

ECE 153 Aptitude Test

Name (Optional):

Simplify the following equations as much as you can. Throughout $r \in (0, 1)$.

1. $\sum_{n=0}^{\infty} r^n =$

2. $\sum_{n=0}^{\infty} nr^n =$

$$3. \sum_{n=0}^{\infty} \frac{r^n}{n!} =$$

$$4. \sum_{k=0}^n \binom{n}{k} r^k (1-r)^{n-k} =$$

$$5. \int_0^{\infty} e^{-x} dx =$$

$$6. \int_0^{\infty} x e^{-x} dx =$$

$$7. \int_0^{\infty} \int_x^{\infty} e^{-y} dy dx =$$

$$8. \int_{-\infty}^{\infty} e^{-x^2} dx =$$

$$9. \int_{-\infty}^{\infty} x e^{-x^2} dx =$$

$$10. \begin{pmatrix} 1 & r \\ r & 1 \end{pmatrix}^{-1} =$$

$$11. \lim_{x \rightarrow 0} x \ln x =$$