

MATH 253 WORKSHEET WEEK 5

This does **not** count for marks.

1. If $\frac{x+1}{x(x-1)(x+2)} = \frac{A}{x} + \frac{B}{x-1} + \frac{C}{x+2}$, then $B =$

a $2/3$.

b $-1/2$.

c Cannot be found.

d $-1/6$.

e 1.

2. If $\frac{2x}{(x+1)(x+2)} = \frac{A}{x+1} + \frac{B}{x+2}$, then $A+B =$

a 0.

b -2 .

c 4.

d 2.

e Cannot be found.

3. If $P(x)$ is a polynomial of degree 4 and $Q(x) = (x-1)^2(x^2+x+1)$ then the partial fraction decomposition of $\frac{P(x)}{Q(x)}$ is

a $K + \frac{A}{(x-1)^2} + \frac{B}{x^2+x+1}$.

b $Kx + F + \frac{A}{(x-1)^2} + \frac{B}{x-1} + \frac{Cx+D}{x^2+x+1}$.

c $\frac{A}{(x-1)^2} + \frac{Cx+D}{x^2+x+1}$.

d $Kx + F + \frac{A}{(x-1)^2} + \frac{B}{x^2+x+1}$.

e $K + \frac{A}{(x-1)^2} + \frac{B}{x-1} + \frac{Cx+D}{x^2+x+1}$.

4. If $P(x)$ is a polynomial of degree 5 and $Q(x) = (x^2 + x + 2)^2$ then the partial fraction decomposition of $\frac{P(x)}{Q(x)}$ is

a $Kx + F + \frac{Ax + B}{(x^2 + x + 2)^2} + \frac{Cx + D}{x^2 + x + 2}$.

b $K + \frac{A}{(x^2 + x + 2)^2} + \frac{B}{x^2 + x + 2}$.

c $Kx + F + \frac{A}{(x^2 + x + 2)^2} + \frac{B}{x^2 + x + 2}$.

d $K + \frac{A}{(x^2 + x + 2)^2} + \frac{B}{x^2 + x + 2}$.

e $\frac{A}{(x^2 + x + 2)^2} + \frac{B}{x^2 + x + 2}$.

5. Find $\int \frac{1}{x^4 + x^3} dx$.

6. Find $\int \frac{1}{x^3 - 3x^2} dx$.

7. Find $\int \frac{1}{x(x+1)(x+2)(x+3)} dx$.

8. Find $\int \frac{1}{e^{2x} - 4e^x + 4} dx$.

9. Find $\int \frac{1}{\sin \theta(1 - \cos \theta)} d\theta$. (**Hint:** You may either use the $\tan(\theta/2)$ identity or let $u = \cos \theta$)

10. Find $\int \frac{1}{\sin \theta(1 + \sin \theta)} d\theta$. (**Hint:** You may use the $\tan(\theta/2)$ identity)