HW2 Part 2 Hand Calc

Nicholas DiGregorio, 1220871392

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$$\int_0^\infty \frac{1}{(1+x)\sqrt{x}}\,dx$$

$$x = \frac{z}{1-z}$$

$$\int_0^1 \left(\frac{1}{\left(1+\frac{z}{1-z}\right)\sqrt{\frac{z}{1-z}}}\right) \times \frac{1}{(1-z)^2}\,dz$$

$$dx = \frac{dz}{(1-z)^2}$$

$$\frac{1}{\left((1-z)+z\right)\sqrt{\frac{z}{1-z}}\,(1-z)}$$

$$\sqrt{\frac{z}{1-z}}\sqrt{(1-z)^2} = \sqrt{z}\sqrt{1-z}$$

$$= \sqrt{z(1-z)}$$

$$\int_0^1 \frac{1}{\sqrt{z*(1-z)}}\,dz$$