

Math 2215 - Calculus 1

Quiz #15 - 2005.12.06

Solutions

1. Assuming $z > 0$, compute the following indefinite integral:

$$\int \frac{1 + z - z^2}{z^2} dz$$

Notice that we can expand the fraction to get:

$$\int \frac{1 + z - z^2}{z^2} dz = \int \frac{1}{z^2} + \frac{1}{z} - 1 dz.$$

This is something that we can do, since each term is a power of x . Thus we have

$$\int \frac{1}{z^2} + \frac{1}{z} - 1 dz = -\frac{1}{z} + \ln(z) - z + C.$$

2. Compute the following definite integral:

$$\int_{-4}^4 2 + \sqrt{w^2 + 16} dw$$

Notice that this can be written as

$$\int_{-4}^4 2 dw + \int_{-4}^4 \sqrt{w^2 + 16} dw$$

Notice that the first integral has value 16, while the second represents the area of half a circle of radius 4 which is 8π . Thus,

$$\int_{-4}^4 2 + \sqrt{w^2 + 16} dw = 16 + 8\pi.$$