We encourage all students to attempt the questions in this slide before the vacation school. This will help you to ask guided questions and enable you to easily clear your doubts. The answers are provided to confirm that your attempt was successful.
Questions 1 and 2

• 1 Three girls entered a race around a track. Anna takes 6 minutes to run one lap. Emily takes 3 minutes to run one lap and it takes Maria 5 minutes to run one lap. If all three girls begin the race at the same time, how many minutes will it take for all three to be at one point again?  
  \((\text{Answer: 30 minutes})\)

• 2 294 blue balls, 252 pink balls and 210 yellow balls are distributed equally among some students with no ball left over. What is the biggest possible number of students?  
  \((\text{Answer: 42 students})\)
Questions 3 and 4

• 3. Simplify \(- \frac{1}{3^{-3}} - \left[ - \left( -2^2 \right) \right] + \sqrt[3]{27} \) (Answer: -34)

• 4. Simplify \( \log_2 \left( \frac{1}{2} \right) - \left( \log_2 1 - \log_2 2 \right) \) (Answer: 0)
Question 5

• 5 From a group of athletes, 1/8 of the athletes were chosen for long jump and 1/4 of the remaining athletes were chosen for javelin. One hundred and five athletes remained, and they were all chosen for relay race.

• 5.1 How many athletes were chosen for long jump? (Answer: 20)

• 5.2 How many athletes were chosen for javelin? (Answer: 35)
Question 6

• 6.1 Factorize the expression
   \[ x^3 + bx^2 - ax - ab \]
   (Answer: \((x^2 - a)(x + b)\))

• 6.2 Simplify the expression
   \[ \frac{6x^{-4}2x^3}{8x^{-3}} \]
   (Answer: \(\frac{3x^2}{2}\))

• 6.3 Expand and simplify the expression
   \[ (x - xy)^2 - x^2 - x(-2xy) \]
   (Answer: \(x^2y^2\))
Question 7

• Determine the values of p, q, r in the Venn diagram:

\[\text{Answer: } p = 90, \quad q = 110, \quad r = 320\]
The sets $A = \{1, 2, 3, 7, 11\}$ and $B = \{3, 5, 7, 11, 12\}$ are subsets of all whole numbers from 1 to 12. Determine the sets

• 8.1 $(A \cap B)'$
  
  (Answer: $\{1, 2, 4, 5, 6, 8, 9, 10, 12\}$)

• 8.2 $A \oplus B'$
  
  (Answer: $\{3, 4, 6, 7, 8, 9, 10, 11\}$)
Question 9

• The equations $5x + 5y = 80$ and $3x + 2y = 44.80$ represent the money collected from school concert tickets sales during two class periods. $x$ represents the cost for each adult ticket and $y$ represents the cost for each student ticket.

• 9.1 Use Cramer’s rule to determine the cost for each adult ticket and each student ticket. (Answer: adult $12.80$, student $3.20$)

• 9.2 How much will 15 adult tickets and 85 student tickets cost? (Answer: $464.00$)
Question 10

• Out of 360 students interviewed, it was found that 185 students speak Spanish (S), 55 students speak neither Spanish nor Portuguese. Furthermore, \((x + 7)\) students speak Portuguese (P) only and \(x\) speak both languages.

• 10.1 Show the information as given above on the Venn diagram.

• 10.2 Determine the value of \(x\) (Answer: 113)

• 10.3 How many students speak Spanish only? (Answer: 72)
Question 11

• Determine the values of m, n, p, and q in the following matrix equation

\[
\begin{pmatrix}
4 & 0 \\
1 & m
\end{pmatrix}
\begin{pmatrix}
n & p \\
-2 & 0
\end{pmatrix}
= 
\begin{pmatrix}
20 & 12 \\
-1 & q
\end{pmatrix}
\]

(Answer: n=5, p=3, q=3, m=3)
Questions 12 and 13

• 12 Calculate the amount payable for a loan of N$1000 for 3 years at a simple interest rate of 10%.  (Answer: n=5, p=3, q=3, m=3)

• 13 Calculate the amount payable for a loan of N$1000 for 3 years at the rate of 10% per annum compounded quarterly. (Answer: n=5, p=3, q=3, m=3)
Question 14 and 15

• 14. Consider the progression 4, 9, 14, 19, . . . Calculate the 150th term AND the sum of the first 75 terms of this progression. (Answer: \( T_{150} = 749 \quad S_{75} = 14175 \) )

• 15. Consider the progression 64, 32, 16, 8, . . . Calculate the 25th term AND the sum of the first 10 terms of this progression. (Answer: \( T_{25} = \frac{1}{262144} \quad S_{10} = -\frac{1023}{8} \) )