

Special Mathematics

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2ND TEST-B

Problem 1. *Flip a coin twice. On each flip, the probability of heads equals  $\frac{3}{8}$ . Let  $X_i$  equal the number of heads (either 0 or 1) on flip  $i$ . Let  $W = X_1 - X_2$  and  $Y = X_1 + X_2$ . Find  $P_{W,Y}(w, y)$ ,  $P_{W|Y}(w|1)$ , and  $P(X_1 \geq X_2)$ .*

4.5 points

Problem 2. i) *Find a general solution of the differential equation*

$$x'(t) + t^5 \cdot x(t) \cdot [1 - x^6(t)] = 0$$

ii) *Find a homogeneous linear differential equation with constant coefficients whose general solution is*

$$y(x) = c_1 \cdot \cosh 7x + c_2 \cdot \sinh 7x$$

4.5 points