

Chapter 11 / Example 14

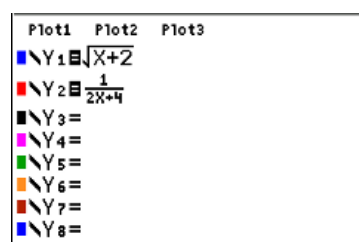
Area between curves

Sketch the region bounded by $y = \sqrt{x+2}$, $y = \frac{1}{2x+4}$ and $x=3$. Find the area of the region.

Press [F1] [Y=] to display the equation entry screen.

Type $\sqrt{x+2}$ and press [ENTER] to enter the first equation as Y_1 .

Type $\frac{1}{2x+4}$ using \square [F1] 1:n/d to select the fraction template and press [ENTER] to enter the second equation as Y_2 .

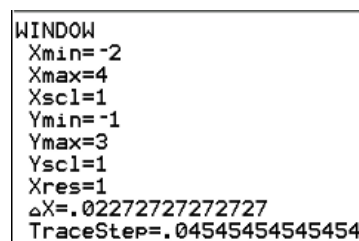


Press [F2] [WINDOW]

Set the axes to show $-2 \leq x \leq 4$ and $-1 \leq y \leq 3$.

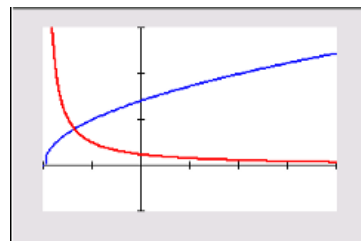
You can leave the last three items as they are.

Press [F5] [GRAPH] when you have finished.



Press [F5] [GRAPH] to display the graph screen.

The GDC now displays the curves $Y_1 = \sqrt{x+2}$ and $Y_2 = \frac{1}{2x+4}$.



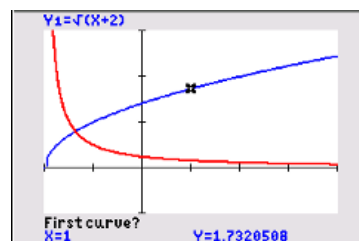
Find the intersection point and then the areas under each of the curves between this point and $x=3$. To find the area bounded by the two curves you will need to subtract the areas.

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?'.

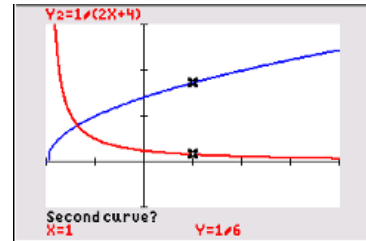
Press [ENTER].



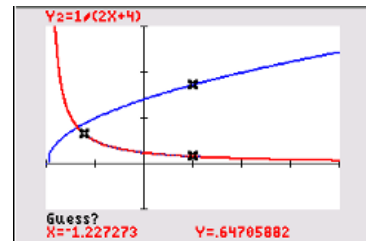
Chapter 11 / Example 14

Area between curves

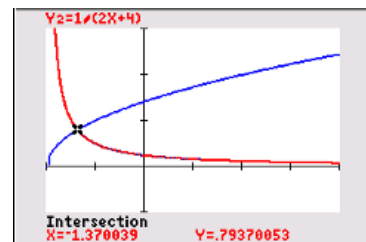
The GDC shows a cross on the other line and 'Second curve?'. Press **ENTER**.



The GDC requires an initial guess for the position of the intersection. Choose a point near the intersection by pressing **|** **~**. Press **ENTER**.



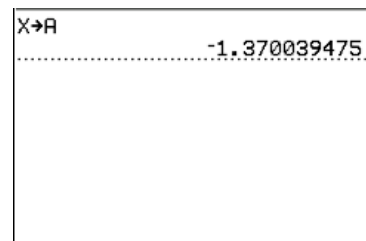
The GDC displays the intersection of the two straight lines at the point $(-1.37, 0.794)$.



To store an accurate value of the x-coordinate press **2nd** **[QUIT]** to enter the home screen.

Press **X,T,Θ,n** **STO>** **ALPHA** **A** and press **ENTER**.

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

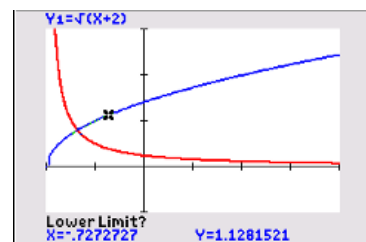


Press **2nd** **[CALC]** 7: $\int f(x)dx$

Select Y_1

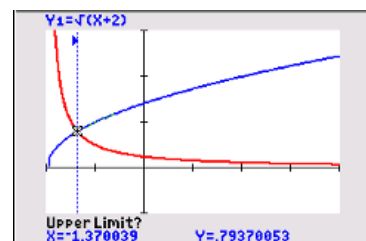
To find the area you need to give the lower and upper limits of the region that includes the intersection.

The GDC asks you to set the lower limit.



Type **ALPHA** **A** and press **ENTER**.

The GDC asks you to set the upper limit.

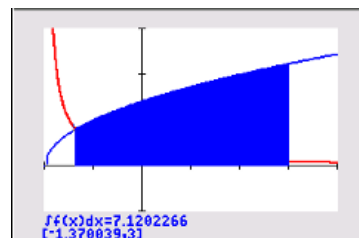


Chapter 11 / Example 14

Area between curves

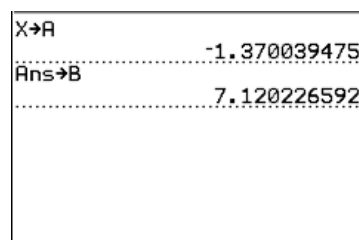
Type 3 and press **[ENTER]**.

The area under the line Y_1 is 7.12.



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

Press **[STO▶]** **[ALPHA]** B and press **[ENTER]**.

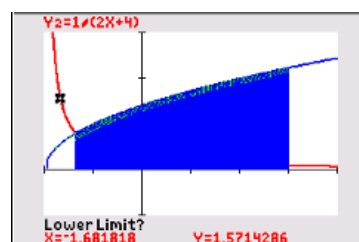


Press **[2nd]** **[CALC]** 7: $\int f(x)dx$

Press **[▲]** to select Y_2 .

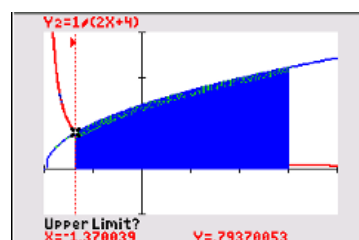
To find the area you need to give the lower and upper limits of the region that includes the intersection.

The GDC asks you to set the lower limit.



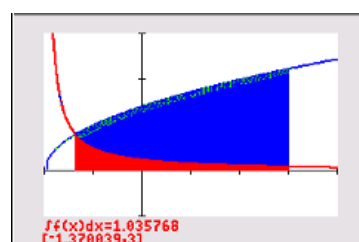
Type **[ALPHA]** A and press **[ENTER]**.

The GDC asks you to set the upper limit.



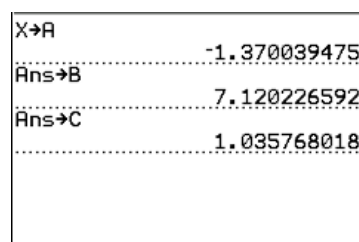
Type 3 and press **[ENTER]**.

The area under the line Y_2 is 1.04.



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

Press **[STO▶]** **[ALPHA]** C and press **[ENTER]**.



Chapter 11 / **Example 14**

Area between curves

Type $\boxed{\text{ALPHA}}$ $\boxed{\text{B}}$ $\boxed{-}$ $\boxed{\text{ALPHA}}$ $\boxed{\text{C}}$

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 6.08.

X \rightarrow A	-1.870039475
Ans \rightarrow B	7.120226592
Ans \rightarrow C	1.035768018
B-C	6.084458573