King Saud University

College of Sciences

Department of Mathematics

106 Math Exercises

(10)

Trigonometric Substitutions

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$\sqrt{a^2 - x^2}$, $x = a\,sin\theta$	$\sqrt{a^2 - u^2}$, $u = a\,sin\theta$
$\sqrt{a^2 + x^2}$, $x = a\,tan\theta$	$\sqrt{a^2 + u^2}$, $u = a\,tan\theta$
$\sqrt{x^2 - a^2}$, $x = a\,sec\theta$	$\sqrt{u^2 - a^2}$, $u = a\,sec\theta$

أو قوى هذه الجذور:

$$(a^2 - u^2)^{3/2} \quad , \quad u = a\,sin\theta$$

$$(a^2 + u^2)^{5/2} \quad , \quad u = a\,tan\theta$$

$$(u^2 - a^2)^{3/2} \quad , \quad u = a\,sec\theta$$

Q. Evaluate the following integrals:

1)

$$\int \sqrt{4 + 9x^2}\,dx$$

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2)

$$\int \frac{x^2}{\sqrt{25-x^2}}\,dx$$

3)

$$\int \frac{1}{x^2\sqrt{x^2-4}}\,dx$$

4)

$$\int \frac{1}{x^2\sqrt{4x^2+9}}\,dx$$

5)

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

6)

$$\int \frac{1}{x^2\sqrt{x^2+4}}\,dx$$

7)

$$\int \frac{1}{(25-x^2)^{3/2}}\,dx$$

8)

$$\int \frac{1}{(x^2+4)^{3/2}}\,dx$$

9)

$$\int \frac{x^2}{\sqrt{9-x^2}}\,dx$$

10)

$$\int (1-x^2)^{3/2}\, dx$$

11)

$$\int \frac{\sqrt{4-x^2}}{x^2}\,dx$$

12)

$$\int \frac{1}{(36+x^2)^2}\,dx$$