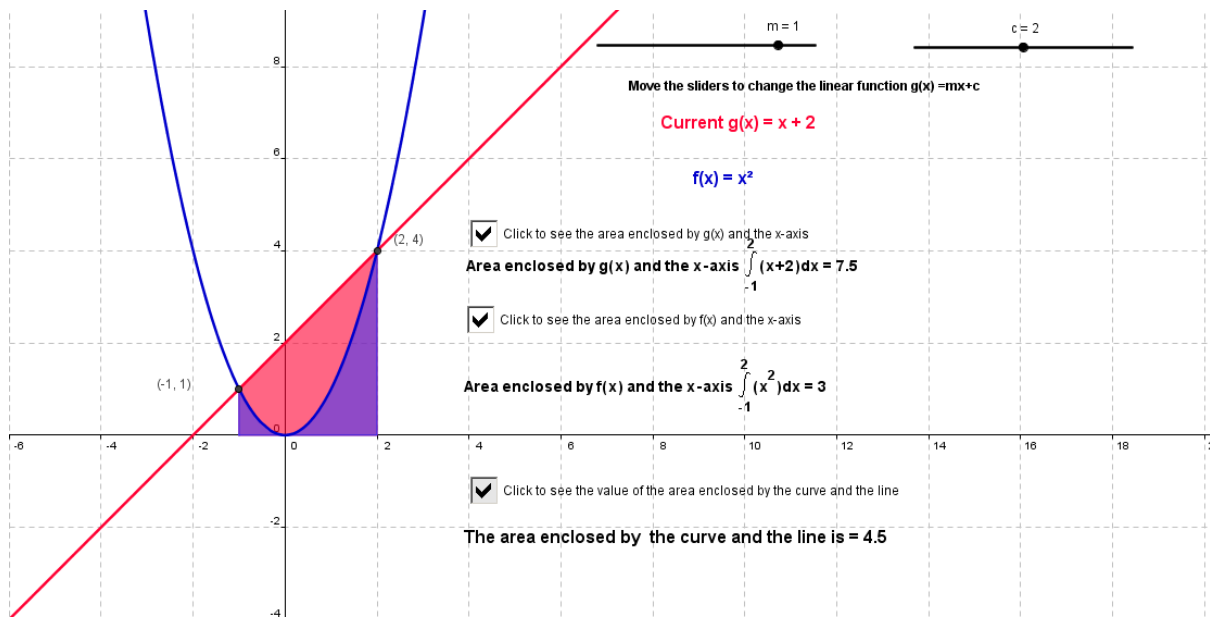


**Student Activity:** To investigate the relationship between integration of a function and the area enclosed by the curve representing the function and a line that intersects the curve

Use in connection with the interactive file, 'Integration and Area 4', on the Student's CD.



**It is recommended that in all instances students draw a sketch of the function in question.**

1.

Calculate  $\int_{-1}^2 x^2 dx$ . Show your calculations.

a.

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b. Hence, write down the area enclosed by the curve that represents the function  $f(x) = x^2$  and the x-axis in the interval  $[-1, 2]$ ?

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c. Calculate.  $\int_{-1}^2 (x + 2) dx$ . Show your calculations.

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d. Hence, write down the area enclosed by the line  $f(x) = x + 2$  and the x-axis in the interval  $[-1, 2]$ ?

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e. Calculate  $\int_{-1}^2 (x + 2)dx - \int_{-1}^2 x^2 dx$ .

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f. Find the points of intersection of  $f(x) = x^2$  and  $g(x) = x + 2$ .

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g. What is the area of the region enclosed by the line  $g(x) = x + 2$  and the curve  $f(x) = x^2$ . Check your answer using the interactive file.

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h. If you wish to find the area enclosed by a line  $g(x)$  and the graph of the function  $f(x)$ , what extra information is required apart from calculating the integral of both  $f(x)$  and  $g(x)$ ?

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2. Find the area enclosed by graphs of the functions  $f(x) = x^2$  and  $g(x) = x$  correct to two decimal places.

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3. Sketch the curve of  $f(x) = -x^2$  and the line  $g(x) = x + 3$ . Find the area enclosed by the curve and the line, correct to two decimal places.

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4. The diagram shows a part of the graph of the function. If the shaded areas are equal find the equation of the vertical line (L)

