

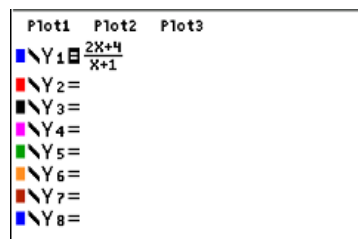
# Chapter 11 / Example 17

## Volume of revolution

Let  $f(x) = \frac{2x+4}{x+1}$ ,  $0 \leq x \leq 4$ . Find the volume of revolution formed when the curve  $f(x)$  is rotated through  $2\pi$  radians about  
**a** the  $x$ -axis      **b** the  $y$ -axis.

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

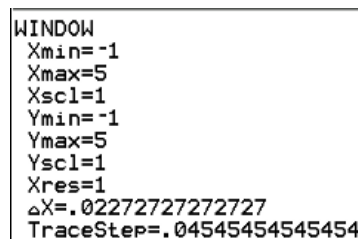
Type  $\frac{2x+4}{x+1}$  and press [ENTER] to enter the equation as  $Y_1$ .



Press [F2] [WINDOW]

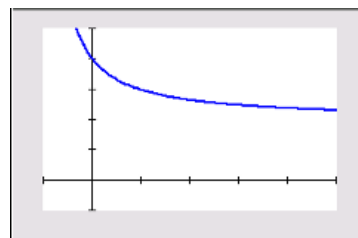
Set the axes to show  $-1 \leq x \leq 5$  and  $-1 \leq y \leq 5$ . You can leave the other items as they are.

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



The GDC displays the graph  $f_1(x) = \frac{2x+4}{x+1}$ .

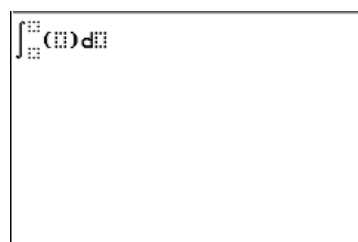
$$V = \int_0^4 \pi \left( \frac{2x+4}{x+1} \right)^2 dx$$



Press [2nd] [QUIT].

To enter the integral template press [ALPHA] [F2] 4:fnInt(.

The template shows places for the limits, the function and the variable that you are integrating with respect to.



# Chapter 11 / Example 17

## Volume of revolution

Enter the lower limit 0 and using the upper limit 4.

Enter the function  $\pi \int_0^4 \frac{2x+4}{x+1} dx$

Use  $\leftarrow$   $\rightarrow$   $\uparrow$   $\downarrow$  to navigate around the template.

Type X.

Press **ENTER**.

$$V = \pi \int_0^4 \frac{2x+4}{x+1} dx = 101.$$

$$\int_0^4 \left( \pi \frac{2x+4}{x+1} \right) dx$$

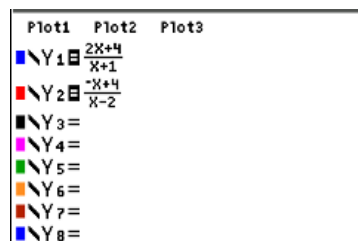
100.7681655

$$y = \frac{2x+4}{x+1} \quad x = \frac{-y+4}{y-2}$$

Express this function as  $Y_2 = \frac{-x+4}{x-2}$

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

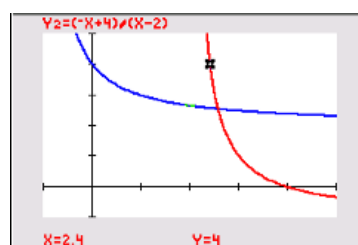
Type  $\frac{-x+4}{x-2}$  and press **ENTER** to enter the equation as  $Y_2$ .



The GDC displays the graph  $f_2(x) = \frac{-x+4}{x-2}$ .

$x = 0 \Rightarrow y = 4$  and  $x = 4 \Rightarrow y = 2.4$  so

$$V = \pi \int_{2.4}^4 \frac{x+4}{x-2} dx$$



Press **2nd** **[QUIT]**.

Press **ALPHA** **[F2]** 4:fnInt(.

Enter the lower limit 2.4 and using the upper limit 4.

Enter the function  $\pi \int_{2.4}^4 \frac{x+4}{x-2} dx$

Use  $\leftarrow$   $\rightarrow$   $\uparrow$   $\downarrow$  to navigate around the template.

Type X.

Press **ENTER**.

$$V = \pi \int_{2.4}^4 \frac{x+4}{x-2} dx = 9.93$$

$$\int_0^4 \left( \pi \frac{2x+4}{x+1} \right) dx$$

100.7681655

$$\int_{2.4}^4 \left( \pi \frac{-x+4}{x-2} \right) dx$$

9.934496186