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Math 2010, Winter 2007, Quiz 14
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Calculate

1. $\int \frac{1}{\sqrt{1-x^2}} dx$

2. $\int \frac{x}{\sqrt{1-x^2}} dx$

3. $\int \frac{x+1}{\sqrt{1-x^2}} dx$

1. $\int \frac{1}{\sqrt{1-x^2}} dx = \boxed{\sin^{-1}(x) + C}$

2. $\int \frac{x}{\sqrt{1-x^2}} dx = -\frac{1}{2} \int \frac{du}{u^{1/2}} = -\frac{1}{2} \int u^{-1/2} du$

$u = 1-x^2$
 $du = -2x dx$
 $-\frac{1}{2} du = x dx$

$= -\frac{1}{2} \frac{1}{1-\frac{1}{2}} u^{1-\frac{1}{2}} + C$

$= -\sqrt{u} + C = \boxed{-\sqrt{1-x^2} + C}$

3. $\int \frac{x+1}{\sqrt{1-x^2}} dx = \sin^{-1}(x) - \sqrt{1-x^2} + C$