\*\*\*\*\*\*\*\*\*\*\* Results for linear regression \*\*\*\*\*\*\*\*\*\*\*\*

\_\_\_\_\_\_\_\_\_\_\_\_ optimal w's \_\_\_\_\_\_\_\_\_\_\_\_

n = 2

w = [[ 0.21264913 0.41690898 1.3191009 ]]

n = 5

w = [[ 2.23703747 -1.68121864 -6.82480477 1.73305451 3.9655179 -0.09835248]]

n = 10

w = [[ 1.20000000e+00 -1.90000000e+00 -3.00000000e-01 2.12000000e+00

-2.54658516e-10 -7.99999999e-02 5.23868948e-10 -4.00177669e-11

-2.19000000e+00 8.75388650e-12 1.19000000e+00]]

n = 20

w = [[ 1.22210920e+00 -1.89659500e+00 -2.69793369e-01 2.11236112e+00

-8.53816271e-02 -7.45035708e-02 4.55522537e-02 -1.65119767e-03

-2.19882393e+00 3.44455242e-04 1.19610596e+00 -2.29775906e-04

-6.99996948e-03 9.98377800e-05 4.05120850e-03 -2.75969505e-05

-1.40190125e-03 7.73370266e-06 2.92301178e-04 -1.00303441e-06

-2.61366367e-05]]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ errors\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

n = 2, training:

20.526954038

n = 2, test:

7.77510687821

============================

n = 5, training:

12.8486086101

n = 5, test:

5.91278016191

============================

n = 10, training:

4.54978596428e-09

n = 10, test:

2.36502481666e-09

============================

n = 20, training:

0.154190273635

n = 20, test:

0.079441919782

============================

\*\* Results for ridge regression \*\* please note that I am showing the transpose of w

n = 2

k = 2

lambda = 37.508355189

hold out error = 15.8131827377

w = [[ 0.41511201 0.31044191 0.85265548]]

training error = 20.8413267529

test error = 7.63803667138

n = 2

k = 5

lambda = 27.1605968435

hold out error = 9.30951823594

w = [[ 0.40740693 0.33462166 0.9268749 ]]

training error = 20.732166321

test error = 7.64240929406

n = 2

k = 10

lambda = 72.0692896949

hold out error = 6.27745711286

w = [[ 0.39590113 0.25057995 0.68789538]]

training error = 21.2231883224

test error = 7.68119617427

n = 2

k = 80

lambda = 279.586822512

hold out error = 1.47232155637

w = [[ 0.2348099 0.11840113 0.33920737]]

training error = 22.8629322742

test error = 8.16553415659

n = 5

k = 2

lambda = -0.0905283581175

hold out error = 13.784663501

w = [[ 2.32818399 -1.84226158 -7.13396093 2.02922306 4.10374334 -0.20528555]]

training error = 12.862356653

test error = 5.88251967908

n = 5

k = 5

lambda = 0.215317789168

hold out error = 6.51317881605

w = [[ 2.048831 -1.42583942 -6.18690492 1.2640559 3.67891618 0.06986507]]

training error = 12.9015541285

test error = 5.98873987667

n = 5

k = 10

lambda = 0.277836637013

hold out error = 4.56129750512

w = [[ 2.00046487 -1.37275637 -6.02303741 1.16689685 3.60505405 0.10444378]]

training error = 12.9312136541

test error = 6.01156833719

n = 5

k = 80

lambda = 1.05488903751

hold out error = 1.13599569954

w = [[ 1.55532409 -1.02739697 -4.51496573 0.54765442 2.9220597 0.31953209]]

training error = 13.4787046025

test error = 6.29544792661

n = 10

k = 2

lambda = 0

hold out error = 2.59930374313e-09

w = [[ 1.20000000e+00 -1.90000000e+00 -3.00000000e-01 2.12000000e+00

-2.54658516e-10 -7.99999999e-02 5.23868948e-10 -4.00177669e-11

-2.19000000e+00 8.75388650e-12 1.19000000e+00]]

training error = 4.54978596428e-09

test error = 2.36502481666e-09

n = 10

k = 5

lambda = 0

hold out error = 1.09100044471e-09

w = [[ 1.20000000e+00 -1.90000000e+00 -3.00000000e-01 2.12000000e+00

-2.54658516e-10 -7.99999999e-02 5.23868948e-10 -4.00177669e-11

-2.19000000e+00 8.75388650e-12 1.19000000e+00]]

training error = 4.54978596428e-09

test error = 2.36502481666e-09

n = 10

k = 10

lambda = 0

hold out error = 7.58778323196e-10

w = [[ 1.20000000e+00 -1.90000000e+00 -3.00000000e-01 2.12000000e+00

-2.54658516e-10 -7.99999999e-02 5.23868948e-10 -4.00177669e-11

-2.19000000e+00 8.75388650e-12 1.19000000e+00]]

training error = 4.54978596428e-09

test error = 2.36502481666e-09

n = 10

k = 80

lambda = 0

hold out error = 2.5217722216e-10

w = [[ 1.20000000e+00 -1.90000000e+00 -3.00000000e-01 2.12000000e+00

-2.54658516e-10 -7.99999999e-02 5.23868948e-10 -4.00177669e-11

-2.19000000e+00 8.75388650e-12 1.19000000e+00]]

training error = 4.54978596428e-09

test error = 2.36502481666e-09

n = 20

k = 2

lambda = 0

hold out error = 0.18525201895

w = [[ 1.22210920e+00 -1.89659500e+00 -2.69793369e-01 2.11236112e+00

-8.53816271e-02 -7.45035708e-02 4.55522537e-02 -1.65119767e-03

-2.19882393e+00 3.44455242e-04 1.19610596e+00 -2.29775906e-04

-6.99996948e-03 9.98377800e-05 4.05120850e-03 -2.75969505e-05

-1.40190125e-03 7.73370266e-06 2.92301178e-04 -1.00303441e-06

-2.61366367e-05]]

training error = 0.154190273635

test error = 0.079441919782

n = 20

k = 5

lambda = 0

hold out error = 0.0577788095564

w = [[ 1.22210920e+00 -1.89659500e+00 -2.69793369e-01 2.11236112e+00

-8.53816271e-02 -7.45035708e-02 4.55522537e-02 -1.65119767e-03

-2.19882393e+00 3.44455242e-04 1.19610596e+00 -2.29775906e-04

-6.99996948e-03 9.98377800e-05 4.05120850e-03 -2.75969505e-05

-1.40190125e-03 7.73370266e-06 2.92301178e-04 -1.00303441e-06

-2.61366367e-05]]

training error = 0.154190273635

test error = 0.079441919782

n = 20

k = 10

lambda = 0

hold out error = 0.0619952667094

w = [[ 1.22210920e+00 -1.89659500e+00 -2.69793369e-01 2.11236112e+00

-8.53816271e-02 -7.45035708e-02 4.55522537e-02 -1.65119767e-03

-2.19882393e+00 3.44455242e-04 1.19610596e+00 -2.29775906e-04

-6.99996948e-03 9.98377800e-05 4.05120850e-03 -2.75969505e-05

-1.40190125e-03 7.73370266e-06 2.92301178e-04 -1.00303441e-06

-2.61366367e-05]]

training error = 0.154190273635

test error = 0.079441919782

n = 20

k = 80

lambda = 0

hold out error = 0.0212627995092

w = [[ 1.22210920e+00 -1.89659500e+00 -2.69793369e-01 2.11236112e+00

-8.53816271e-02 -7.45035708e-02 4.55522537e-02 -1.65119767e-03

-2.19882393e+00 3.44455242e-04 1.19610596e+00 -2.29775906e-04

-6.99996948e-03 9.98377800e-05 4.05120850e-03 -2.75969505e-05

-1.40190125e-03 7.73370266e-06 2.92301178e-04 -1.00303441e-06

-2.61366367e-05]]

training error = 0.154190273635

test error = 0.079441919782