STA5MA LAB 1

Q1.

a.

SUPPOSE THAT

E[M] = E[W\_1 X\_1 + W\_2 x\_2] = mew(w\_1 + w\_2) , Where w\_1 + w\_2 = 1

Then , E[M] = mew

b.

V[M] = Var[W\_1 X\_1 + W\_2 x\_2] = w\_1 ^ 2 \* sigma\_1 ^ 2 + (1-w\_1) ^ 2 \* sigma\_2 ^ 2 + 2 w\_1 \*(1-w\_1) Cov(X1,X2)

Since X1 and X2 are independent, then

w\_1 ^ 2 \* 2 + (1-w\_1) ^ 2

c.i

V[M] = (½)^2 \* sigma\_1 ^ 2 + (½)^2 \* sigma\_2 ^ 2 + ½ Cov(X1,X2)

Since X1, and X2 is independent. Then. V[M] = Var[W\_1 X\_1 + W\_2 x\_2] = (½ )^2\* sigma\_1 ^ 2 +( ½ )^2\* sigma\_2 ^ 2

= (½ )^2\* (2) +( ½ )^2\* (1) = 3/4

ii. Since X1, and X2 is independent. Then. V[M] = Var[W\_1 X\_1 + W\_2 x\_2] = (1/3)^2 \* sigma\_1 ^ 2 + (2/3)^2 \* sigma\_2 ^ 2

Then, (1/3)^2 \* 2+ (2/3)^2 \* 1 = 2/9 + 4/9 = 2/3

d.

From c.ii is the best estimator because we want to minimize our variance.

e.

V[M] = Var[W\_1 X\_1 + W\_2 x\_2] = w\_1 ^ 2 \* sigma\_1 ^ 2 + w\_2 ^ 2 \* sigma\_2 ^ 2 + 2 w\_1 \*w\_2\* Cov(X1,X2) = w\_1 ^ 2 \* sigma\_1 ^ 2 + (1-w\_1) ^ 2 \* sigma\_2 ^ 2

SEE Q1f, by hand