Homework 3 1/28: MATH 112-1 Prof. Maxwell Auerbach

Show all work. No credit will be given for answers without sufficient work. No calculators are allowed. Collaboration with classmates is allowed, but all work submitted must be written out and explained by you.

1 Homework 3 Problems: Starting Partial Fraction Decomposition

1.1 Find the following integrals.

1.1 a) (7.4.9) $\int \frac{5x+1}{(2x+1)(x-1)}\,dx$

1.1 b) (7.4.10) $\int \frac{y}{(y+4)(2y-1)}\,dy$

1.1 c) (7.4.17) $\int_1^2 \frac{4y^2-7y-12}{y(y+2)(y-3)}\,dy$

1.1 d) (7.4.19) $\int_0^1 \frac{x^2+x+1}{(x+1)^2(x+2)}\,dx$

1.1 e) (7.4.24) $\int \frac{x^2-x+6}{x^3+3x}\,dx$

1.1 f) (7.4.14) $\int \frac{1}{(x+a)(x+b)}\,dx$

1.1 g) (7.4.21) $\int \frac{1}{(t^2-1)^2}\,dt$

1.1 h) (7.4.20) $\int_2^3 \frac{x(3-5x)}{(3x-1)(x-1)^2}\,dx$

Extra Problems 1/28: MATH 112-1 Prof. Maxwell Auerbach

Show all work. No credit will be given for answers without sufficient work. No calculators are allowed. Collaboration with classmates is allowed, but all work submitted must be written out and explained by you.

2 Extra Problems: Partial Fraction Decomposition

2.1 Find the following integrals

2.1 a) (7.4.23) $\displaystyle\int \frac{10}{(x-1)(x^2+9)}\,dx$

2.1 b) (original) $\displaystyle\int \frac{x^3+2x^2+3x+5}{(x^2+1)(x^2+2x+4)}\,dx$

2.1 c) (7.4.31) $\displaystyle\int \frac{1}{x^3-1}\,dx$

2.1 d) (original) $\displaystyle\int \frac{7x^2+12x+6}{x^3-6x-9}\,dx$

2.1 e) (original) $\displaystyle\int \frac{9x^2-13x-4}{x^3-2x^2-x+2}\,dx$

2.1 f) (7.4.33) $\displaystyle\int_0^1 \frac{x^3+2x}{x^4+4x^2+3}\,dx$

2.1 g) (7.4.10) $\displaystyle\int \frac{y}{(y+4)(2y+1)}\,dy$

2.1 h) (original) $\displaystyle\int \frac{5y+4}{12y^2-5y-2}\,dy$

2.1 i) (original) $\displaystyle\int \frac{-x^2-x+8}{x^3+11x^2+40x+48}\,dx$

2.1 j) (7.4.48) $\displaystyle\int \frac{\sin(x)}{\cos^2(x)-3\cos(x)}\,dx$

2.1 k) (original) $\displaystyle\int \frac{-2x^4+x^3-9x^2+2x-8}{x^4+4x^2+3}\,dx$

2.1 l) (original) $\displaystyle\frac{5t^3+2}{t^4+t^3}\,dt$

2.2 (original) Fred the fisherman finds that his company, Fred's Fantastic Fishery, fishes $f(x) = \dfrac{11x^2-4x-6}{(2x+1)(x^2-x-6)}$ fish per kilometer where x is kilometers traveled into the ocean. How much fish is caught if Fred's company fishes out to 3 kilometers.

2.3 (original) Geeta sells gravel by the kilogram, and the amount she sells per day is described by the function $g(t) = \dfrac{5t^4+t^3+11t^2+4t+1}{(t+1)(t^2+2)(t^2+3)}$ kilograms per day. How much gravel does Geeta sell between days $t=2$ and $t=4$.