**Clydebank High School**

 **Higher Mathematics**

 **Unit 1**

 **Practice Assessment 2**

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 5*x* + 2*y* = 10.

Find the equation of the line parallel to the given line, which passes

through the point (3, –4). **(2)**

1. Find the equation of the line through the point (–2, 6) which is

perpendicular to the line with equation 3*y* = – 4*x* + 5. **(2)**

1. Calculate the size of the obtuse angle between the line *y* = 5*x* – 3

and the *x*-axis. **(#2.1, 2)**

1. A ramp is categorised by its gradient as shown in the table.

|  |  |
| --- | --- |
| **Ramp category** | **Gradient (m) of ramp** |
| Teaching and general skiing | 0 < m ≤ 3 |
| Extreme skiing | m > 3 |

Which category does the ramp in the diagram below belong to?

 Explain your answer fully. **(1, #2.2)**

105˚

º

*y*

*x*

O

**Applications Assessment Standard 1.2**

1. The diagram shows two congruent circles. One circle has centre the origin and diameter 20 units.

*y*

O

*x*

Find the equation of the other circle which passes through the origin

and whose centre lies on the *x*-axis. **(3)**

1. Determine algebraically if the line *y* = *x* – 1 is a tangent to the circle

(*x* + 4)² + (*y* – 2)² = 49. **(3. #2.2)**

**Applications Assessment Standard 1.3**

1. For the recurrence relation un+1 = *a*un + *b*, it is known that

uₒ = 5, u1 = 11, u2 = 29

1. Find the values of *a* and *b*.
2. Hence find the values of u3. **(4)**
3. The deer population in a forest is estimated to drop by 7∙3% each year.

Each year 20 deer are introduced to the forest. The initial deer population is 200.

1. Set up a recurrence relation to show the number of deer present at the

start of each year, just after the new deer are introduced.

1. Find the limit of this sequence and use this to explain what happens in

the long run to the initial population of 200 deer. **(#2.2, 3)**

**Relationships and Calculus Assessment Standard 1.1**

1. Factorise the cubic ƒ(*x*) = 2*x*³ – 15*x*² + 16*x* + 12 fully.

Hence solve ƒ(*x*) = 0. **(6)**

1. Solve the cubic equation ƒ(*x*) = 0 given the following:
* when ƒ(*x*) is divided by *x* – 3, the remainder is zero.
* when the graph of ƒ(*x*) is drawn, it passes through the point (5, 0).
* (*x* + 2) is a factor of ƒ(*x*). **(#2.2)**
1. The graph of the function ƒ(*x*) = *kx*² + 9*x* – 5 does not touch or cross the *x*-axis.

What is the range of values for *k*? **(#2.1, 2)**