**Clydebank High School**

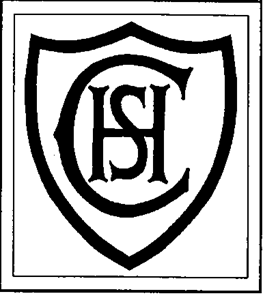
**Higher Mathematics**

**Unit 1**

**Practice Assessment 1**

Covering:

* A1.1: Straight Line Q’s 1, 2, 3, 4
* A1.2: The Circle Q’s 5, 6
* A1.3: Recurrence Relations Q’s 7, 8
* R1.1: Quadratic Theory/ Polynomials Q’s 9, 10, 11





Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



**Applications Assessment Standard 1.1**

1. A straight line has the equation 3x + 2y = 6.Find the equation of the line parallel to the given line, which passes through the point (2, 5).

**(2)**

2 Find the equation of the line through the point ( -1, -4) which is perpendicular to the line with equation 2y = 4x – 5.

**(2)**

3 Calculate the size of the **obtuse** angle between the line y = 3x + 2 and the   
 *x*-axis.

**(#2.1, 2)**

4 A ski slope is categorised by its gradient as shown in the table.

|  |  |
| --- | --- |
| **Dry slope category** | **Gradient (*m*) of slope** |
| Teaching and general skiing | 0 < m ≤ 0.5 |
| Extreme skiing | m > 0.5 |

Which category does the dry ski slope in the diagram below belong to?

Explain your answer fully.

135˚

º

*y*

*x*

O

**(1, #2.2)**

**Applications Assessment Standard 1.2**

5 The diagram shows two congruent circles. One circle has centre the origin and diameter 30 units.

*y*

*x*

O

**(3)**

Find the equation of the other circle which passes through the origin and whose centre lies on the *y*-axis.

6 Determine algebraically if the line y = 2x – 25 is a tangent to the circle

**(3, #2.2)**

(x – 6 )² + (y + 3 )² = 20.

**Applications Assessment Standard 1.3**

7. For the recurrence relation un+1 = aun + b , it is known that

**(4)**

uₒ = 6, u1 = 12 u2 = 21  
.  
a) Find the values of a and b.

b) Hence find the values of u3

8. A farmer has 160 hens. Foxes attack the hens and kill 30 % of the remaining hens each month.

At the end of each month the farmer buys 30 new hens to replenish his stock.

1. Set up a recurrence relation to show the number of hens present at the start of each month, just after he restocks his farm.
2. Find the limit of this sequence and use this to explain what happens in the long run to his initial stock of 160 hens.

**(#2.2, 3)**

**Relationships and Calculus Assessment Standard 1.1**

1. Factorise the cubic ƒ (x) = x³ + 2x² - 15x – 36 fully.

Hence solve 

**(6)**

10. Solve the cubic equation  given the following:

when is divided by x + 1, the remainder is zero

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**(#2.2)**

when the graph of  is drawn, it passes through the point (-2,0)

( x – 3) is a factor of 

11. The graph of the function ƒ (x) = kx² - 12x + 5 does not touch or cross the   
 *x*-axis.

**(#2.1, 2)**

What is the range of values for ?