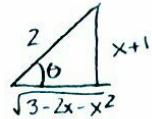


Quiz 7

February 16, 2017

Show all work and circle your final answer.

1. (10 points) Evaluate $\int \frac{x}{\sqrt{3-2x-x^2}} dx$.



$$\begin{aligned}
 3-2x-x^2 &= -[x^2+2x-3] \\
 &= -[x^2+2x+1-3-1] \\
 &= -[(x+1)^2-4] \\
 &= 4-(x+1)^2
 \end{aligned}
 \left. \begin{array}{l} \\ \\ \\ \\ \end{array} \right\} = \int \frac{x}{\sqrt{4-(x+1)^2}} dx$$

$x+1 = 2\sin\theta \rightarrow x = 2\sin\theta - 1$
 $dx = 2\cos\theta d\theta$

$$\begin{aligned}
 &= \int \frac{2\sin\theta - 1}{\sqrt{4-(2\sin\theta)^2}} \cdot 2\cos\theta d\theta \\
 &= \int \frac{2\sin\theta - 1}{\sqrt{4(\cos^2\theta)}} \cdot 2\cos\theta d\theta \\
 &= \int \frac{2\sin\theta - 1}{2\cos\theta} \cdot 2\cos\theta d\theta \\
 &= -2\cos\theta - \theta + C = \boxed{-2\left(\frac{\sqrt{3-2x-x^2}}{2}\right) - \sin^{-1}\left(\frac{x+1}{2}\right) + C}
 \end{aligned}$$

CHECK: $4-(x+1)^2 = 4-(x^2+2x+1) = 3-2x-x^2 \checkmark$

2. (4 points) Write the *form* of the partial fraction decomposition of

$$\frac{2x+1}{(x+1)^3(x^2+4)^2}$$

Do *not* determine the numerical value of the coefficients.

$$= \boxed{\frac{A}{x+1} + \frac{B}{(x+1)^2} + \frac{C}{(x+1)^3} + \frac{Dx+E}{x^2+4} + \frac{Fx+G}{(x^2+4)^2}}$$

3. (4 points) Evaluate $\int 1 + \frac{-3/2}{x+1} + \frac{8}{3-2x} dx$

$$= \boxed{x - \frac{3}{2} \ln|x+1| + \frac{8}{-2} \ln|3-2x| + C}$$

4. (2 points) Answers will vary. $(u=x+1)$ $(u=3-2x)$