Math 152 - Week-In-Review 6

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1. Write out the form of the following partial decompisition fractions. Do not solve.

   (a) $\dfrac{1-x}{x^3+x^4}$

   (b) $\dfrac{x}{x^2+x-6}$

   (c) $\dfrac{1+16x}{(2x-3)(x+5)^2(x^2+4)}$

Evaluate the following integrals:

2. $\displaystyle\int \frac{5x+1}{(2x+1)(x-1)}\,dx$

3. $\displaystyle\int_0^1 \frac{x^2+x+1}{(x+1)^2(x+2)}\,dx$

4. $\displaystyle\int \frac{x^2}{x^4 - 81}\, dx$

5. $\displaystyle\int \frac{x^5 - x^4 - 2x^2 + 2x + 5}{x^4 + x^3}\, dx$

Compute the following integrals or show that they diverge.

6. $\displaystyle\int_{-\infty}^{\infty} \frac{dx}{1+x^2}$

7. $\displaystyle\int_{0}^{\infty} \frac{dx}{(x+2)(x+3)}$

8. $\displaystyle\int_1^{\infty} \frac{\ln x}{x^3}\, dx$

9. $\displaystyle\int_{\pi/4}^{\pi/2} \tan^2 x\, dx$

10. $\displaystyle\int_2^{10} \frac{dx}{x^2 - 9}$

11. $\displaystyle\int_1^{\infty} \sin(\pi x)\, dx$

12. $\displaystyle\int_0^2 \frac{dx}{4x-5}$

Use the Comparison test to determine whether the following integrals converge or diverge.

13. $\displaystyle\int_1^\infty \frac{dx}{\sqrt{x^3+1}}$

14. $\displaystyle\int_1^\infty \frac{\cos^2 x}{x^2}\,dx$

15. $\displaystyle\int_1^\infty \frac{2+\cos x}{\sqrt{x^4+x^2}}\,dx$

16. $\displaystyle\int_1^\infty \frac{2+e^{-x}}{x}\,dx$