

Mathematics Department – Langholm Academy

HIGHER HOMEWORK

UNIT 3

CHAPTER 2

Further Differentiation and Integration

Higher - Unit 3
Further Differentiation and Integration 1

1. Differentiate

a. $7 \sin x$
 b. $4 \cos x$

c. $\frac{1}{3} \sin x$
 d. $2 \sin x - \frac{2}{3} \cos x$

2. Find the exact value of (without a calculator)

a. $\sin \frac{4\pi}{3}$
 b. $\cos \frac{4\pi}{3}$

c. $\sin \frac{5\pi}{6}$
 d. $\cos \frac{5\pi}{6}$

3. Find $\frac{dy}{dx}$

a. $y = (x+6)^3$
 b. $y = (x-2)^7$
 c. $y = (5x+1)^4$
 d. $y = (7x-6)^{-3}$

e. $y = (3x^2 - 6)^5$
 f. $y = (x^2 + 3)^{1/2}$
 g. $y = \sqrt{3x^2 + 2}$

h. $y = \frac{5}{\sqrt{(7x^2 - 2)}}$

4. Differentiate

a. $\sin 3x$
 b. $\cos \frac{1}{2}x$
 c. $\sin(2x+5)$
 d. $\sin(7-x)$
 e. $\cos(x^2+5x)$

f. $\sin^2 x$
 g. $\cos^5 x$
 h. $\sqrt{\cos x}$
 i. $\sqrt[4]{\cos^3 x}$
 j. $(\sin x)^{-1}$

k. $\frac{1}{\cos 2x}$
 l. $\frac{1}{\sqrt{\sin 3x}}$

5. Integrate

a. $(x+6)^3$
 b. $(2x+1)^2$
 c. $(3x^2+6)^7$

d. $(x-4)^{-3}$
 e. $(x^3-6)^{-2}$
 f. $(x+1)^{1/2}$

g. $(5x-2)^{1/5}$
 h. $\sqrt{(1-5x)}$

6. Find

a. $\int (2x-1)^3$
 b. $\int \frac{1}{(x-3)^2}$
 c. $\int \sin 3x$
 d. $\int 5 \cos 6x$

e. $\int_1^1 (3x+1)^3$
 f. $\int_{-1/2}^0 (1-2x)^4$