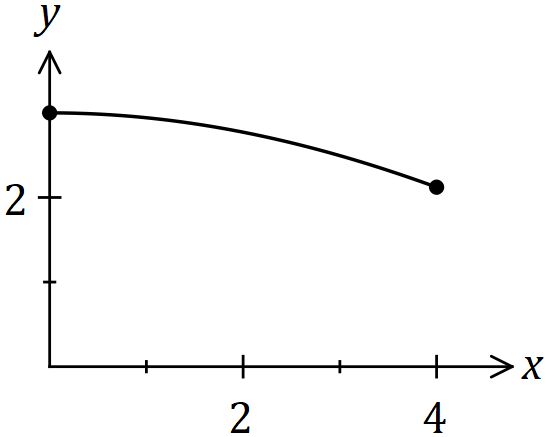
|  |  |
| --- | --- |
|  | **MATHEMATICS:SPECIALIST 3 & 4**  **SEMESTER 2 2019**  **TEST 4**  **Calculator Free** |
|  |  |

Reading Time: 2 minutes Time Allowed: 30 minutes

Total Marks: 26

Question 1 (4 marks)

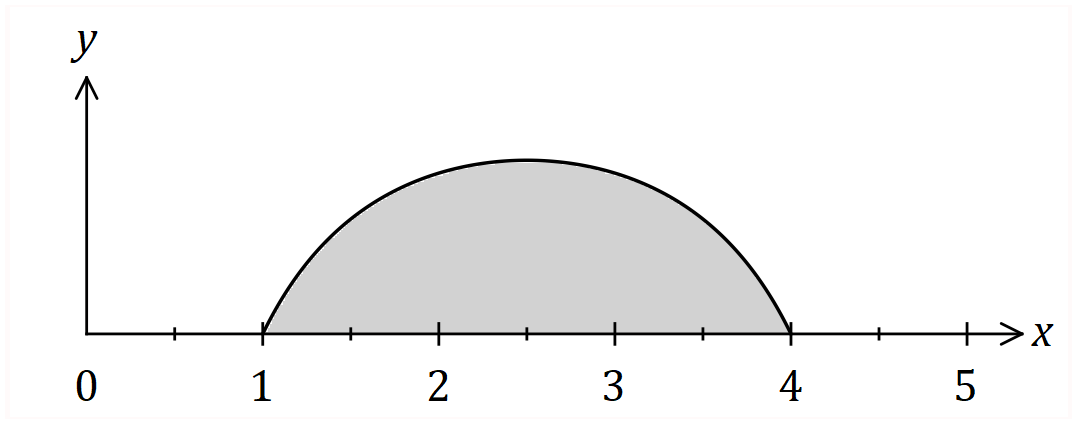
The curve defined by , where , is shown below.



Determine the volume of the solid generated when the area bounded by the axis and the curve is rotated about the axis between and .

Question 2 (5 marks)

Part of the graph of is shown below.



Determine the shaded area, bounded by the curve and the -axis.

Question 3 (5 marks)

Use the substitution *u*  =  + 3 to find *dx.*

Question 4 (12 marks)

1. Use double-angle formulae to evaluate

 . (4 marks)

1. Use the substitution  to determine  . (4 marks)

1. Determine the value of the integer  if

(4 marks)

|  |  |
| --- | --- |
|  | **MATHEMATICS:SPECIALIST 3 & 4**  **SEMESTER 2 2019**  **TEST 4**  **Calculator Assumed** |
|  |  |

Reading Time: 2 minutes Time Allowed: 26 minutes

Total Marks: 21

Question 5 (6 marks)

(a) An unknown function is such that its table of values are given below.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| f(x) | 13 | 13.8 | 14.1 | 14.6 | 15.3 | 15.7 | 15.9 | 16.5 | 17.1 | 18.6 | 20.1 |

Using the midpoint rule with 5 strips, determine the approximate area under the function between x = 3 and x = 13.

The formula for the midpoint rule is:

(3 marks)

(b) An unknown function is such that its table of values are given below.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | 1 | 1.5 | 2 | 2.5 | 3 | … | 10 | 10.5 | 11 |
| f(x) | 8.2 | 8.175 | 7.6 | 6.625 | 5.4 | … | 46 | 59.025 | 74.2 |

The formula for the trapezoidal rule is:

Given that determine the approximate area under the function between x = 1 and x = 11 using the trapezoidal rule.

(3 marks)

Question 6 (6 marks)

The region trapped between the curve y = (x – 1)3 + 2 and the line y = 3x + 1 is rotated about the y-axis. Determine the volume of the shape created.



**Question 7 (4 marks)**

Use partial fractions to prove that



Question 8 (5 marks)

The region enclosed by the curves and , has an area of square units.

Determine the value of the positive constant .