



Question # 1
Statistics Team Round
Florida Blue Key Invitational 2008

Those wanting to participate in a state marathon race must first qualify by running in a regional marathon. The times of the 3750 regional runners are normally distributed with a mean of 198 min 36 s and a standard deviation of 23 min 14 s. If there are to be only 30 runners in the state marathon, what is the slowest time that will qualify a regional runner for the state race, to the nearest second? (Use the appropriate statistics table to answer the question, or points may be lost due to rounding issues)



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Question # 2
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The contingency table below categorizes MAΘ students by car color and hair color.

		Variable: Car Color			
		Blue	Brown	Black	Red
Variable:	Black	15	7	9	7
	Brown	10	3	10	5
Hair Color	Blonde	7	4	9	1
	Red	2	0	2	8

A = the probability that a MAΘ student drives a brown car.

B = the probability a MAΘ student drives a brown car given they have blonde hair.

C = the probability a MAΘ student has red hair given they drive a blue or black car.

D = the probability a MAΘ student has black hair given they drive a car that is the same color as their hair. Find the exact value of $(AD)/(BC)$



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Question # 3
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The lifetime of a mockingbird has a continuous distribution on the interval $(0, 40)$ with probability density function f , where $f(x)$ is proportional to $\left(\frac{40-x}{10}\right)$, in terms of years.

Calculate the probability that the lifetime of a mockingbird is less than 6 years.



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Question # 4
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Let x = the number of values that can be negative out of the seven in the box below.

- Mean
- Median
- Standard Deviation
- Correlation
- Coefficient of Determination
- Variance
- Mode

Find the probability of getting x tails in a row if you flip a fair coin seven times.



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Question # 5
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Superwoman throws a tricycle upwards from ground level. The table below shows the height in feet, h , of the tricycle above the ground t seconds after being thrown.

t	1	2	3	5	6	7
h	12	115	200	211	165	85

The linear regression line of the relationship between t and h can be modeled by the equation $At + B = h$. The quadratic regression model of the relationship between t and h can be modeled by the equation $Ct^2 + Dt + E = h$. A, B, C, D, E are all rounded to the nearest integer.

Find $\frac{ACDE}{B}$.



Question # 5
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Question # 6
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A bakery makes a batch of 200 cookies in which 2000 chocolate chips were used. What is the probability that a cookie picked at random from the batch will contain at least 13 chocolate chips, to the nearest hundredth?



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Question # 7
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A least-squares regression line was calculated from the following set of data:

x	1	2	3	6	8	11	12
y	1.1	2.0	3.4	5.2	6.1	8.7	9.5

What is the sum of the residuals for the data and its best fit line?



Question # 7
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Question # 8
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Which of the following will cause the standard deviation of the following set to change?
{239, 305, 352, 321, 386, 407, 561, 727, 754, 722, 786, 813, 850, 863, 904, 941, 954}

- I. Multiplying each entry by 1,800
- II. Adding 5,555,555 to each entry
- III. Taking the log of each entry
- IV. Dividing each entry by 911
- V. Negating each entry
- VI. Removing the entry equal to the mean

Give your answer as a list of roman numerals separated by commas (e.g. I, II, III, IV, V, VI)



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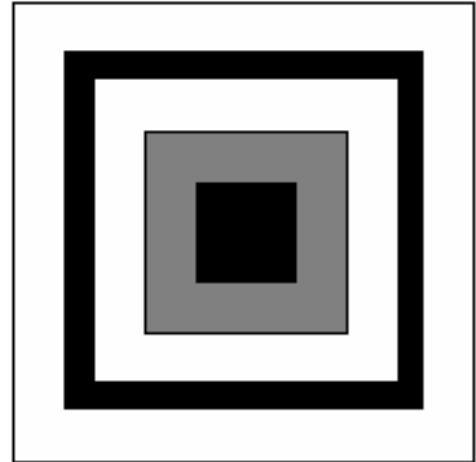
Give your answer as a list of roman numerals separated by commas (e.g. I, II, III, IV, V, VI)



Question # 9
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The weird dartboard to the right has five concentric squares with side lengths of 1, 3, 5, 6, and 10, respectively. Landing a dart in the white area earns 2 points, the gray area earns 5 points, and the black area earns 10 points. If the dart lands off of the board, they get another try until they hit the dartboard.

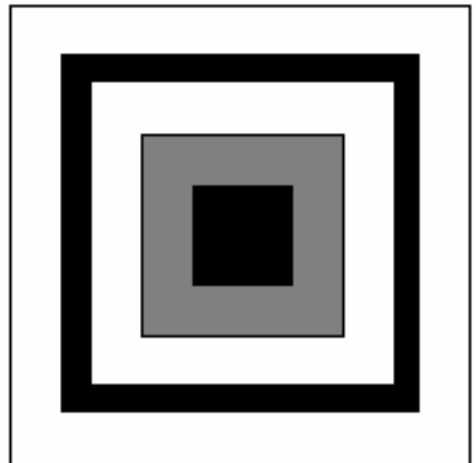
What is the probability that a player has an odd-numbered score after throwing three darts, to the nearest hundredth?



Question # 9
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What is the probability that a player has an odd-numbered score after throwing three darts, to the nearest hundredth?





Question # 10
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Six distinct integers are chosen at random from the first ten natural numbers. What is the probability that, among those selected, the second largest is 8?



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Question # 11
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Frank gets paid his allowance based on how many chores he completes for his parents. Unfortunately, he got hurt while doing the laundry, but he should be better within five days. Frank decided to strike a deal with his parents. Since he got hurt doing chores, he should be getting paid for the chores he COULD be doing. His parents agreed, and being statistician, worked up the following formula. They will pay him \$5.00 per day for up to 3 days of healing, and \$2.50 per day for each day spent healing after that. The number of days of healing he'll need, X , is a discrete random variable distributed equally among all X with probability function:

$$\begin{cases} \frac{6-X}{15} & X = 1,2,3,4,5 \\ 0 & \textit{otherwise} \end{cases}$$

Determine the expected payment for healing under this "policy".



Question # 11
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Question # 12
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Two fair, six-sided dice are rolled. What is the expected value of the lower of the two?
(If each die reveals the same number, choose **one** die to be the “lower” number).



Question # 12
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Two fair, six-sided dice are rolled. What is the expected value of the lower of the two?
(If each die reveals the same number, choose **one** die to be the “lower” number).



Question # 13
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$$\text{Let } A = \sum_{r=1}^{10} ({}_{10}C_r)$$

$$\text{Let } B = \sum_{n=1}^{10} ({}_n C_1)$$

$$\text{Let } C = \prod_{r=2}^{14} \left(\frac{{}_{14}C_r}{{}_{14}C_{(r-1)}} \right)$$

$$\text{Let } D = \prod_{r=1}^5 \left(\frac{{}_{14}P_r}{{}_{14}C_r} \right)$$

Evaluate $\frac{AD + BC}{BD}$ to the nearest tenth.



Question # 13
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Evaluate $\frac{AD + BC}{BD}$ to the nearest tenth.



Question # 14
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In the latest shipment of fifty hamsters at a pet store, one was pregnant. If Sally went in and purchased five hamsters, what are the chances that none are pregnant? (Assume she bought them as soon as the shipment arrived.)



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Question # 15
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Hours	0	1	2	3	4	5	6	7	8
# of People	1	13	12	9	16	4	4	0	1

Given the above data regarding the number of guinea pig enthusiasts versus the number of hours spent per week cleaning a cage,

Let A= the mean number of hours spent cage cleaning per week.

Let B= the median number of hours spent cage cleaning per week.

Let C= the mode number of hours spent cage cleaning per week.

Find $\sqrt[A]{C^B}$.



Question # 15
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