

## Exemplar Problems

### Derivatives

17. Given the function  $f(x) = 1/(x+2)$ . Find the points of discontinuity of the composite function

$$y = f(f(x)).$$

**Solution:**

Given,

$$f(x) = \frac{1}{x+2}$$

$$f[f(x)] = \frac{1}{f(x)+2} = \frac{1}{\frac{1}{x+2}+2} = \frac{1}{\frac{1+2x+4}{x+2}} = \frac{x+2}{2x+5}$$

$$\therefore f[f(x)] = \frac{x+2}{2x+5}$$

Now, the function will not be defined and continuous where

$$2x+5=0 \Rightarrow x = -5/2$$

Therefore,  $x = -5/2$  is the point of discontinuity.