TI - Readiness Assurance Test

1. Find the derivative of $f(x) = \ln(x^2 + 1)$.
   (a) $f'(x) = \frac{1}{x^2+1}$.
   (b) $f'(x) = \frac{1}{2x}$.
   (c) $f'(x) = \frac{1}{2x} + 1$.
   (d) $f'(x) = \frac{2x}{x^2+1}$.
   (e) $f'(x) = \ln(2x)$.

2. Find the derivative of $f(t) = t^2 \cdot \cos(t)$.
   (a) $f'(t) = 2t\sin(t)$.
   (b) $f'(t) = -2t\sin(t)$.
   (c) $f'(t) = 2t\cos(t) + t^2\sin(t)$.
   (d) $f'(t) = 2t\cos(t) - t^2\sin(t)$.
   (e) $f'(t) = t^2\cos(t) - 2t\sin(t)$.

3. Evaluate the integral $\int_1^4 \frac{1}{x} + x dx$.
   (a) $\ln(x) + \frac{x^2}{2} + C$.
   (b) $8 + \ln(4)$.
   (c) $7.5 + \ln(4)$.
   (d) $7 + \ln(4)$.
   (e) 7.

4. Compute the antiderivative of $2e^x + \sqrt{x}$.
   (a) $2e^x + \frac{1}{2\sqrt{x}} + C$.
   (b) $e^x + \frac{1}{2\sqrt{x}} + C$.
   (c) $2e^x + \frac{2}{3}x^{3/2} + C$.
   (d) $e^x + \frac{2}{3}x^{3/2} + C$.
   (e) $2e^{2x} + \frac{2}{3}x^{3/2} + C$.

5. Evaluate the following derivative: $\frac{d}{d\theta}[\tan(\theta)]$
   (a) $\sin^2(\theta)$.
   (b) $\cos^2(\theta)$.
   (c) $\sec^2(\theta)$.
   (d) $\csc^2(\theta)$.
   (e) $\cot(\theta)$.

6. Solve for values of $\theta \in [0, 2\pi)$ such that
   $$\sin^2(\theta) + \cos(\theta) = 1$$
   (note that $\cos(\theta)$ lacks an exponent).
   (a) All values of θ satisfy this equality.
   (b) $\theta = 0, \pi/2, \pi$.
   (c) $\theta = 0, \pi$.
   (d) $\theta = 0, \pi/2, \frac{3\pi}{2}$.
   (e) $\theta = \pi/4, \pi/2, \frac{3\pi}{4}$.

7. Which of the following expressions is equal to
$$\frac{2}{x} + \frac{1}{x+2}?$$
   (a) $\frac{3x+4}{x^2+2x}$.
   (b) $\frac{3}{x^2+2x}$.
   (c) $\frac{2}{x^2+2x}$.
   (d) $\frac{3x+4}{2x+2}$.
   (e) $\frac{3}{2x+2}$.

8. Compute the limit
$$\lim_{x\to\infty} \frac{5x^2+3}{3x^3-1}.$$
   (a) 0.
   (b) ∞.
   (c) $\frac{5}{3}$.
   (d) $\frac{10}{9}$.
   (e) -3.

9. Compute the limit
$$\lim_{x\to 0} \frac{3x^2+2x+4}{4x^2-x+1}.$$
   (a) ∞.
   (b) $-\infty$.
   (c) 0.
   (d) $\frac{3}{4}$.
   (e) 4.

10. Compute the limit
$$\lim_{x\to 2} \frac{x^2+3x-10}{x^2-4}.$$
   (a) 0.
   (b) 1.
   (c) $\frac{7}{4}$.
   (d) ∞.
   (e) undefined.