## Changing Circles Project Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## MATH A104

Most math books define the area of a circle as follows: , where *A* is the area of the circle and *r* is the radius of a circle.

A text used in UAA’s Automotive Diesel program defines the area of a circle as , where *A* is the area of the circle andis the diameter of the circle.

1. (2 points) Think about what would happen to the area of the circle if the diameter increases. Do you think the area of the circle would change linearly (by the same factor / at a constant rate) or not linearly (by a changing factor)? Give a reason to back up your guess.

1. (4 points) Calculate the area of the circle two different ways for the following diameters.

| **Diameter** | **Area found using , in mm2** | **Area found using (use the π button on your calculator), in mm2** |
| --- | --- | --- |
| 1 mm |  |  |
| 2 mm |  |  |
| 3 mm |  |  |
| 4 mm |  |  |

1. (3 points) Describe how the two area calculations in the table above compare. Explain why this might be. Compare the answers, not the steps used in the computations.
2. (2 points) Look at the MIDDLE column of the table above (the one using ). Divide each of these areas by 0.7854. Notice that doing this is just dividing out a constant. Write your answers in the table below.

| **Diameter** | **Area** |
| --- | --- |
| 1 mm |  |
| 2 mm |  |
| 3 mm |  |
| 4 mm |  |

1. (4 points) If you calculated the values in #4 correctly, those numbers are significant. Mathematically why does it make sense that the area of the circle changes in such a way? You may find it helpful to look at the equation. Keep your answer to one sentence, if possible.
2. (4 points) Describe the pattern in the area values as the diameter increases (see the table from #4). If this growth is different from linear growth, HOW is it different?