IQRM Online Assessment Test

This test will help you determine whether you should take Intro to Quantitative Risk Management (IQRM) *before* taking either Financial Risk Management or Insurance Risk Management.

If you answer fewer than **15 out of the 20 questions** below correctly, then we strongly suggest that you either a) successfully complete the IQRM course prior to registering for this FRM or IRM course, or b) select either Strategic Risk Management or Operational Risk Management as your elective to complete the Certificate.

Please allow yourself no more than 30 minutes to complete this test.
Correct answers appear on the final page.

1. At 5% annual interest rates, how much principal does it take to earn 10 dollars per year forever (without reinvesting the payments)?

a) $50
b) $100
c) $200
d) $500

2. Out of 10 bonds, each with a 10% probability of default, what is the probability that 2 bonds default?

a) 2/10 * .1^2 * .9^8
b) .1^2 * .2^8
c) 2 Choose 10 * .1^5 * .9^8
d) 10 Choose 2 * .1^2 * .9^8

3. A 5 year zero coupon bond's yield to maturity increases by 1%. Approximately how much does the bond's value change by?

a) -5%
b) -1%
c) 0
d) 1%
e) 5%

4. A one year interest rate is 1% and a two year rate is 2%. Estimate the one year forward rate using continuous compounding?

a) 1%
b) 2%
c) 3%
d) 5%

5. A factory produces widgets of average size 5.25 and standard deviation .25. What is the probability the size of a widget is less than 5.75?

a) .6826
b) .8413
c) .9772
d) .9986

6. A linear regression beta is 1.5 and the standard deviation of the beta is .5, what is the p-value of the beta?

a) .001
b) .022
c) .033
d) .044

7. The probability that a machine breaks when it's raining is 80%. The probability that it's raining is 10%. What is the probability that it rains and the machine breaks?

a) 2%
b) 8%
c) 18%
d) 80%

8. Out of n trials, what is the probability that an event with probability p happens at least once?

a) n Choose 1 * p^n * q^(n-1)
b) n Choose n * p^0 * q^n
c) 1 - (n Choose 0 * p^n)
d) 1 - (n Choose 1 * p^n * q^(n-1))

9. What is the formula for covariance?

a) E[(x - E(x))*(y-E[y])]
b) E[(x - E(x))*(y-E[y])]/[sigma(x)*sigma(y)]
c) summation((x-E(x))^2 * P(x))
d) summation(x * P(x))

10. What is the formula for variance?

a) E((x-E(x))^2)
b) E[(x - E(x))*(y-E[y])]
c) E[(x - E(x))*(y-E[y])]/[sigma(x)*sigma(y)]
d) summation(x * P(x))

11. What does the value of the second derivative need to be in order to be sure that you are at a minimum?

a) 0
b) Inf
c) -Inf
d) Negative
e) Positive

12. How does the Duration of a bond relate to the first derivative of a bond's price?

a) dB/dy = D/B
b) dB/dy = D*(1+y)
c) dB/dy = -D*B/(1+y)
d) dB/dy = -D/(B/(1+y))

13. How do you use linear algebra to calculate the variance of a portfolio?

a) transpose(w)*w
b) w*transpose(w)
c) sum(diag(CovarianceMatrix))
d) transpose(w)*CovarianceMatrix*w

14. What distribution tests if two variances are the same?

a) Chi Square distribution
b) F distribution
c) Normal distribution
d) T distribution

15. What distribution tests if variance is equal to a certain value?

a) Chi Square distribution
b) F distribution
c) Normal distribution
d) T distribution

16. How is the lognormal distribution constructed?

a) exp(x) where x is normally distributed
b) ln(x) where x is normally distributed
c) log(ln(x)) where x is normally distributed
d) log(x) where x is normally distributed

17. The annual volatility of an interest rate is 12%. Approximately what is the daily volatility?

a) 12%/365
b) 12%/252
c) .75%
d) 1%

18. In regression analysis, what is the formula for R-Square?

a) RSS/TSS
b) TSS/RSS
c) (1+RSS)/TSS
d) 1-RSS/TSS

19. How does a regression beta relate to covariance?

a) Beta = Cov(x,y)/(var(x)*var(y))
b) Beta = Cov(x,y)/var(x)
c) Beta = Cov(x,y)/var(x)
d) Beta = Cov(x,y)/var(x)

20. An optimal hedging strategy minimizes the variance between an asset f and n futures contracts. What value of n solves argmin (n) var(S-nF?)

a) Cov(S,F)/var(F)
b) Cov(x,y)/(var(x)*var(y))
c) Cov(x,y)/var(x)
d) Cov(x,y)/var(x)

ANSWER KEY

1. c) $200

2. d) 10 Choose 2 * .1^2 * .9^8

3. a) -5%

4. c) 3%

5. c) .9772

6. a) .001

7. b) 8%

8. c) 1 - (n Choose 0 * p^n)

9. a) E[(x - E(x))*(y-E[y])]

10. a) E((x-E(x))^2)

11. e) Positive

12. c) dB/dy = -D*B/(1+y)

13. d) transpose(w)*CovarianceMatrix*w

14. b) F distribution

15. a) Chi Square distribution

16. a) exp(x) where x is normally distributed

17. c) .75%

18. d) 1-RSS/TSS

19. b) Beta = Cov(x,y)/var(x)

20. a) Cov(S,F)/var(F)