Research Based Curricula

How Can Mathematics Help a Farmer?

Key Stage 5

Maths/Business
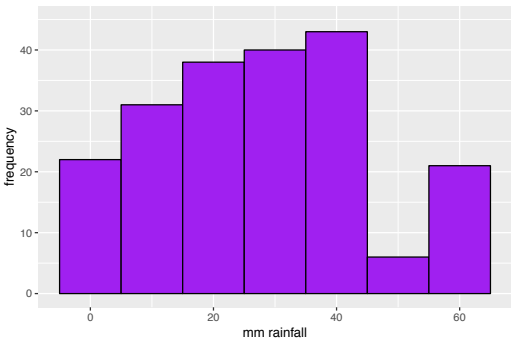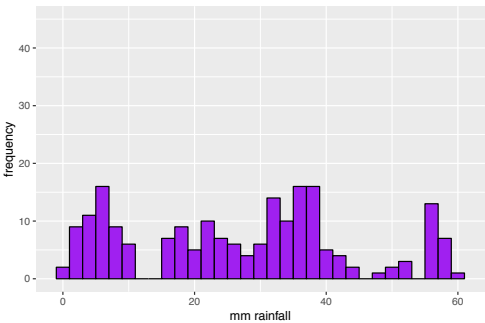
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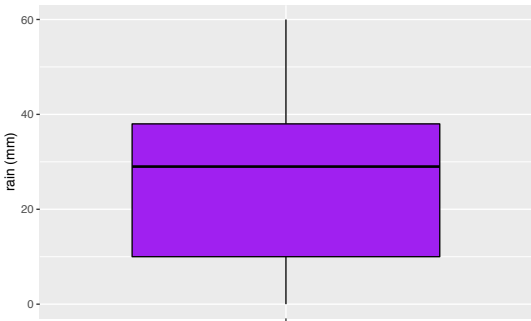ACCESS ED

Resource One
Model Answers

Answers

1.

2. Lower columns since we split it up more


3.

4. 2A, 1B, 3C

5. If we just want to get a quick feeling for how spread out our data points are and if it is symmetric about the mean, a BW plot is preferable. A BW plot is also preferable if we have several different datasets and want to compare them side by side. If we instead want a deeper understanding of how the data is distributed, a histogram is better since we see how it is distributed for all values.

Resource Two
Model Answers

Answers

1. Periodic
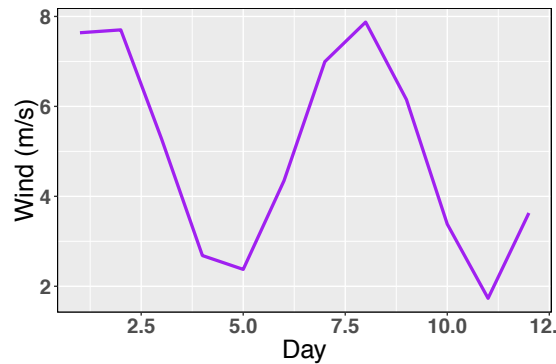
2. 1: increasing ; 2: periodic and decreasing ; 3: increasing volatility and increasing ; 4: increasing for first half and decreasing for second half ; 5: decreasing volatility and periodic

3. Since the sales of gloves depends on what season we are in, splitting the data into months will give us the best information on when to stock up with gloves.

4. The data should have a slightly increasing pattern since the tree gets a little bit bigger all the time.

5. This can be anything that depends on the season or time of the day. For example, how much ice cream is being sold by a café, since more people buy ice cream when it is warm.

6. Can again be anything that either grows or shrinks. Example is the height of a child (up to a certain age).

Resource Three
Model Answers

Answers

1. If we remove the south east region, then we would assume that all of UK receives more rainfall than it does since we would not have any regions left with the smaller rainfall values.

2. Both of the locations we have taken measurements are places with low levels of pollution, so we should take measurements from a busy road or next to a red light where cars stand still.

3. We would assume that a lower proportion of the population takes the bus, since we only have measurements from the places where a lower proportion of the population takes the bus.

4. If we only ask couples without any children, the amount will be much lower than the average amount. If we only ask households who mostly buy take-out, then the amount will be higher than the average. Asking families with many children will result in a higher average.

5. Measuring number of people taking the train. If we measure during rush hour, then we will get a higher value than the average and if we measure late in the evening, then it will be a lower value than the average.

Resource Four
Model Answers

Answers

1. 5*5 + 20 = 45mm

2. a= 2.2 and b=4.2. Increasing
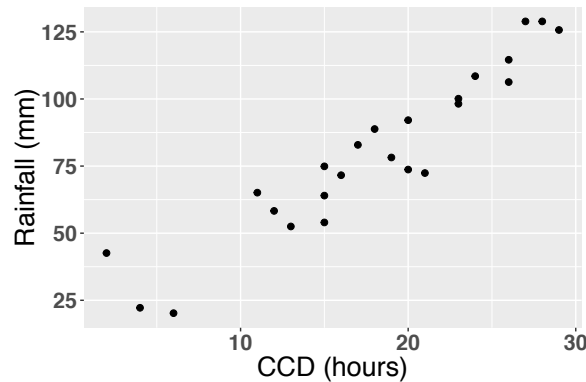
Sample	x = CCD	y = Rain	$x_i * y_i$	x^2
1	13	52.5	682.5	169
2	23	98.2	2258.6	529
3	17	82.9	1409.3	289
4	28	128.9	3609.2	784
5	24	108.5	2604	576
6	26	106.3	2763.8	676
7	21	72.4	1520.4	441
8	26	114.6	2979.6	676
9	6	20.2	121.2	36
10	11	65.1	716.1	121
n= 10	195	849.6	18664.7	4297
	19.5	84.96		

3. Larger grid if we measure all of Africa since it is a bigger area so more expensive if we want to use a smaller grid size.

4. If the grid size is very large than we can have locations where it rains and locations that it does not rain within the same square. Averaging this will mean that we assign a lower rainfall value to the measured CCD.

5. If the spread is very large then the fitted line does not represent many of the possible outcomes so we might put more confidence in our estimate than we should. If there is a very large spread then it is better to describe the values with a BW plot for each half hour to show the spread.

Resource Five
Model Answers

Answers

1. 15% of all adults do not have any savings.

2. You are free to always take the cheaper option if you have more money and can afford to take a financial risk.

3. Buying big packs are usually cheaper than buying several small packets. Buying a seasonal train/bus ticket is cheaper than buying a monthly or daily ticket.

4. E.g roulette, playing a single number or row gives a much higher reward than playing one of the colours.

5. Offer a long pay-off plan with low interest rate could ease the financial loss. Sell a mixture of seeds to spread out the risk.

Resource Six
Model Answers

Answers

1. To protect you in very expensive situations that you else would not afford.

2. Home: water leakage ; Car: accidentally drive into someone ; Travel: break a leg and need medical help.

3. Receipts and pictures.

4. Flooding, fire, insects, storm.

5. If our model estimated too much rainfall then the probability of drought will be smaller so the scheme will not pay out when it should. If it instead estimates too little rain then the scheme will pay out even when it should not so the insurance company will probably go bankrupt.

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