IB Maths SL mini Topic Exam: **Mixed Topics**

Recommended Time: 30mins.  
Total Mark: \( /33 \)

Student Name: ___________________  
Teacher: ____________________

**Question 1**

[Maximum mark: 5]

Let \( f(x) = a(x - h)^2 + k \). The vertex of the graph of \( f \) is at (3,4) and the graph passes through (1,-4).

(a) Write down the value of \( h \) and \( k \).  
(b) Find the value of \( a \).

**Working**  

/5
Question 2

[Maximum mark: 7]

Given that \( \sin x = \frac{3}{5} \), where \( x \) is an acute angle, find

(a) \( \cos x \). [3]
(b) \( \sin 2x \). [2]
(c) \( \cos 2x \). [2]

Working
Question 3

[Maximum mark: 7]

Let \( f(x) = px^3 - qx \). At \( x = 0 \), the gradient of the curve of \( f \) is 2. Given that \( f^{-1}(12) = 2 \), find the value of \( p \) and \( q \).

Working

/7
Question 4

[Maximum mark: 6]

In an arithmetic sequence, \( u_5 = 24, \ u_{13} = 80. \)

(a) Find the common difference. \([2]\)

(b) Find the first term. \([2]\)

(c) Find the sum of the first 20 terms of the sequence. \([2]\)

Working
Question 5

[Maximum mark: 8]  
A factory makes toys. The probability that a toy is defective is 0.08. A random sample of 50 toys is tested.

(a) Find the expected number of defective toys. [2]

(b) Find the probability that there is at least one defective toy in the sample. [3]

(c) Given that there is at least one defective toy in the sample, find the probability that there are, at most, three defective toys. [3]