MATH 7: HANDOUT 2
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) $\sqrt{\dfrac{56}{13}} \cdot \sqrt{\dfrac{26}{7}} =$

(b) $\sqrt{48} =$

(c) $\dfrac{\sqrt{48}}{\sqrt{15}} =$

2. Express the following expressions in the form $2^r 3^s a^m b^n$:

(a) $8a^3 b^2 (27a^3)(2^5 ab) =$

(b) $3^2 (2ab)^3 (16a^2 b^5)(24b^2 a) =$

(c) $16a^2 b^3 (6ab^4)(ab^2)^3 =$

3. Expand as sums of powers of x:

(a) $(2x+5)^2 =$

(b) $(2-4x)^2 =$

(c) $(1-2x)^2 =$

(d) $(1-x)^2(2-x) =$

(e) $(2x+1)^2(2-3x) =$

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

(a) $a^2 - 2a + 1$
(b) $a^2 + 4ab + 4b^2$
(c) $4x^2 + 8xy + 4y^2$
(d) $9x^2 - 25$
(e) $x^2 - 7$ [Hint: $7 = (\sqrt{7})^2$.]
(f) $(x-2)^2 - (y+3)^2$
(g) $(x-2)^2 - 10(x-2) + 25$

(h) $a^4 - b^4$ [Hint: $a^4 = (a^2)^2$.]
(i) $256 - a^8 b^8$
(j) $3x^3 - x^2 y + 6x^2 y - 2xy^2 + 3xy^2 - y^3$
(k) $a^2 - b^2 - 10b - 25$
(l) $x^4 + 4$
    [Hint: add and then subtract $4x^2$.]

5. Solve the following equations.

(a) $5(x+1) = 3x+2$

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

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

(d) $(x-3)(x+4) = 0$

(e) $x^2 + 4x = 0$

(f) $x^3 + 4x = 0$

6. A $4 \times 4 \times 4$ cubical box has 64 small cubes inside. How many of these touch a side or the bottom of the box?

7. Amanda has an average of 92 on her seven tests. What should she get on her $8th$ test to have an average of 93?