1. $f\left(x\right)=\frac{3x-1}{\left(x-2\right)\left(x+2\right)}$
2. Express f(x) in partial fractions
3. Hence find the series expansion of f(x) is ascending powers of x up to and including the term in $x^{3}$
4. $f\left(x\right)=\frac{3x+1}{\left(x-2\right)\left(x+2\right)}$
5. Express f(x) in partial fractions
6. Hence find the series expansion of f(x) is ascending powers of x up to and including the term in $x^{3}$
7. $f\left(x\right)=\frac{2x+1}{\left(x-1\right)\left(x+2\right)}$
8. Express f(x) in partial fractions
9. Hence find the series expansion of f(x) is ascending powers of x up to and including the term in $x^{3}$
10. $=\frac{2x+1}{\left(x-1\right)^{2}\left(x+2\right)}$
11. Express f(x) in partial fractions
12. Hence find the series expansion of f(x) is ascending powers of x up to and including the term in $x^{3}$

Answers

1 a) $\frac{7}{4\left(x+2\right)}+\frac{5}{4\left(x-2\right)}$

b) $\frac{1}{4}-\frac{3x}{4}+\frac{x^{2}}{16}-\frac{3x^{3}}{16}$

2 a) $\frac{5}{4\left(x+2\right)}+\frac{7}{4\left(x-2\right)}$

b) $-\frac{1}{4}-\frac{3x}{4}-\frac{x^{2}}{16}-\frac{3x^{3}}{16}$

3 a) $\frac{1}{\left(x+2\right)}+\frac{1}{\left(x-1\right)}$

b) $-\frac{1}{2}-\frac{5x}{4}-\frac{7x^{2}}{8}-\frac{17x^{3}}{16}$

4 a) $\frac{-1}{3\left(x+2\right)}+\frac{1}{3\left(x-1\right)}+\frac{1}{\left(x-1\right)^{2}}$

b) $\frac{1}{2}+\frac{7x}{4}+\frac{21x^{2}}{8}+\frac{59x^{3}}{16}$

Answers

1 a)

A = $\frac{7}{4\left(x+2\right)}-\frac{5}{4\left(x-2\right)}$

B=$\frac{7}{4\left(x+2\right)}+\frac{5}{4\left(x-2\right)}$

C=$\frac{5}{4\left(x+2\right)}+\frac{7}{4\left(x-2\right)}$

D=$\frac{5}{4\left(x+2\right)}-\frac{7}{4\left(x-2\right)}$

1b)

A= $\frac{1}{4}+\frac{3x}{4}+\frac{3x^{2}}{16}-\frac{3x^{3}}{16}$

B= $\frac{1}{4}-\frac{3x}{4}+\frac{x^{2}}{16}+\frac{3x^{3}}{16}$

C= $\frac{1}{4}-\frac{3x}{4}+\frac{x^{2}}{16}-\frac{3x^{3}}{16}$

D= $\frac{1}{4}+\frac{3x}{4}+\frac{7x^{2}}{16}+\frac{3x^{3}}{16}$

2 a)

A= $\frac{7}{4\left(x+2\right)}-\frac{5}{4\left(x-2\right)}$

B= $\frac{5}{4\left(x+2\right)}-\frac{7}{4\left(x-2\right)}$

C= $\frac{5}{4\left(x+2\right)}+\frac{7}{4\left(x-2\right)}$

D= $\frac{7}{4\left(x+2\right)}+\frac{5}{4\left(x-2\right)}$

2b)

A= $-\frac{1}{4}+\frac{3x}{4}-\frac{3x^{2}}{16}-\frac{3x^{3}}{16}$

B= $-\frac{1}{4}+\frac{3x}{4}-\frac{x^{2}}{16}-\frac{3x^{3}}{16}$

C= $-\frac{1}{4}-\frac{3x}{4}-\frac{5x^{2}}{16}-\frac{3x^{3}}{16}$

D= $-\frac{1}{4}-\frac{3x}{4}-\frac{x^{2}}{16}-\frac{3x^{3}}{16}$

3a)

A= $\frac{1}{\left(x+2\right)}-\frac{1}{2\left(x-1\right)}$

B= $\frac{1}{\left(x+2\right)}-\frac{1}{\left(x-1\right)}$

C= $\frac{1}{\left(x+2\right)}+\frac{1}{2\left(x-1\right)}$

D= $\frac{1}{\left(x+2\right)}+\frac{1}{\left(x-1\right)}$

3b)

A= $-\frac{1}{2}-\frac{5x}{4}-\frac{7x^{2}}{8}-\frac{17x^{3}}{16}$

B= $-\frac{1}{2}-\frac{5x}{4}-\frac{7x^{2}}{8}-\frac{15x^{3}}{16}$

C= $\frac{1}{2}-\frac{5x}{4}-\frac{7x^{2}}{8}-\frac{15x^{3}}{16}$

D= $-\frac{1}{2}-\frac{5x}{4}+\frac{7x^{2}}{8}-\frac{17x^{3}}{16}$

4 a)

A= $\frac{-1}{3\left(x+2\right)}+\frac{1}{3\left(x-1\right)}+\frac{1}{\left(x-1\right)^{2}}$

B= $\frac{-1}{3\left(x+2\right)}+\frac{1}{3\left(x-1\right)}+\frac{1}{3\left(x-1\right)^{2}}$

C= $\frac{-1}{3\left(x+2\right)}+\frac{1}{\left(x-1\right)}+\frac{1}{\left(x-1\right)^{2}}$

D= $\frac{-1}{3\left(x+2\right)}+\frac{1}{3\left(x-1\right)}+\frac{1}{3\left(x-1\right)^{2}}$

4b)

A= $\frac{1}{2}+\frac{7x}{4}+\frac{21x^{2}}{8}+\frac{57x^{3}}{16}$

B= $\frac{1}{2}+\frac{7x}{4}+\frac{21x^{2}}{8}+\frac{59x^{3}}{16}$

C= $\frac{1}{2}+\frac{7x}{4}+\frac{23x^{2}}{8}+\frac{59x^{3}}{16}$

D= $\frac{1}{2}+\frac{9x}{4}+\frac{21x^{2}}{8}+\frac{59x^{3}}{16}$