

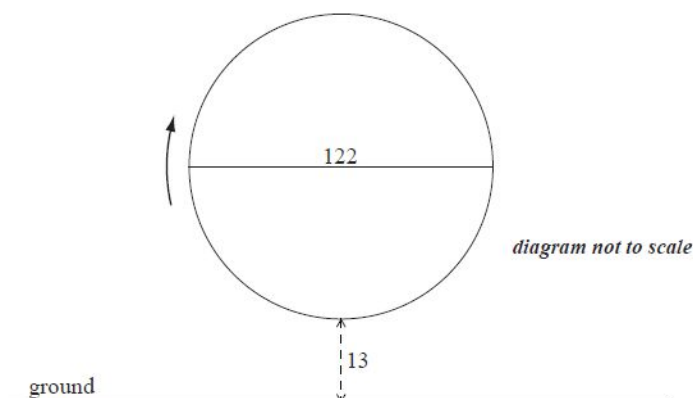
1. **(SP4.2; CA)** Roeland has prepared a frequency table distribution for a data set shown in the table below. *(Oxford 8.3, p.260)*

x	1	2	3	4
frequency	32	20	41	16

- Find the mean and median of this data set.
 - For the frequency row, re-express each frequency as a relative frequency (or rather as a probability). Find the mean and median now. What observations do you make about the mean and median and the total relative frequency now?
2. **(GT3.8; CA)** A Ferris wheel with diameter 122 metres rotates clockwise at a constant speed. The wheel completes 2.4 rotations every hour. The bottom of the wheel is 13 metres above the ground. A seat starts at the bottom of the wheel.

(Cirrito 10.5, p.361)

- Find the maximum height above the ground of the seat.
- After t minutes, the height h metres above the ground of the seat is given by $h(t) = M + a \cos(bt)$.
 - Show that the period of $h(t)$ is 25 minutes.
 - Write down the **exact** value of b .
- Find the value of a and of M .
- Sketch the graph of $h(t)$, for $0 \leq t \leq 50$.
- In one rotation of the wheel, find the probability that a randomly selected seat is at least 105 metres above the ground.



3. **(F2.6; CI)** Let g be a quadratic function such that $g(0) = 5$. The line $x = 2$ is the axis of symmetry of g . *(Cirrito 2.4.2, p44)*
- Find $g(4)$.
 - The function g can be expressed in the form $g(x) = a(x - h)^2 + 3$.
 - Write down the value of h .
 - Find the value of a .
 - Find the equation of the inverse of g .

4. (F2.9; CI) Solve the following;

(Cirrito 7.4, p.221)

a. $\log_2(x+7) + \log_2 x = 3$ b. $\log_2 x + \log_2 x^3 = 4$ c. $\log_{10}(x+7) + \log_{10}(x-2) = 1$

5. (F2.8; CI) Consider the function $f(x) = \frac{4x-6}{x+3}$.

(Cirrito 5.4, p.148)

- Write down the equation of the asymptote(s) of this function
- Determine the intercepts of this function
- The point $P(3, 1)$ is on the graph of $f(x)$. Let $h(x) = -2f(\frac{1}{3}x) + 1$. Determine the coordinates of the point P' on $h(x)$ which corresponds to the point P .

6. (F2.6; CI) Given the function $q(x) = 2x^2 - 3x + 2$, determine:

(Cirrito 2.4.1, p.41)

- The number of x-intercepts of $q(x)$.
- The value of K in the linear function $f(x) = -x + K$ such that the equation $q(x) = f(x)$ has only one solution.
- Interpret the meaning of the scenario in Q(b).

7. (F2.9, CI) Given the functions $f(x) = e^{2x+1}$ and $g(x) = \ln \sqrt{x}$;

(Cirrito 5.3.3, p.131; 5.3.4, p.138)

- Sketch each function.
- Show that $(g \circ f)(x) = x + \frac{1}{2}$. Hence, are the 2 functions inverses of each other?
- Find the equation for $f^{-1}(x)$ and $g^{-1}(x)$.

8. (SP 4.2, CA) Here are the results of a survey on hours of homework done over the weekend by IB year 1 students. Students were asked to round their studying time to the nearest hour.

(Cirrito 16.1, p527)

Number of hours studied	0	1	2	3	4	5
Number of students	4	12	8	3	2	1
Relative frequency				0.10		

- Explain why this data table shows an example of a **discrete** data set
- Find the mean and standard deviation of the number of hours studied.
- Prepare a frequency histogram of the results.
- How probable is it that a randomly selected student studied 2 hours?
- How probable is it that a randomly selected student studied at most 3 hours?
- How probable is it that a randomly selected student studied either 2 or 3 hours?
- Complete the row wherein you calculate the relative frequencies.
- We will now define the variable X as the number of hours studied. Determine:
 - $P(X = 3)$
 - $P(X \geq 3)$
 - $P(X = 3 | X \geq 3)$
 - $P(2 \leq X \leq 4)$