Prelim Revision **Unit 1 Outcome 1 Binomial Theorem**

1) Use the binomial theorem to expand

a) $(2x + y)^5$ b) $(x - 3y)^3$ c) $(3x - 2)^6$ d) $\left(x + \frac{1}{x}\right)^4$

e) $\left(\frac{3}{4}x + y\right)^3$ f) $\left(x + \frac{1}{3}y\right)^4$ g) $\left(\frac{1}{4}x + \frac{1}{3}y\right)^3$

2) What is the coefficient of x^2y^2 in the expansion of $(2x - 3y)^4$

3) What is the coefficient of x^6 in the expansion of $(3x^2 + 1)^4$

4) Find the term independent of x in the expansion of $\left(x - \frac{3}{x}\right)^8$

5) What is the coefficient of x^3y^4 in the expansion of $(x + y)^7$

6) Find the coefficient of y^5 in the expansion of $\left(y - \frac{1}{y}\right)^5$

Answers.

1a) $32x^5 + 80x^4y + 80x^3y^2 + 40x^2y^3 + 10xy^4 + y^5$

b) $x^3 - 9x^2y + 27xy^2 - 9y^3$

c) $729x^6 - 2916x^5 + 4860x^4 - 4320x^3 + 2160x^2 - 576x + 64$

d) $x^4 + 4x^2 + 6 + 4x^{-2} + x^{-4}$

e) $\frac{27}{64}x^3 + \frac{27}{16}x^2y + \frac{9}{4}xy^2 + y^3$

f) $x^4 + \frac{4}{3}x^3y + \frac{2}{3}x^2y^2 + \frac{4}{27}xy^3 + \frac{1}{81}y^4$

g) $\frac{1}{64}x^3 + \frac{1}{16}x^2y + \frac{1}{12}xy^2 + \frac{1}{27}y^3$

2) 216 3) 108 4) 5670 5) 35 6) 1