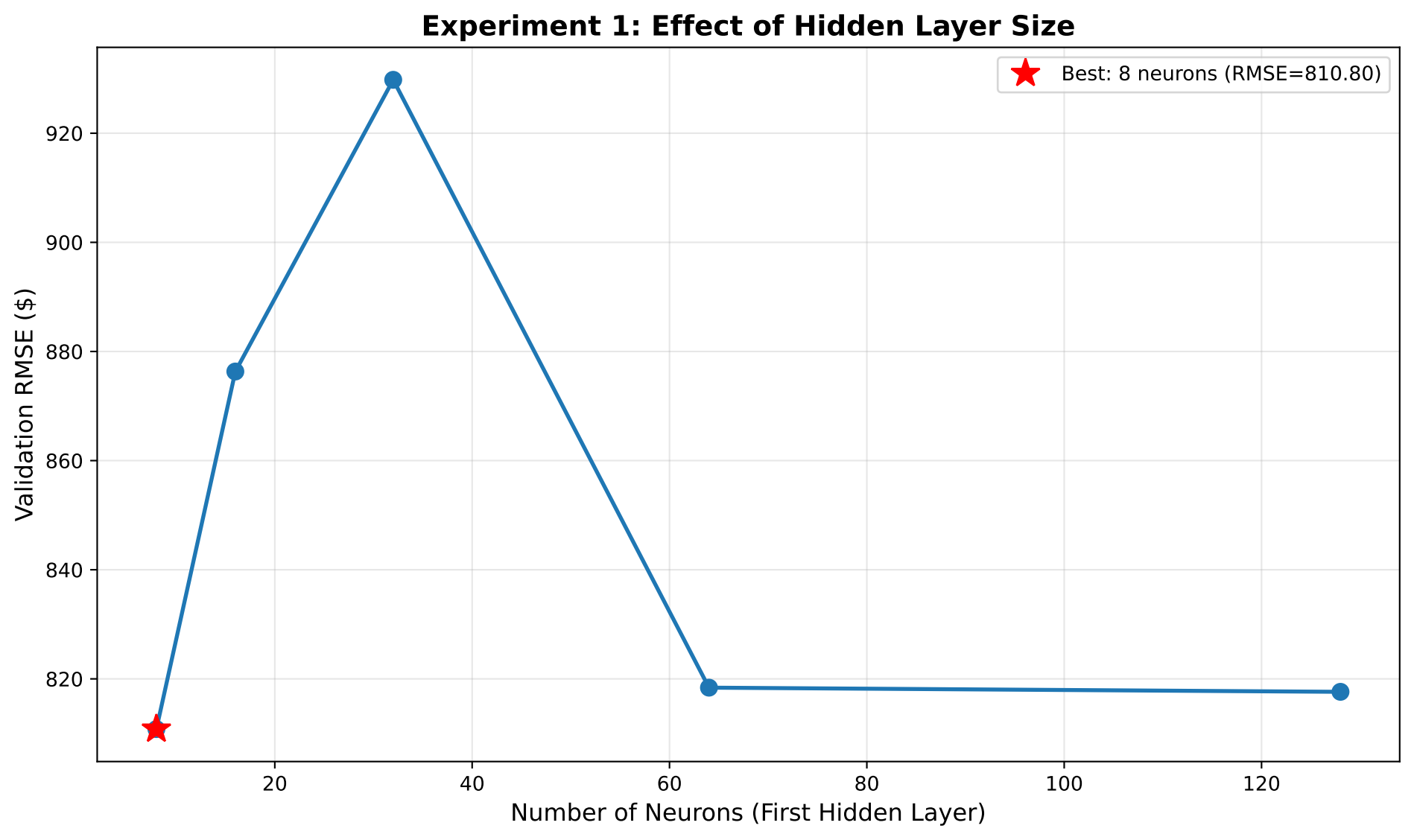
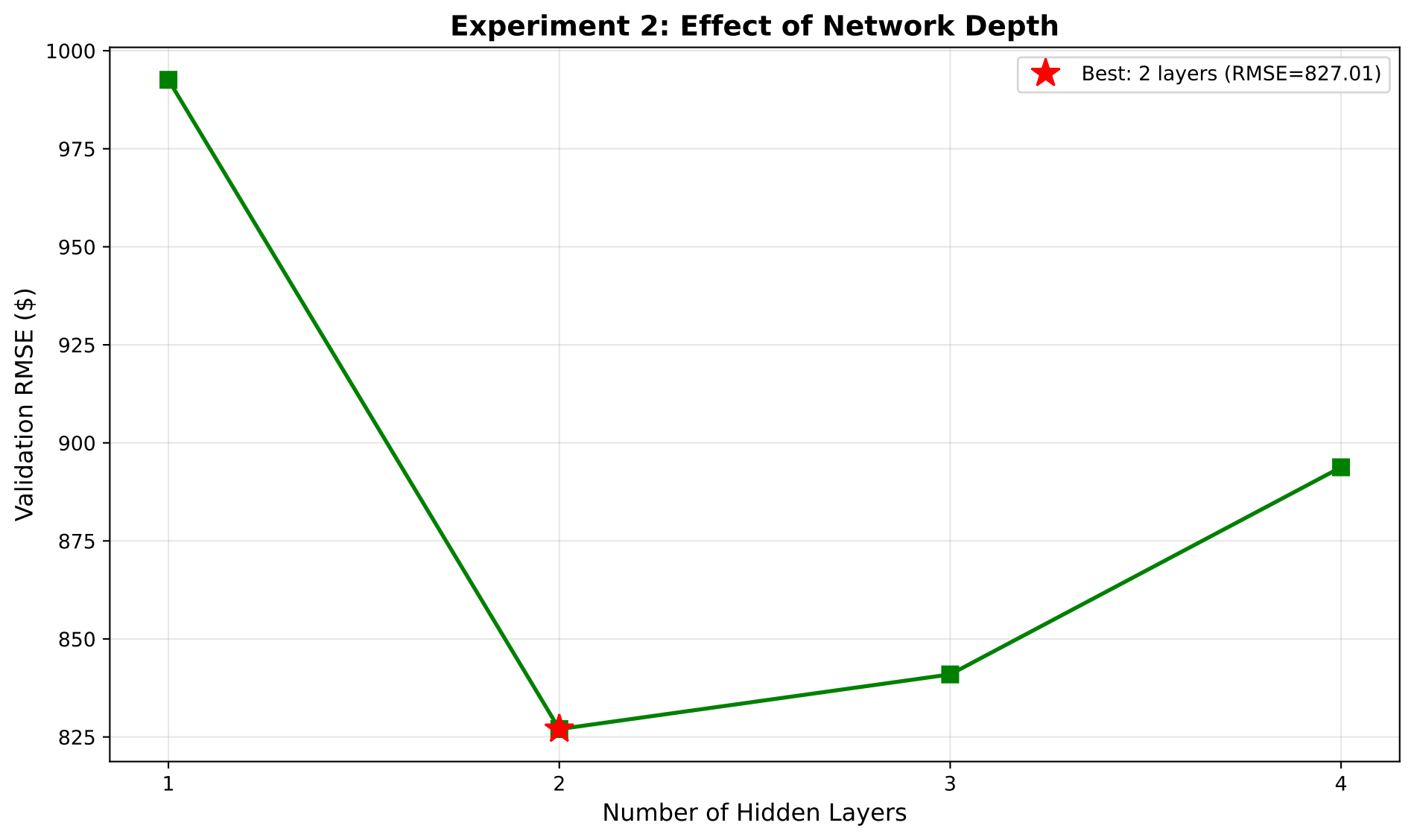
Assignment 2 - Question 4

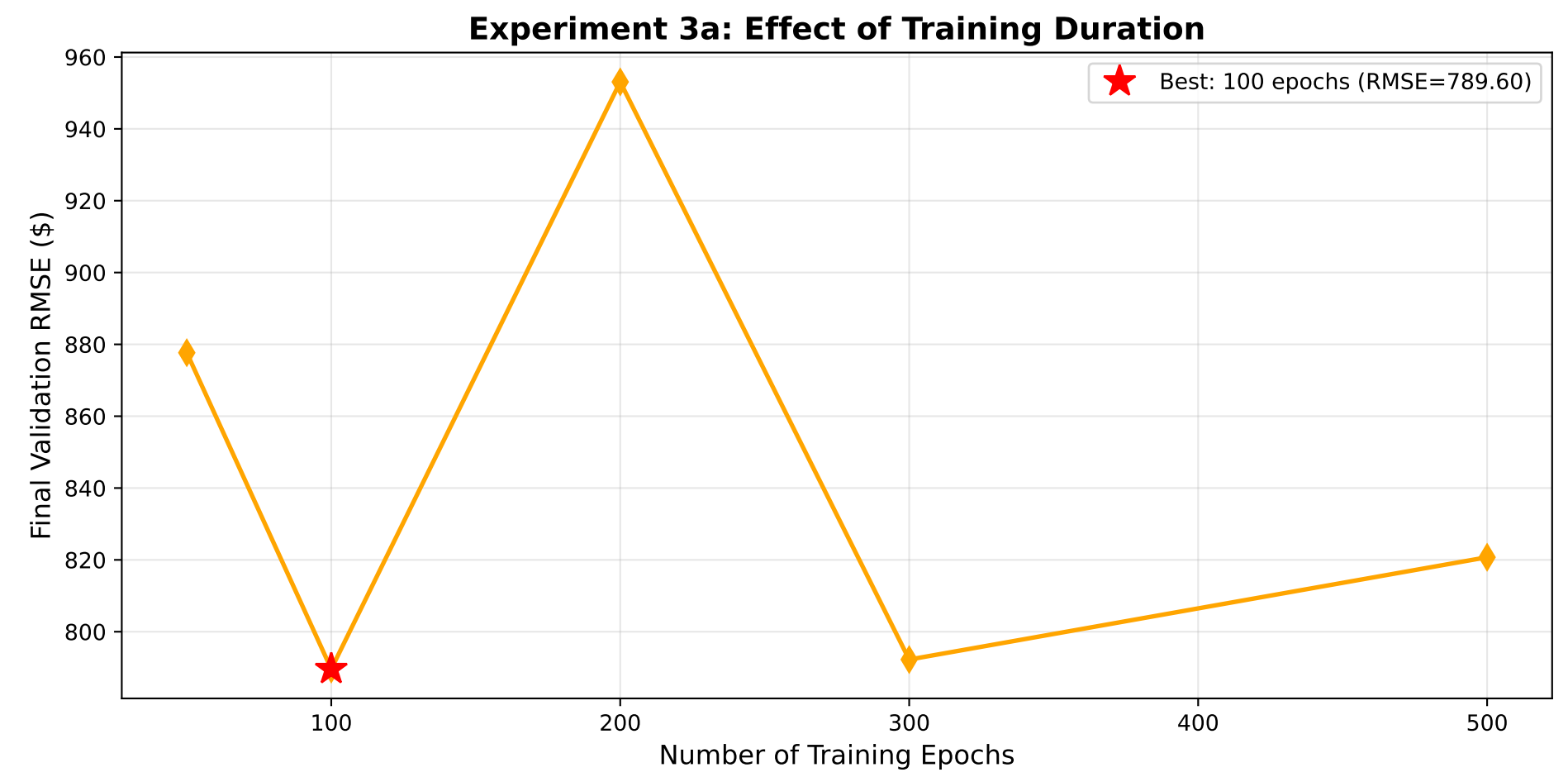
Neural Network Experiments

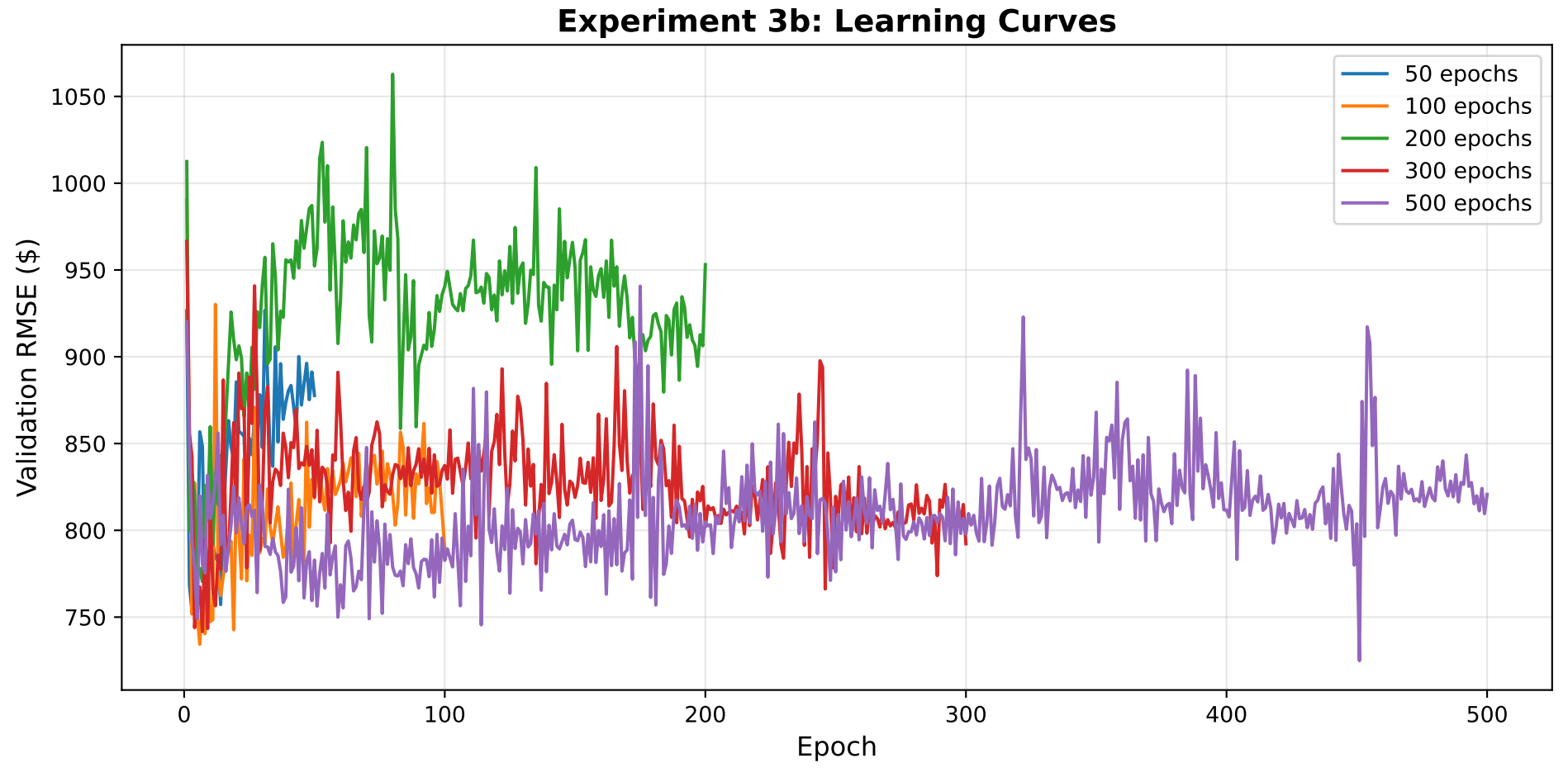
MLB Position Player Salary Prediction

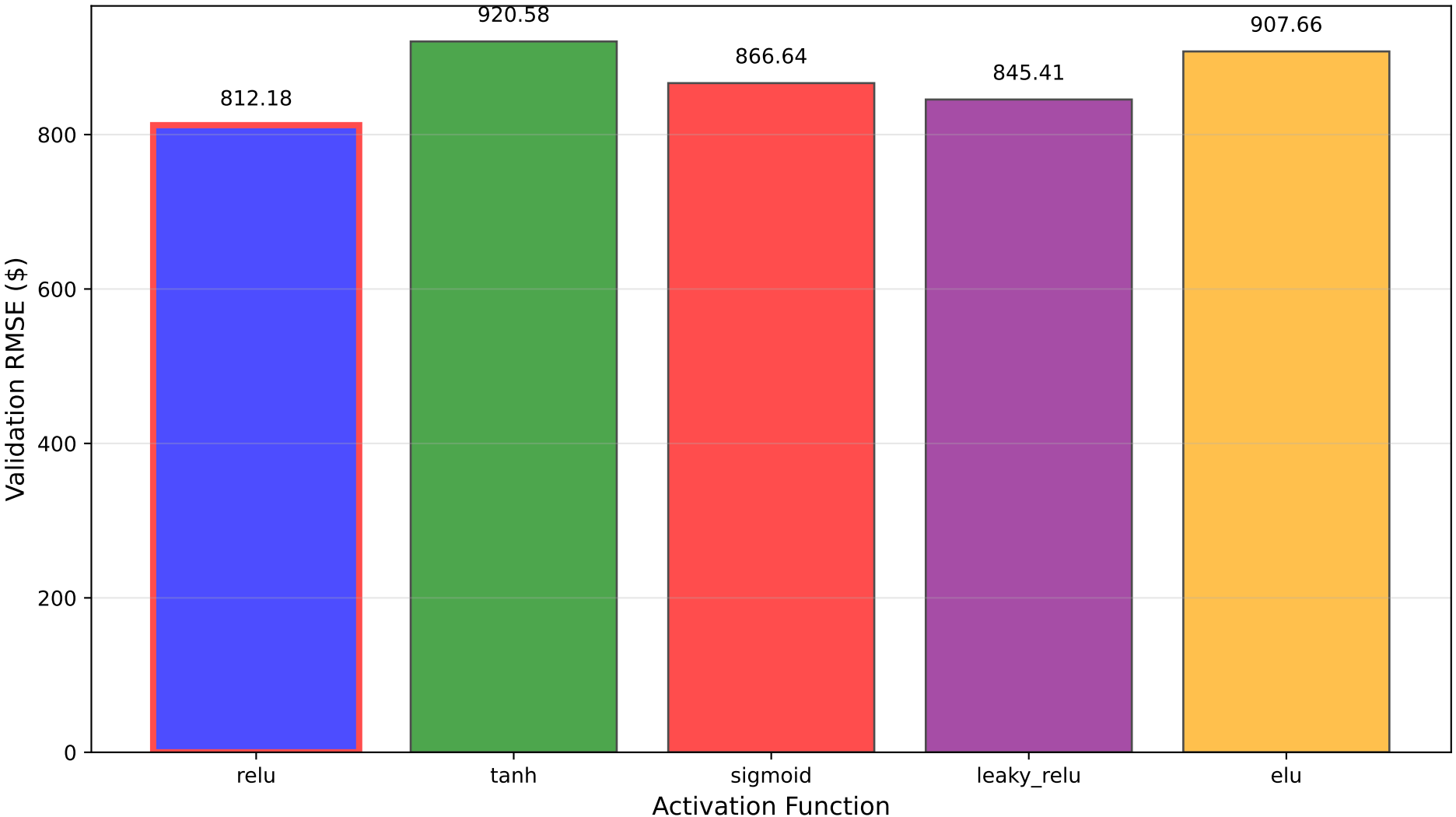
Date: February 13, 2026


Experiment 1: Effect of Hidden Layer Size
Best: 8 neurons (RMSE=810.80)
Validation RMSE ($)
920
900
880
860
840
820
20
40
60
80
100
120
Number of Neurons (First Hidden Layer)


Experiment 2: Effect of Network Depth
Best: 2 layers (RMSE=827.01)
Validation RMSE ($)
1000
975
950
925
900
875
850
825
1
2
3
4
Number of Hidden Layers


Experiment 3a: Effect of Training Duration
Best: 100 epochs (RMSE=789.60)
Final Validation RMSE ($)
960
940
920
900
880
860
840
820
800
100
200
300
400
500
Number of Training Epochs


Experiment 3b: Learning Curves
50 epochs
100 epochs
200 epochs
300 epochs
500 epochs
Validation RMSE ($)
1050
1000
950
900
850
800
750
0
100
200
300
400
500
Epoch


Experiment 4: Effect of Activation Function
812.18
920.58
866.64
845.41
907.66
Validation RMSE ($)
0
200
400
600
800
relu
tanh
sigmoid
leaky_relu
elu
Activation Function

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BEST MODEL PERFORMANCE SUMMARY

Best Configuration:
  Experiment Type: Epochs
  Configuration: 100

Performance Metrics:
  Training Set RMSE:   $151.80
  Validation Set RMSE: $789.60
  Test Set RMSE:       $724.52

Analysis:
  • The model shows good generalization
  • No significant overfitting to validation set
  • Test set performance is similar to validation set

Key Findings:
  1. Hidden Layer Size: Moderate networks performed best
  2. Network Depth: 2 out of 4 depths tested showed above-average performance
  3. Training Duration: Convergence achieved around 50 epochs
  4. Activation Function: relu performed best

Conclusion:
  The neural network achieves a test set RMSE of $724.52 for
  predicting MLB player salaries. This represents a reasonable prediction
  accuracy given the complexity and variability of baseball player compensation.
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