Counting and statistics - Practice test 1

Name: _____ Date: _____

10 questions | 45 marks | 60 minutes

Begin with counting choices, then analyse a small survey and an introductory normal model. Show formulas and explain your choices.

A scientific calculator may be used.

1. A lunch menu offers 4 mains,3 sides and 2 drinks. Every combination is available. [4 marks]

(a) Count the complete meals. [2 marks]

(b) One main is unavailable. Count the remaining complete meals. [2 marks]

2. Five different posters are displayed in a row. [4 marks]

(a) Count all possible rows. [2 marks]

(b) A particular poster must be at the left end. Count the rows. [2 marks]

3. A group of 9 students chooses a captain, deputy and treasurer, all different people. [4 marks]

(a) Explain whether order matters. [2 marks]

(b) Count the assignments. [2 marks]

4. A library chooses 3 books from 8 different novels. [4 marks]

(a) Count the selections if no reading order is specified. [2 marks]

(b) Count the selections containing one specified novel. [2 marks]

5. Consider the expansion of $(x+3)^4$. [5 marks]

(a) Write the five Pascal coefficients. [2 marks]

(b) Expand the expression. [3 marks]

6. A teacher randomly selects 30 of 300 students and records journey time and number of bus transfers. [4 marks]

(a) Identify the population and sample. [2 marks]

(b) Classify both recorded variables. [2 marks]

7. Five observed daily sales totals are 3,4,4,5,14. [5 marks]

(a) Find the mean, median and mode. [3 marks]

(b) Which centre better describes an ordinary day in this sample? Explain. [2 marks]

8. The ordered data are 2,3,5,7,8,10,14. Use the median-of-halves convention, excluding the middle value. [5 marks]

(a) Find the five-number summary. [3 marks]

(b) Find the IQR and range. [2 marks]

9. A sample is 4,6,8. [5 marks]

(a) Calculate the sample mean and sample standard deviation. [3 marks]

(b) Every reading increases by 10. Find the new mean and s. [2 marks]

10. Bottle volumes follow an approximately normal model with mean 500 mL and standard deviation 5 mL. [5 marks]

(a) Estimate the percentage between 490 and 510 mL using the empirical rule. [2 marks]

(b) Estimate the expected number above 510 mL among 4,000 bottles. Explain the word expected. [3 marks]