





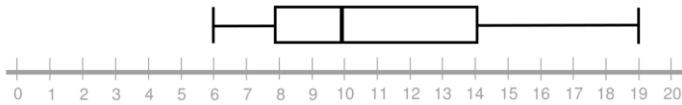
MDM4U – Sample Test 4 – One Variable Analysis – November 13, 2023

Name: _____

Knowledge 	Application 	Communication 	Thinking 	Total	Percent
26	28	21	18	93	%

Knowledge

1. Identify the following items on this box and whisker graph. /6



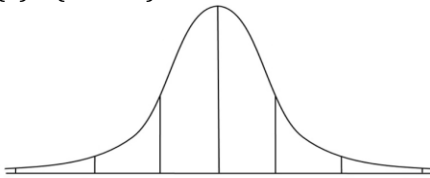
Min:	<input type="text"/>	Max:	<input type="text"/>
Q1:	<input type="text"/>	Q3:	<input type="text"/>
Median:	<input type="text"/>	IQR:	<input type="text"/>

2. Use the z-score table to fill in the probabilities of each z-score in the last column. /5

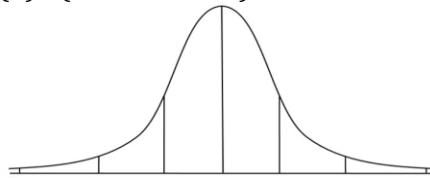
- (a) $P(z < 1.0)$
- (b) $P(z < -0.75)$
- (c) $P(z < 0.56)$
- (d) $P(z > 0.56)$
- (e) $P(z > -0.75 \text{ and } z < 0.56)$

3. Shade in the area on the normal distribution indicated by the probability. /5

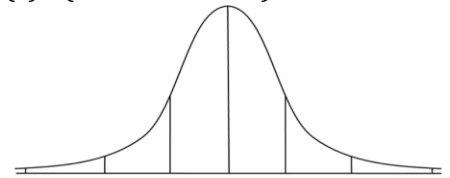
(a) $P(z > 0.5)$



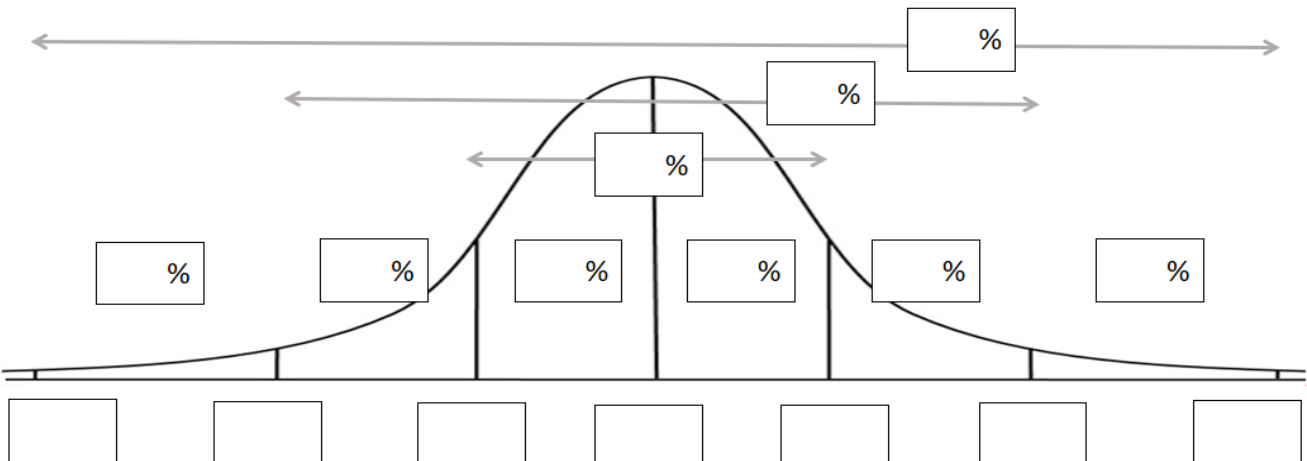
(b) $P(z < -1 \text{ or } z > 1)$



(c) $P(z > -2 \text{ and } z < 1)$



4. Fill in the boxes to fully label the normal distribution. /10





Application

5. What are the formulas found in the indicated cells of this spreadsheet?

/11

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	The Data:					The Analysis:							
2	2	3	4	7		Mean	4.08	Minimum	1	Q3	5.75	X	5
3	3	5	4	3		Standard Deviation	1.98	Q1	3	Maximum	8	Zscore	0.46
4	1	3	6	8		Mode	3	Median	3.5	IQR	2.75	P(x<5)	0.6789

G2	
G3	
G4	
I2	
I3	
I4	

K2	
K3	
K4	
M3	
M4	

6. Calculate the standard deviation of the following values.

/5

Mean	Standard Deviation Pieces			Standard Deviation
$\bar{x} = \frac{\sum x}{n}$	x	$\bar{x} - x$	$(\bar{x} - x)^2$	$\sigma = \sqrt{\frac{\sum (\bar{x} - x)^2}{n}}$
	11			
	13			
	14			
	16			
	17			
	19			
	$\Sigma =$		$\Sigma =$	

7. Calculate the standard deviation of the following frequency values.

/7

Mean	Standard Deviation Pieces						Standard Deviation
$\bar{x} = \frac{\sum x \times f}{\sum f}$	x	freq	$x \times f$	$\bar{x} - x$	$(\bar{x} - x)^2$	$f(\bar{x} - x)^2$	$\sigma = \sqrt{\frac{\sum f(\bar{x} - x)^2}{\sum f}}$
	8	3					
	9	8					
	11	6					
	12	4					
		$\Sigma =$		$\Sigma =$			

8. If the mean height of a newborn kitten is 12 cm with a standard deviation of 1.5 cm, then what percentage of kittens are born smaller than 10 cm?

/5



Communication

9. Write the terms indicated in the last columns.

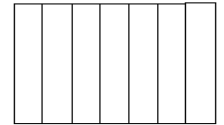
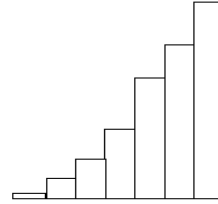
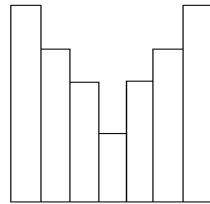
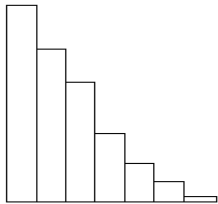
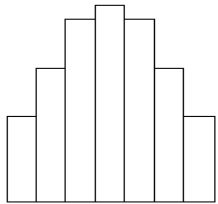
/2

(a) Measures of spread.

(b) Measure of central tendency.

10. Classify each histogram's shape.

/5



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11. Fill in the final column with the term or number indicated.

/10

- (a) The standard deviation for: $X \sim N(34, 25)$
- (b) The distribution shape where mode > median > mean.
- (c) A distribution shape where mode = median = mean.
- (d) A distribution shape with two modes.
- (e) The measure of spread that goes with a median.
- (f) The number of standard deviations something is from the mean.
- (g) A measure of how tightly grouped data is around the mean.
- (h) A measure of central tendency not effected by outliers.
- (i) The term for the most frequently occurring value.
- (j) The top percentile on the SAT test (or any test, for that matter)

12. Define and explain the importance of the term "Normal Distribution".

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Thinking

13. Draw a box and whisker graph for this data.

/5

Position:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Value:	6	8	9	11	12	14	15	17	19	20	21	23	24	26	30



14. The weights of babies born at Prince Louis Hospital last year averaged 3.0 kg with a standard deviation of 0.2 kg. If there were 545 babies born at the hospital last year, how many weighed less than 3.3 kg?

Write down any formulas you use. Be careful to use titles.

/6

15. The weights of Florida's oranges are normally distributed. 84% of the crop weighs more than 152 grams and 16% weigh more than 200 g. What is the mean and standard deviation of the crop?

Write down any formulas you use. Be careful to use titles.

/7