Mathematics Questionnaire - Set 4

1. Find the area between the curves y = x^2 and y = x from x = 0 to x = 1.

   a) 1/6 b) 1/3 c) 1/2 d) 1/4

2. The integral of x * e^x dx is best solved using:

   a) U-substitution b) Trigonometric substitution c) Integration by parts d) Partial fractions

3. What is u in the substitution for integral of x * cos(x^2) dx?

   a) u = x^2 b) u = cos x c) u = x d) u = sin(x^2)

4. Which integral suggests trigonometric substitution?

   a) integral of dx / sqrt(9 - x^2) b) integral of x * e^x dx

   c) integral of (x^2 + 1) dx d) integral of x * sin x dx

5. The standard trigonometric substitution for sqrt(a^2 - x^2) is:

   a) x = a tan(theta) b) x = a sin(theta) c) x = a sec(theta) d) x = a cos(theta)

6. Evaluate integral of dx / (x^2 + 1).

   a) arctan(x) + C b) arcsin(x) + C c) ln|x| + C d) x^2/2 + C

7. The integral of dx / (x^2 - 4) is best solved using:

   a) U-substitution b) Partial fraction decomposition c) Integration by parts d) Trigonometric substitution

8. What is the form of partial fractions for 1 / ((x - 1)(x + 2))?

   a) A / (x - 1) + B / (x + 2)

   b) A / x + B / x^2

   c) A / (x^2 + 1) + B / (x + 2)

   d) A / (x - 1) + B / (x + 2)^2

9. Which of the following integrals requires inverse sine to evaluate?

   a) integral of dx / sqrt(1 - x^2) b) integral of dx / (x^2 + 1)

   c) integral of e^x dx d) integral of x * cos x dx

10. Evaluate integral of dx / sqrt(4 - x^2).

a) arcsin(x/2) + C b) arctan(x/2) + C c) ln|x + 2| + C d) x^2/2 + C

11. Which function has an integral that leads to arctan(x)?

a) 1 / (x^2 + 1) b) 1 / sqrt(1 - x^2) c) e^x d) x cos x

12. What is the correct substitution for integral of (x^3 + 2)^5 (3x^2) dx?

a) u = x^3 + 2 b) u = 3x^2 c) u = x^5 d) u = 5(x^3 + 2)^4

13. Which expression represents the integral of e^x cos(e^x) dx using substitution?

a) u = e^x b) u = cos(e^x) c) u = sin x d) u = x e^x

14. Which of these integrals does NOT require partial fractions?

a) integral of dx / (x^2 + 1) b) integral of dx / (x^2 - 4)

c) integral of dx / ((x - 1)(x + 2)) d) integral of dx / (x(x+1))

15. If u = x^2 + 3x, what is du?

a) 2x dx b) (2x + 3) dx c) (x^2 + 3x) dx d) x dx