angle is 30° .

An alternate approach would be to use the exterior angle theorem, noting that the measure of $\angle QPR$ is equal to the sum of the measures of $\angle QMR$ and $\angle NRM$. Since both angles are equal, each of them has a measure of 30° .

Question f2f277fe
Advanced Math - Equivalent expressions

▼ 145/150

Show

The expression $(3x - 23)(19x + 6)$ is equivalent to the expression $ax^2 + bx + c$, where a , b , and c are constants. What is the value of b ?

Answer

1

$(3x_1 - 23)(19x_1 + 6) \sim ax$

REGRESSION PARAMETERS

$a = 57$ $b = -419$

$c = -138$

STATISTICS

$RMSE = 4.64 \times 10^{-14}$

RESIDUALS

e_1

2

$x_1 = \text{random}(6)$

$= 0.645909609385$ [6 element list](#)

The correct answer is -419 . It's given that the expression $(3x - 23)(19x + 6)$ is equivalent to the expression $ax^2 + bx + c$, where a , b , and c are constants. Applying the distributive property to the given expression, $(3x - 23)(19x + 6)$, yields $(3x)(19x) + (3x)(6) - (23)(19x) - (23)(6)$, which can be rewritten as $57x^2 + 18x - 437x - 138$. Combining like terms yields $57x^2 - 419x - 138$. Since this expression is equivalent to $ax^2 + bx + c$, it follows that the value of b is -419 .

Question dc252b23
Advanced Math - Equivalent expressions

▼ 182/208

Show

$$f(x) = x^2 + bx$$
$$g(x) = 9x^2 - 27x$$

Functions f and g are given, and in function f , b is a constant. If $f(x) \cdot g(x) = 9x^4 - 26x^3 - 3x^2$, what is the value of b ?

☐ -26

☐ $-\frac{26}{9}$

☐ $\frac{1}{9}$

☐ 9

Choice C is correct. Multiplying the given functions f and g yields $f(x) \cdot g(x) = (x^2 + bx)(9x^2 - 27x)$. Applying the distributive property to the right-hand side of this equation yields $f(x) \cdot g(x) = (x^2)(9x^2) - (x^2)(27x) + (bx)(9x^2) - (bx)(27x)$, which is equivalent to $f(x) \cdot g(x) = 9x^4 - 27x^3 + 9bx^3 - 27bx^2$. Factoring out x^3 from the second and third terms yields $f(x) \cdot g(x) = 9x^4 + (-27 + 9b)x^3 - 27bx^2$. Since the left-hand sides of $f(x) \cdot g(x) = 9x^4 + (-27 + 9b)x^3 - 27bx^2$ and $f(x) \cdot g(x) = 9x^4 - 26x^3 - 3x^2$ are equal, it follows that $(-27 + 9b)x^3 = -26x^3$, or $-27 + 9b = -26$, and $-27bx^2 = -3x^2$, or $-27b = -3$. Adding 27 to each side of $-27 + 9b = -26$ yields $9b = 1$. Dividing each side of this equation by 9 yields $b = \frac{1}{9}$. Similarly, dividing each side of $-27b = -3$ by -27 yields $b = \frac{1}{9}$. Therefore, the value of b is $\frac{1}{9}$.

1

$f(x) = x^2 + bx$

2

$g(x) = 9x^2 - 27x$

3

$f(x_1) \cdot g(x_1) \sim 9x_1^4 - 26x_1^3 - 3x_1^2$

REGRESSION PARAMETERS

$b = 0.1111111$

STATISTICS

$RMSE = 0$

RESIDUALS

e_1

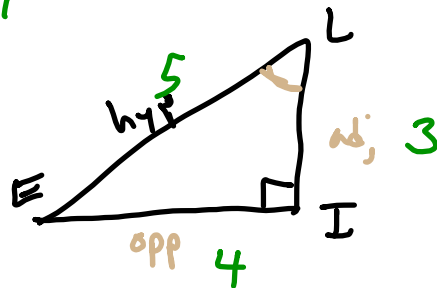
4

$x_1 = \text{random}(5)$

$= 0.130566799639$ 0.057400870828 [5 element list](#)

$$\cos = \frac{\text{adj}}{\text{hyp}} \quad \tan = \frac{\text{opp}}{\text{adj}} \quad \sin(\angle L) = \frac{\text{opp}}{\text{hyp}} \leftarrow$$

in a right triangle
label hyp 1st.
then opp, adj



Suppose $\angle L$

$$\sin(\angle L) = \frac{\text{opp}}{\text{hyp}}$$

$$= \frac{4}{5}$$

Question da57ac78 ■ ■ ■

Algebra - Systems of two linear equations in two variables

✓ 63/78

Show

$$ax + by = 72$$

$$6x + 2by = 56$$

In the given system of equations, a and b are constants. The graphs of these equations in the xy -plane intersect at the point $(4, y)$. What is the value of a ?

☐ 3

✕

☐ 4

✕

☐ 6

✕

☐ 14

✕

Choice D is correct. It's given that the graphs of the given system of equations intersect at the point $(4, y)$.

Therefore, $(4, y)$ is the solution to the given system.

Multiplying the first equation in the given system by -2

yields $-2ax - 2by = -144$. Adding this equation to

the second equation in the system yields $(-2a + 6)x$

$+ (-2b + 2b)y = (-144 + 56)$, or $(-2a + 6)x$

$= -88$. Since $(4, y)$ is the solution to the system, the

value of a can be found by substituting 4 for x in this

equation, which yields $(-2a + 6)(4) = -88$. Dividing

both sides of this equation by 4 yields $-2a + 6 = -22$.

Subtracting 6 from both sides of this equation yields

$-2a = -28$. Dividing both sides of this equation by -2

yields $a = 14$.

