

Chapter 10 / **Example 13**

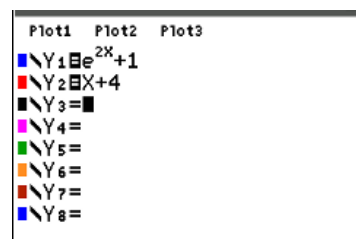
Find the area of a region bounded by curves

Find the area of the region bounded by the curves $f(x) = e^{2x} + 1$ and $g(x) = x + 4$.

Press $[f1]$ $[y=]$ to display the equation entry screen.

Type $e^{2x} + 1$ and press $[enter]$ to enter the equation as Y_1 .

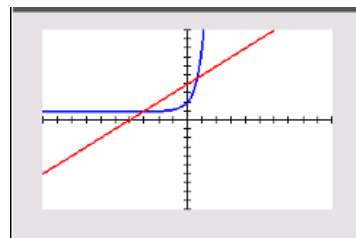
Type $x + 4$ and press $[enter]$ to enter the equation as Y_2 .



Press $[f5]$ $[graph]$ to display the graph screen.

The GDC now displays the curves $Y_1 = e^{2x} + 1$ and $Y_2 = x + 4$.

The default axes are $-10 \leq x \leq 10$ and $-10 \leq y \leq 10$.



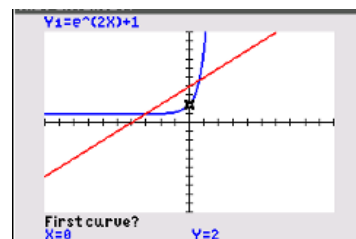
Find the intersection points and then the areas under each of the curves between these limits. To find the area bounded by the two curves you will need to subtract the areas.

Press $[2nd]$ $[f4]$ $[calc]$ 5:intersect

To find the intersection you need to choose the two lines that intersect.

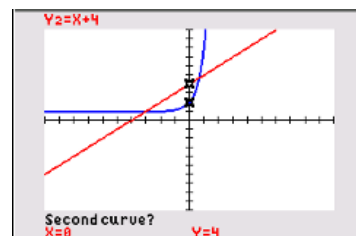
The GDC shows a cross on one of the lines and 'First curve?'.

Press $[enter]$.



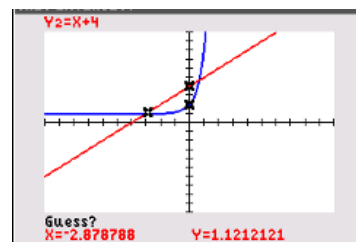
The GDC shows a cross on the other line and 'Second curve?'.

Press $[enter]$.



The GDC requires an initial guess for the position of the intersection. Choose a point near the left-hand intersection by pressing $[left]$ $[right]$.

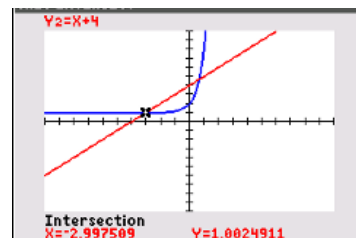
Press $[enter]$.



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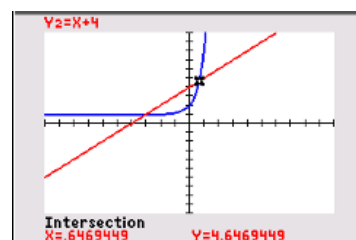
Find the area of a region bounded by curves

The GDC displays the intersection of the two straight lines at the point $(-3, 1)$.



Find the second intersection by the same method.

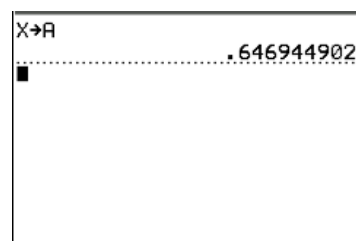
The GDC displays the intersection of the two straight lines at the point $(0.647, 4.647)$.



To store an accurate value of the x-coordinate press $\boxed{2\text{nd}} \boxed{[\text{quit}]}$ to enter the home screen.

Press $\boxed{X,T,\theta,n} \boxed{\text{sto} \rightarrow} \boxed{\text{XXXX}} \text{A}$ and press $\boxed{\text{enter}}$.

The integration limits are -3 and the value stored as A.

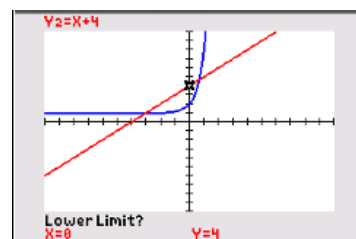


Press $\boxed{2\text{nd}} \boxed{[\text{calc}]} \boxed{7: \int f(x) dx}$

Press $\boxed{\uparrow}$ to select Y_2

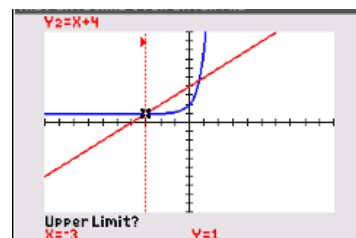
To find the area you need to give the lower and upper limits of the region that includes the intersection.

The GDC asks you to set the lower limit.



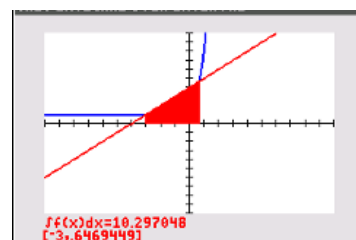
Type -3 and press $\boxed{\text{enter}}$.

The GDC asks you to set the upper limit.



Type $\boxed{\text{XXXX}} \text{A}$ and press $\boxed{\text{enter}}$.

The area under the line Y_2 is 10.30

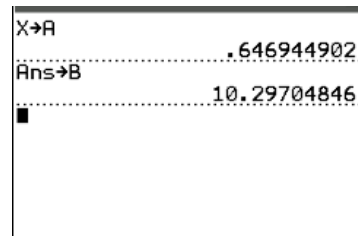


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Find the area of a region bounded by curves

To store an accurate value of the area press **2nd** **[quit]** to enter the home screen.

Press **sto→** **[DEL]** B and press **enter**.

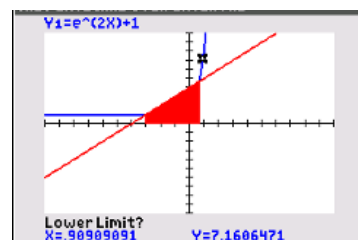


Press **2nd** **[calc]** 7: $\int f(x) dx$

Make sure that Y_1 is selected.

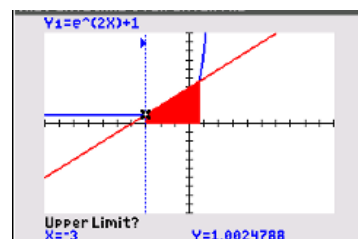
To find the area you need to give the lower and upper limits of the region that includes the intersection.

The GDC asks you to set the lower limit.



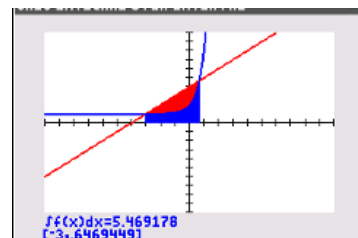
Type -3 and press **enter**.

The GDC asks you to set the upper limit.



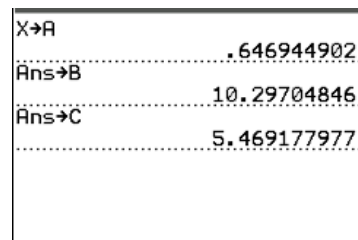
Type **[DEL]** A and press **enter**.

The area under the line Y_2 is 5.47.



To store an accurate value of the area press **2nd** **[quit]** to enter the home screen.

Press **sto→** **[DEL]** C and press **enter**.



Type **[DEL]** B **-** **[DEL]** C

The GDC has calculated the difference between the two areas which is the area between the curve and the line.

The area of the region is 4.83.

