DOUBLE TUTORIAL 3

First Hour

Question 1. Find the value of the following expressions

(a) $2^4 \div 2^2 \times 3$,

(b) $5^{-2} \times 5^3$,

(c) $(91^2 - 89)^0$.

Question 2. Simplify

(a) $\dfrac{4m^2}{6m}$,

(b) $\dfrac{x^2 + x}{2x}$,

(c) $\dfrac{2x}{x^2 + x}$.

Question 3. Combine the like terms

(a) $v^2 - 2v^3 + 3v^2 - 1 - v^3$,

(b) $x^{-1} + 4(x^{-1} + 3)$,

(c) $a^2b - 5a(ab - 2 + b^2) - ab^2$,

(d) $5\sqrt{2} - 3(\sqrt{2} - 1) - (\sqrt{2} + 3)(\sqrt{2} - 3)$.

Question 4. Is it true or false?

(a) $(-1)^2 = 1$,

(b) $(-1)^0 = 1$,

(c) $a^{99} \times a^{-99} = 0$,

(d) $a^{99} \times a^{-99} = 1$,

(e) $-(-(-a)) = -a$,

(f) $-(-(-a)) = a$.

Question 5.   Expand the brackets

(a) $t(5 + 7t^2)$,

(b) $(2x + 4)^2$,

(c) $(2x - 3)(2x + 3)$,

(d) $(3 - ab)(a^2 - b)$.

Question 6.   Factorize the following expressions

(a) $t^2 - t$,

(b) $t^3 - t$,

(c) $3x^2y^3 - 6xy + 12xy^2$,

(d) $88ab + 33a$.

Question 7.   Simplify by factorising and cancelling

(a) $\dfrac{x^2 - 1}{x - 1}$,

(b) $\dfrac{x^2}{5x^4}$,

(c) $\dfrac{a^2 + 2ab + b^2}{a + b}$,

(d) $\dfrac{t}{t^5 + t}$.

Question 8.   Illustrate that $a(a + b) = a^2 + ab$. Construct the corresponding rectangles and compare their areas. See the similar illustrations in the lecture notes Section 5.5.

Second Hour

Question 1.   Solve the following linear equations

(a) $x - 6 = 0$,

(b) $x + 32 = 108$,

(c) $2x + 32 = 108$,

(d) $\frac{1}{7}x - 7 = 10 + \frac{1}{14}x$,

(e) $-\frac{2}{3}x - 2x - 9 = \frac{1}{3}x + 1$.

Question 2.   Solve the following equations

(a) $(x - 1)(x + 1) = 0$,

(b) $-4x(x - \frac{5}{2}) = 0$,

(c) $(x - 771)^2 = 0$.

Question 3.   Factorise the left hand side and solve the equations

(a) $x^2 + 2x + 1 = 0$,

(b) $4x^2 - 4x + 1 = 0$,

(c) $16x^2 - 25 = 0$,

(d) $x^4 - \frac{1}{2}x^3 = 0$.

Question 4.   Is it true or false?

(a) The equation $x^2 = 1$ has one and only one solution;

(b) The equation $x^2 = -1$ has two solutions;

(c) If $ab = 0$, then either $a = 0$, or $b = 0$, or $a = b = 0$;

(d) If $ab = 0$, then $a = 0$ and $b = 0$;

(e) If $a - b = 0$, then either $a = 0$ or $b = 0$;

(f) If $a - b = 0$, then $a = b$.

Question 5. Solve the equations

(a) $2x^2 - 6x + 9 = x^2 - 12x,$

(b) $\dfrac{7}{9}x^2 - 2x + 1 = \dfrac{2}{3}x^2 - 2x + 10.$