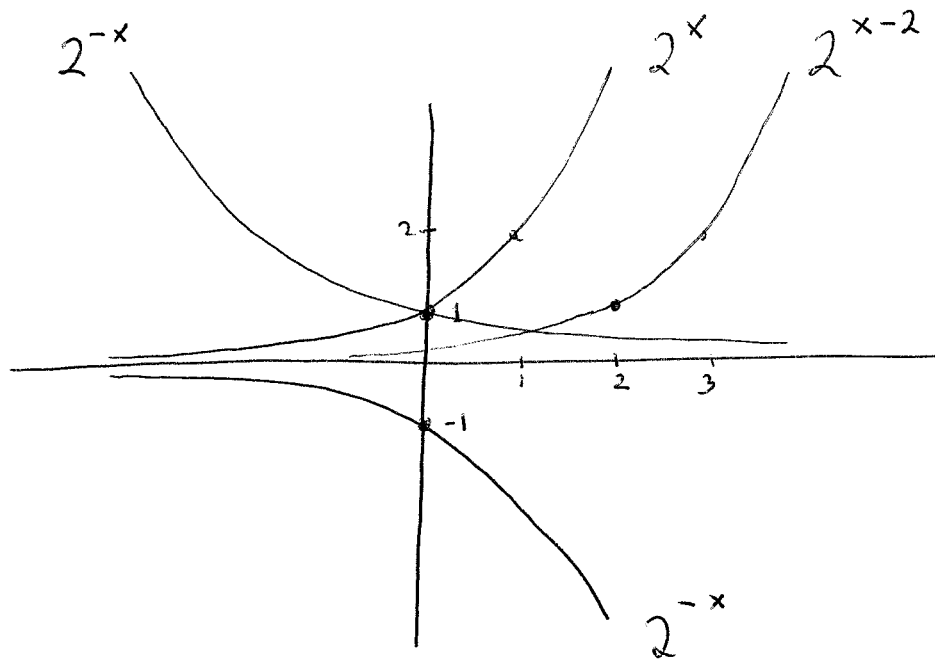
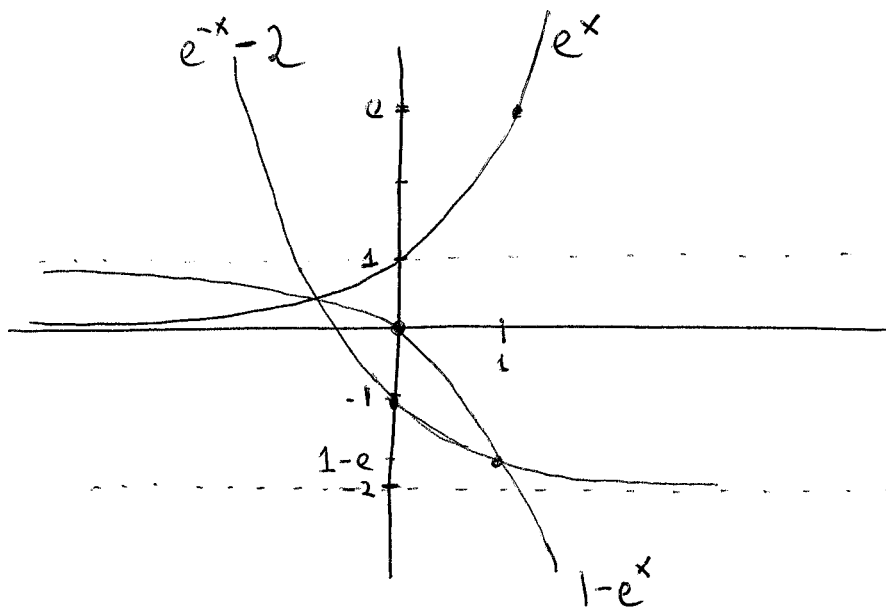


M102 Answers #5

1 a)



b)



$$2. \quad f(x) = 3(x^2 + 2x) - 1$$

$$= 3(x^2 + 2x + 1 - 1) - 1$$

$$= 3(x^2 + 2x + 1) - 3 - 1$$

$$= 3(x^2 + 2x + 1) - 4 = 3(x+1)^2 - 4$$

IE VERTEX AT
 $(-1, -4)$

(#5 CONTINUUM)

(3) a) AREA = LENGTH $\times$ WIDTH OF RECTANGLE
+ AREA OF SEMI CIRCLE

NOTE: AREA OF SEMICIRCLE IS $\frac{\pi r^2}{2}$

AND RADIUS OF THIS CIRCLE
IS HALF OF x , IE $r = \frac{x}{2}$

$$\text{AND AREA} = \frac{\pi \left(\frac{x}{2}\right)^2}{2} = \frac{\pi x^2}{8}$$

HENCE TOTAL AREA IS

$$A(x) = 3x + \frac{\pi x^2}{8}$$

b) AREA OF THE SEMICIRCLE IS UNCHANGED

AT $\frac{\pi x^2}{8}$

THE RECTANGLE, HOWEVER, HAS WIDTH ~~x~~ AND

HEIGHT $3 - \frac{x}{2}$, IE AREA $x \left(3 - \frac{x}{2}\right)$

TOTAL AREA IS

$$A(x) = 3x - \frac{x^2}{2} + \frac{\pi x^2}{8}$$