Calculating the area above and below the x-axis can be used to work out values, like the amount of water in a reservoir.

A definite integral is one which has an upper limit, b and a lower limit, a.

If you evaluate a definite integral above the x axis the answer will be positive, and if it's below it will be negative, so it's important to find the roots of the function to divide the area into different parts.

Calculate the total shaded area of y equals x squared subtract eight x plus 15.

To find the limits for the definite integral, factorise y equals x squared subtract eight x plus 15.

Factorised gives y equals bracket x subtract three bracket times bracket x subtract five bracket.

To find the roots, set each bracket equal to zero and solve for x. X will equal three or five.

Separate integrations need to be done for above and below the x-axis.

Integrate the function and evaluate between zero and three for area one.

The integrated function is one third x cubed subtract four x squared plus 15 x.

Substitute the limits of the definite integral, three and zero to get area one equal to 18.

Repeat the process for area two, evaluating the definite integral between three and five.

The area is negative four thirds but take the positive value.

Total area is 18 plus four over three, which equals 58 over three square units.