

**Partial Fractions and Binomial Expansions – 2020 A2**

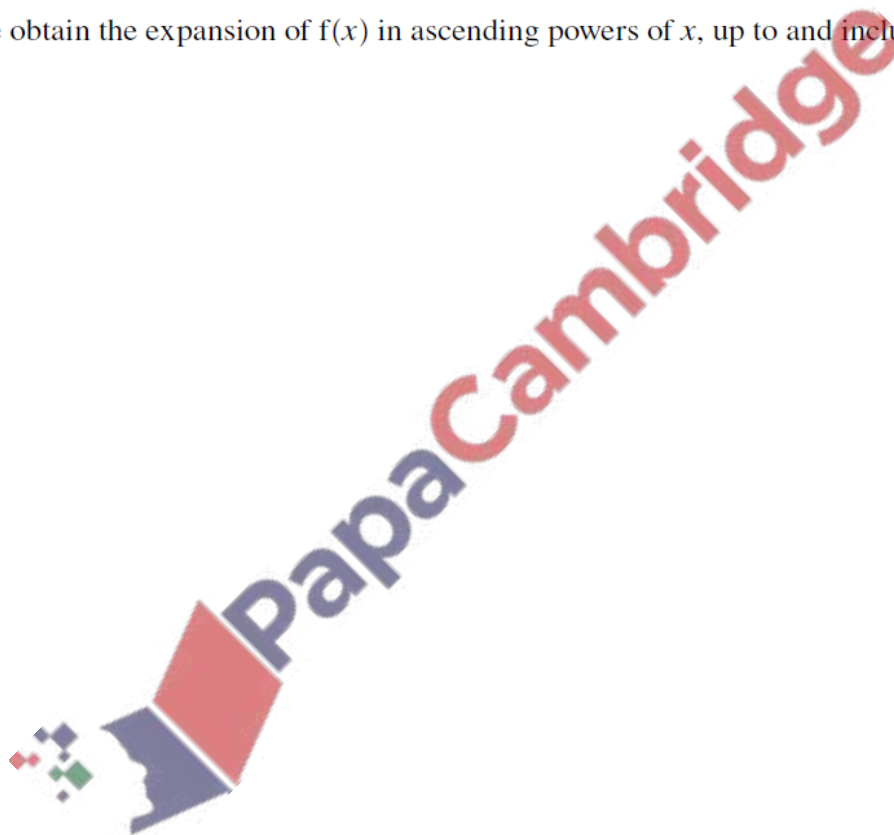
1. Nov/2020/Paper\_9709/31/No.9

$$\text{Let } f(x) = \frac{8 + 5x + 12x^2}{(1-x)(2+3x)^2}.$$

(a) Express  $f(x)$  in partial fractions.

[5]

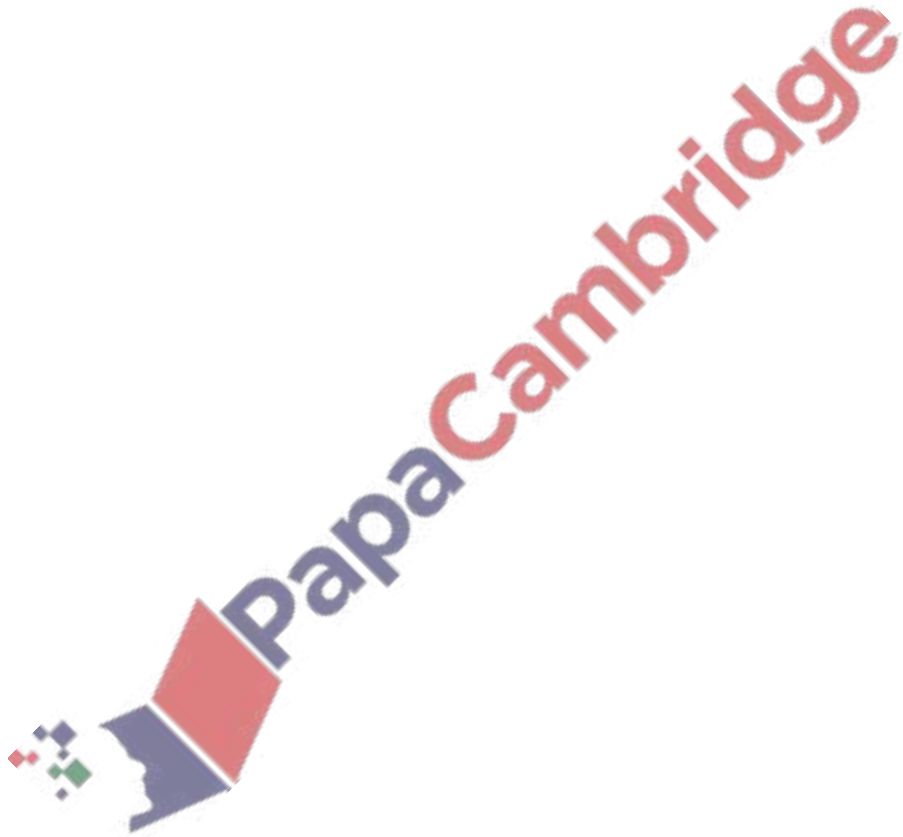
(b) Hence obtain the expansion of  $f(x)$  in ascending powers of  $x$ , up to and including the term in  $x^2$ .  
[5]



2. Nov/2020/Paper\_9709/32/No.2

(a) Expand  $\sqrt[3]{1+6x}$  in ascending powers of  $x$ , up to and including the term in  $x^3$ , simplifying the coefficients. [4]

(b) State the set of values of  $x$  for which the expansion is valid. [1]

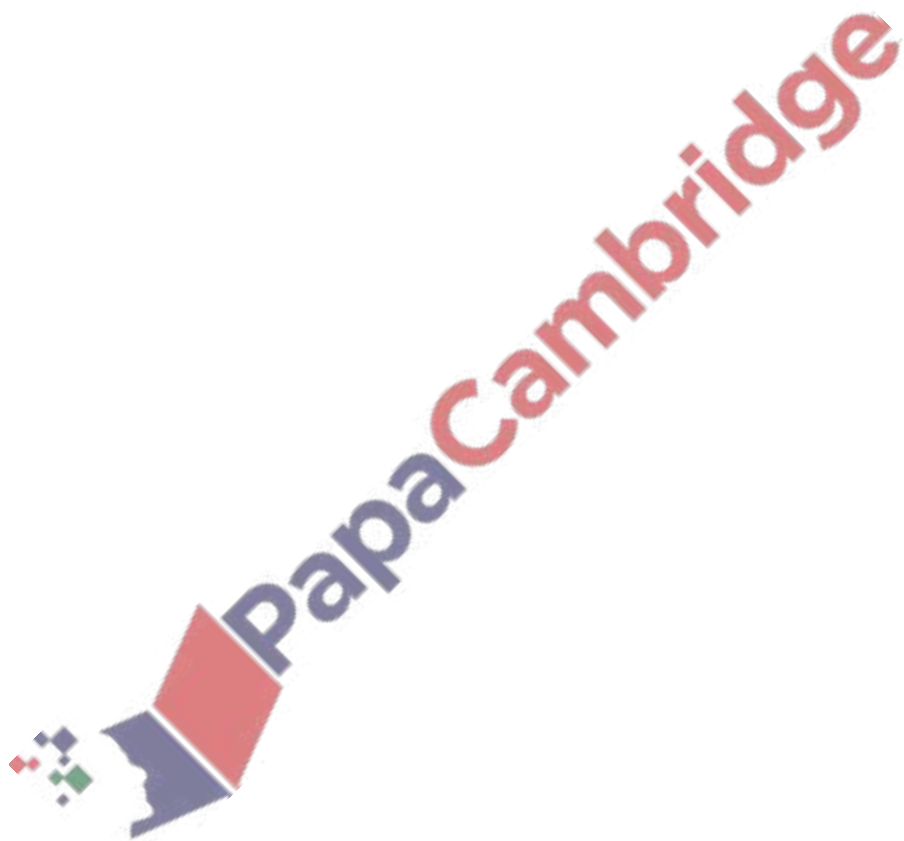


3. Nov/2020/Paper\_9709/32/No.9a

$$\text{Let } f(x) = \frac{7x + 18}{(3x + 2)(x^2 + 4)}.$$

(a) Express  $f(x)$  in partial fractions.

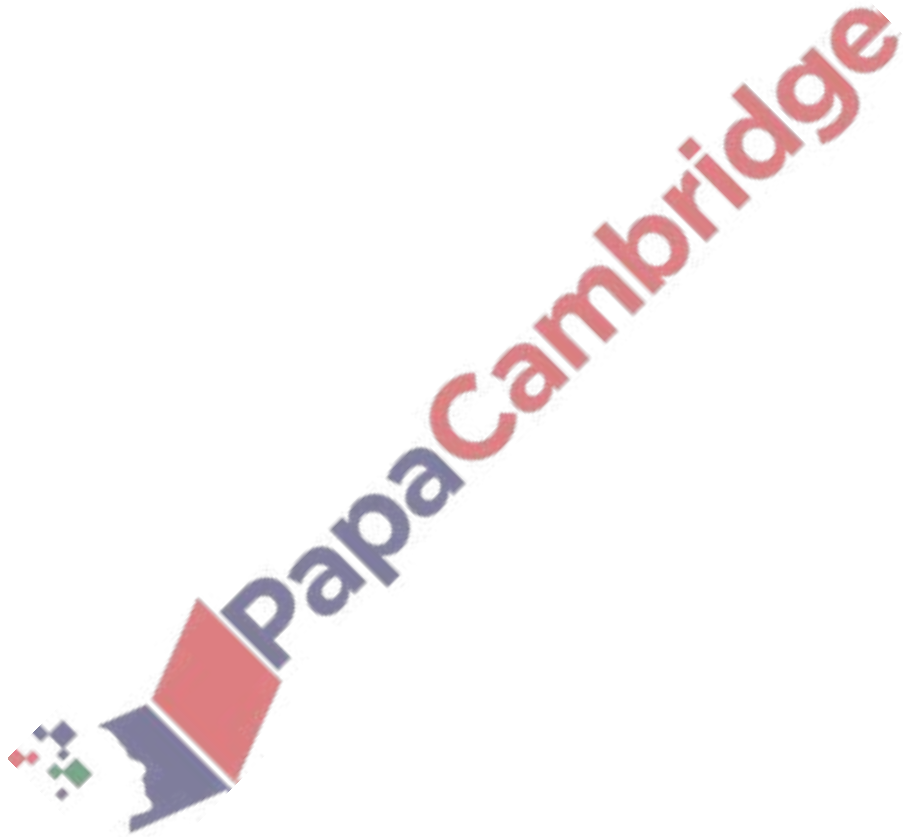
[5]



4. June/2020/Paper\_9709/31/No.2

(a) Expand  $(2 - 3x)^{-2}$  in ascending powers of  $x$ , up to and including the term in  $x^2$ , simplifying the coefficients. [4]

(b) State the set of values of  $x$  for which the expansion is valid. [1]



5. June/2020/Paper\_9709/33/No.7

$$\text{Let } f(x) = \frac{2}{(2x-1)(2x+1)}.$$

(a) Express  $f(x)$  in partial fractions.

[2]

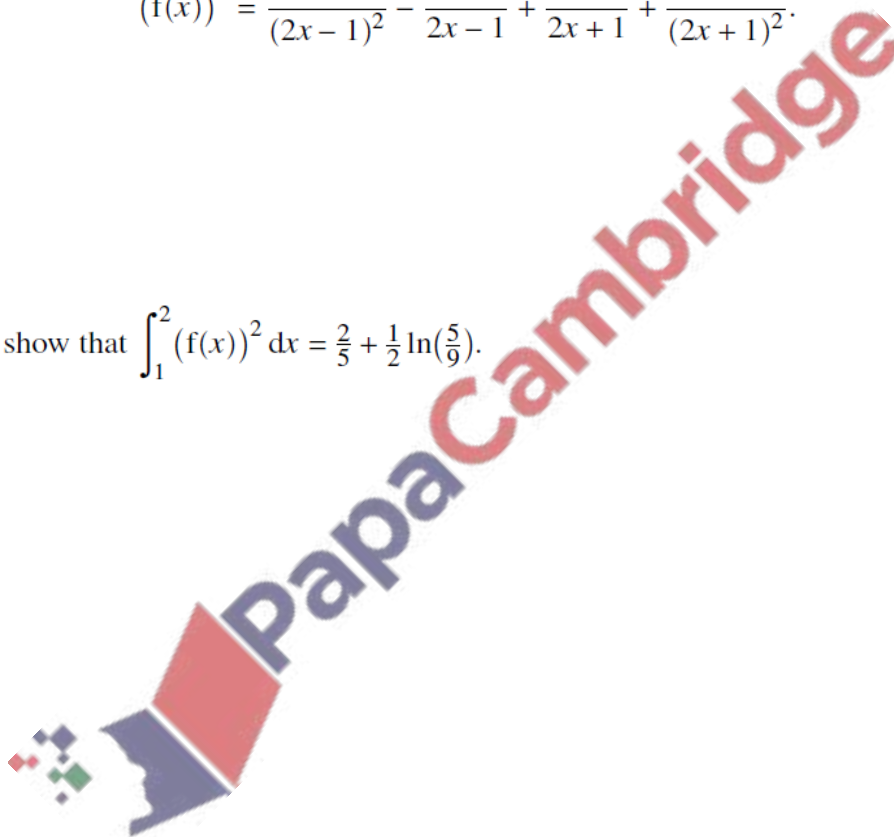
(b) Using your answer to part (a), show that

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

[2]

(c) Hence show that  $\int_1^2 (f(x))^2 dx = \frac{2}{5} + \frac{1}{2} \ln\left(\frac{5}{9}\right).$

[5]



6. March/2020/Paper\_9709/32/No.9

$$\text{Let } f(x) = \frac{2 + 11x - 10x^2}{(1 + 2x)(1 - 2x)(2 + x)}.$$

(a) Express  $f(x)$  in partial fractions.

[5]

(b) Hence obtain the expansion of  $f(x)$  in ascending powers of  $x$ , up to and including the term in  $x^2$ .  
[5]

