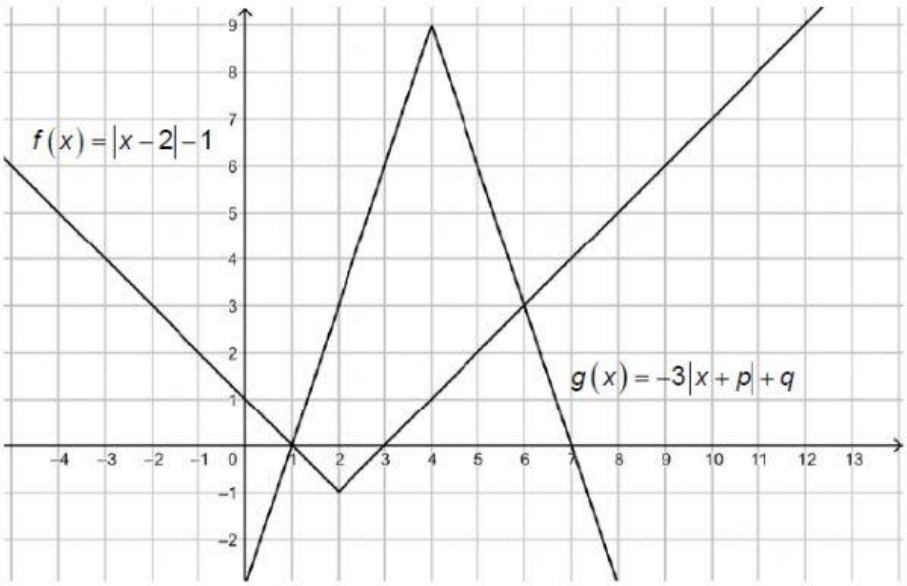
9.2 Consider the functions $f(x)=|x-2|-1$ and $g(x)=-3|x+p|+q$ drawn below:



(a) Determine the values of p and q. (4)

(b) Using the graphs, or otherwise, solve: $|x-2|+3|x-4|>10$. (6)

(c) Determine $\int_1^7 g(x)\,dx$. (4)

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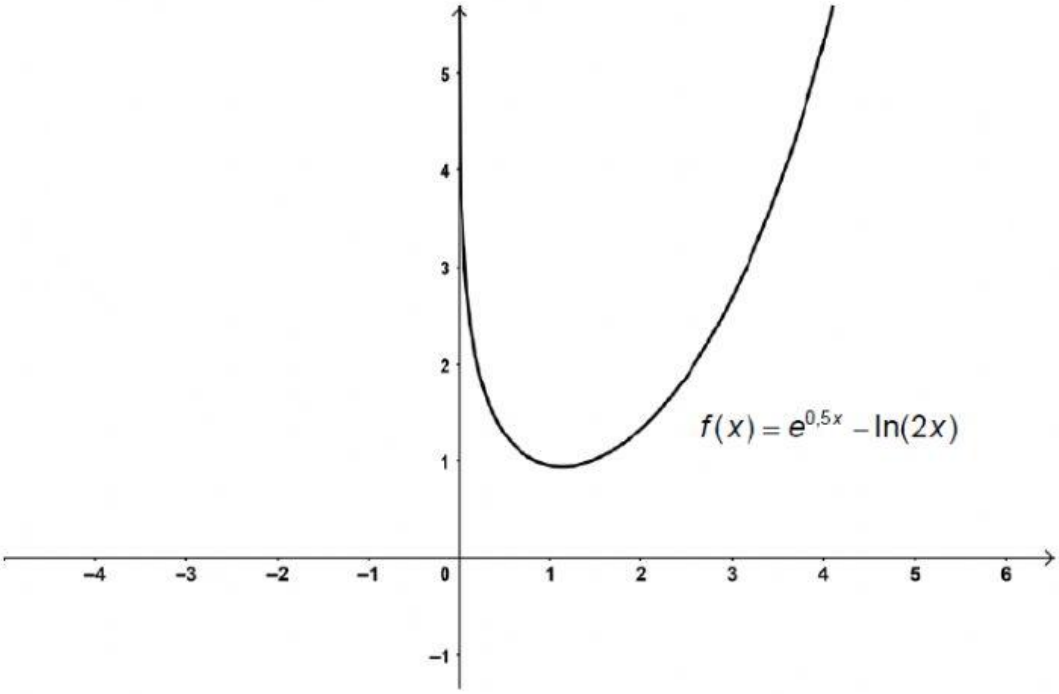
QUESTION 10

Use Newton-Raphson iteration to find the turning point of the given function.



You should:

- Show the iterative formula you use.
- Use an initial approximation of $x = 2$.
- Show your first approximation to 5 decimal places.

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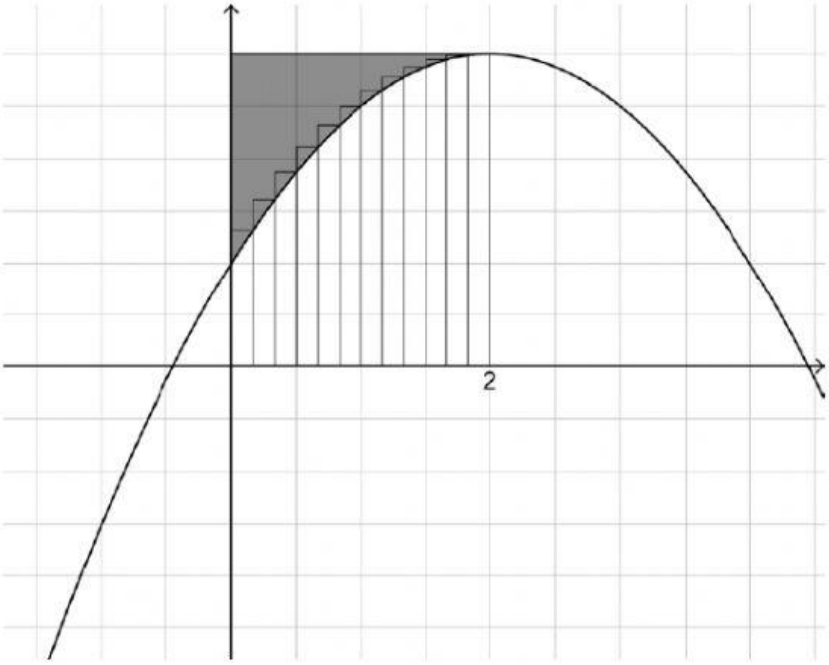
QUESTION 11

11.1 When the area bounded by the curve f, the x-axis and the lines $x = 0$ and $x = 2$ is partitioned into n rectangles the area is given by:

$$A = -\frac{8}{3} - \frac{4}{3n^2} + 12 + \frac{4}{n}$$



If it is further given that $f(2) = 6$ then determine the shaded area, correct to 2 decimal places.

(6)

11.2 Determine:

(a) $\int x\left(3x^2 + 7\right)^3 \, dx$ (6)

LIVEWORKSHEETS

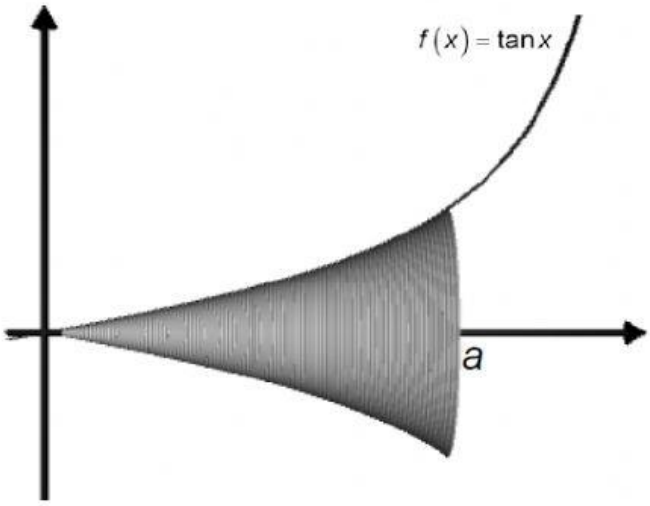
(b) $\int e^{2x} x \, dx$ (8)

(c) $\int \frac{3x-5}{x^2-2x-3} \, dx$ (10)

[30]

QUESTION 12

The area bounded by the curve $f(x) = \tan x$, the x-axis, the line $x = 0$ and the line $x = a$, $a < \frac{\pi}{2}$ is rotated about the x-axis.



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Give an expression for the volume in terms of a.

[10]

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