

Skills Test

MA2160 Spring 2007

Name _____

1. $\frac{d}{dx}(\sin x)$

Solution.

$$\frac{d}{dx}\left(\frac{1}{x}\right) = \frac{d}{dx}(x^{-1}) = -x^{-2} = \frac{-1}{x^2}$$

□

2. $\frac{d}{dx}(x)$

Solution.

$$\frac{d}{dx}(x) = 1$$

□

3. $\frac{d}{dx}(-3e^x + 7 \arctan x)$

Solution.

$$\frac{d}{dx}(-3e^x + 7 \arctan x) = -3e^x + \frac{7}{1+x^2}$$

□

4. $\frac{d}{dx}(\ln(\cos x))$

Solution.

$$\frac{d}{dx}(\ln(\cos x)) = \frac{1}{\cos x} \cdot -\sin x = -\tan x$$

□

5. $\frac{d}{dx}(e^{\sqrt{x}})$

Solution.

$$\frac{d}{dx}(e^{\sqrt{x}}) = \frac{d}{dx}(e^{x^{\frac{1}{2}}}) = e^{x^{\frac{1}{2}}} \cdot \frac{1}{2}x^{-\frac{1}{2}} = \frac{e^{\sqrt{x}}}{2\sqrt{x}}$$

□

6. $\frac{d}{dx}\left(\frac{2^x}{x}\right)$

Solution.

$$\frac{d}{dx}\left(\frac{2^x}{x}\right) = \frac{d}{dx}(x^{-1} \cdot 2^x) = -1x^{-2}2^x + x^{-1}2^x \ln 2 = -\frac{2^x}{x^2} + \frac{2^x \ln 2}{x}$$

□

7. $\int e^{3x} dx$

Solution.

$$\int e^{3x} dx = \frac{1}{3} \int 3e^{3x} dx = \frac{1}{3} e^{3x} + c$$

□

8. $\int \frac{2}{x} dx$

Solution.

$$\int \frac{2}{x} dx = 2 \int \frac{1}{x} dx = 2 \ln x + c$$

□

9. $\int (-6 + \frac{1}{x^{3/2}} + 3x^2) dx$

Solution.

$$\int (-6 + \frac{1}{x^{3/2}} + 3x^2) dx = -6x - \frac{2}{\sqrt{x}} + x^3 + c$$

□

10. $\int \sin(3x) dx$

Solution.

$$\int \sin(3x) dx = -\frac{1}{3} \int -3 \sin(3x) dx = -\frac{1}{3} \cos(3x) + c$$

□