MATH 7: HANDOUT 3
ALGEBRAIC EXPRESSIONS AND IDENTITIES

MAIN ALGEBRAIC IDENTITIES

$$(a + b)^2 = a^2 + 2ab + b^2$$
$$(a - b)^2 = a^2 - 2ab + b^2$$
$$a^2 - b^2 = (a - b)(a + b)$$

HOMEWORK

1. Simplify:

(a) $\sqrt{\dfrac{65}{14}} \cdot \sqrt{\dfrac{39}{11}}$

(b) $\sqrt{72}$

(c) $\dfrac{\sqrt{72}}{\sqrt{18}}$

2. Expand as sums of powers of x:

(a) $(3x + 4)^2 =$

(b) $(5 - 2x)^2 =$

(c) $(2x - 3)^2 =$

(d) $(3 - x)^2(4 - x) =$

(e) $(2x + 2)^2(3 - 4x) =$

3. Factor (i.e., write as a product) the following expressions:

(a) $a^2 - 2a + 1$

(b) $a^2 + 4ab + 4b^2$

(c) $16x^2 - 32xy + 16y^2$

(d) $16x^2 - 25$

(e) $(x - 5)^2 - (y - 4)^2$

(f) $(x - 5)^2 - 12(x - 5) + 36$

(g) $a^2 - b^2 - 12b - 36$

(h) $x^4 + 64$ [Hint: add and then subtract $16x^2$.]

(i) $x^2 - 7$ [Hint: $7 = (\sqrt{7})^2$.]

(j) $a^4 - b^4$ [Hint: $a^4 = (a^2)^2$.]

4. Solve the following equations.

(a) $2(x - 3) = 4x + 1$

(b) $(x^2 + 2)(x - 1) = 0$

(c) $\frac{x-1}{x+4} = \frac{3}{2}$

(d) $(x - 2)(x + 5) = 0$

(e) $x^2 - 5x = 0$

(f) $x^3 - 5x = 0$

5. Find expansions of $(a + b)^3$, $(a - b)^3$ using the previous results.