Business Mathematics II

ANSWERS FOR FINAL EXAM STUDY GUIDE

1. (a) 2.1
   (b) 5.09
   (c) 2.256

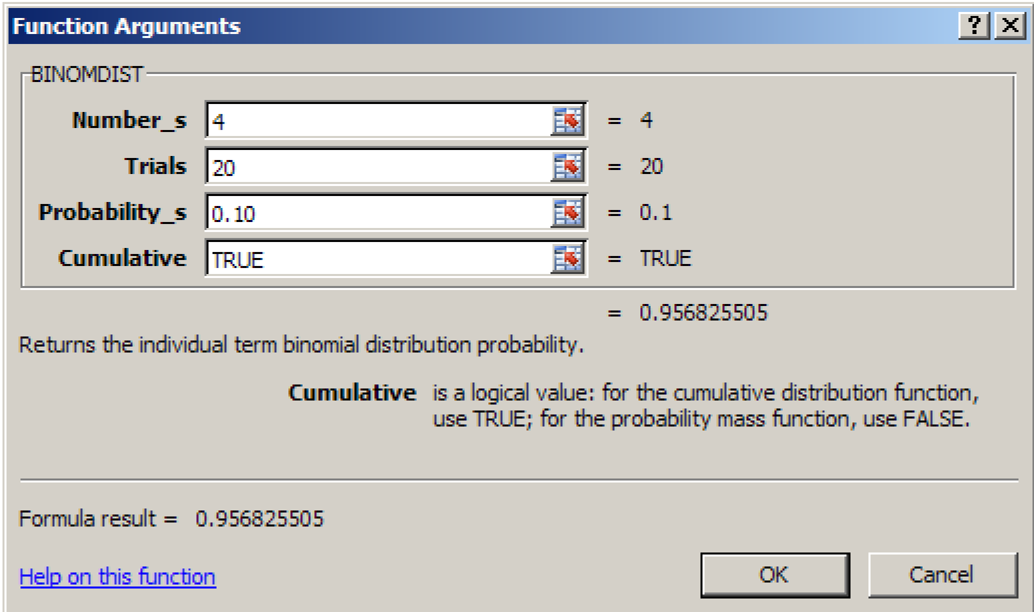
2. (a) $$F_Y(y) = \begin{cases} 0 & \text{if } y < 15 \\ 0.125 & \text{if } 15 \le y < 30 \\ 0.920 & \text{if } 30 \le y < 60 \\ 0.974 & \text{if } 60 \le y < 90 \\ 0.982 & \text{if } 90 \le y < 120 \\ 1 & \text{if } y \ge 120 \end{cases}$$
   (b) 31.845
   (c) 247.921
   (d) 15.746

3. (a) $$F_Y(y) = \begin{cases} 0 & \text{if } y < 15 \\ 0.125 & \text{if } 15 \le y < 30 \\ 0.920 & \text{if } 30 \le y < 60 \\ 0.975 & \text{if } 60 \le y < 90 \\ 0.985 & \text{if } 90 \le y < 120 \\ 1 & \text{if } y \ge 120 \end{cases}$$
   (b) 0.025
   (c) 31.725
   (d) 232.1494
   (e) 15.236

4. (a) 0.3
   (b) 0.6
   (c) 3.5
   (d) 2.6552
   (e) 4.5
   (f) 3.7417

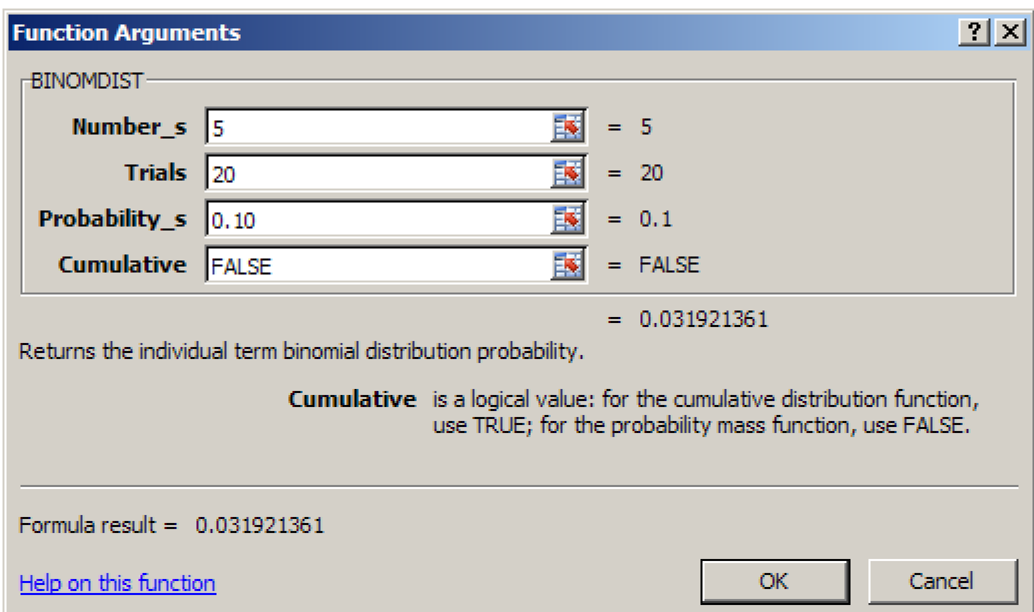
5. (a) 0.3
   (b) 4.6
   (c) 2.5377

6. (a)



(b) 2
(c) 1.8

7. (a)



(b) 2
(c) 1.8

8. (a) binomial
(b) 3.8
(c) 0.25285

9. (a) 434
   (b) 164.92
   (c) $\cong 12.8421$

10. (a) $\mu_X = 0.8$; $\sigma_X = 0.8$
    (b) $\bar{x} = 2$; $s = 1.633$
    (c) $\mu_{\bar{x}} = 0.8$; $\sigma_{\bar{x}} \cong 0.3024$

11. (a)

x	0	1	2	3	4
$F_X(x)$	0.0625	0.3125	0.6875	0.9375	1

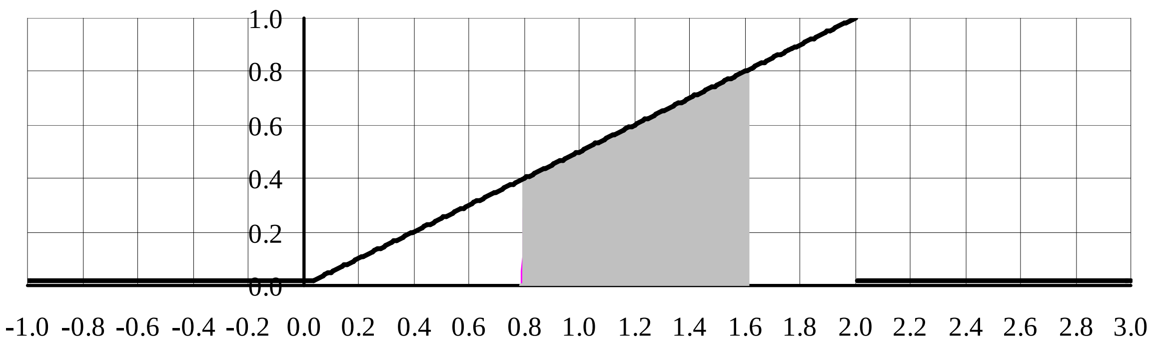
(b)

x	0	1	2	3	4
$f_X(x)$	0.0625	0.25	0.375	0.25	0.0625

(c) 0.375; 0
(d) 0.6875; 0.875
(e) 2; 1
(f) 1
(g) 0.3125
(h) $\bar{x} = 1.8$; $s = 1.3038$
(i) $\mu_{\bar{x}} = 2$; $\sigma_{\bar{x}} \cong 0.4472$
(j) $\mu_{S_5} = 0$; $\sigma_{S_5} = 1$

12. (a) Plot B
    (b)

Plot A



(c) 0.5
(d) 0.48
(e) 1.3
(f) $\int_{0.8}^{1.6} \frac{x}{2}\, dx = 0.48$

(g) $\int_0^2 x \cdot \frac{x}{2}\, dx = \frac{4}{3}$

(h) $\int_0^2 \left(x - \frac{4}{3}\right)^2 \cdot \frac{x}{2}\, dx = \frac{2}{9}$

13. (a) $\int_{1.5}^{4} \frac{3}{64} \cdot t^2 \cdot (4-t)\, dt$

(b) 0.8484

14. (a) $\int_0^1 90 \cdot t \cdot (1-t)^8\ dt$

(b) $\int_{0.1}^{0.2} 90 \cdot t \cdot (1-t)^8\ dt$

(c) $\int_0^1 90 \cdot t^2 \cdot (1-t)^8\ dt$

(d)

Definition	**Computation**		**Plot Interval**		**Integration Interval**	
Formula for $f(x)$	***x***	**$f(x)$**	***A***	***B***	***a***	***b***
			0	1	0	1

Formula for $f(x)$: =90*x^2*(1-x)^8

(e) $\int_0^1 (t - 0.1818)^2 \cdot 90 \cdot t \cdot (1-t)^8\ dt$

15. (a) $\int_{-1}^{2} x \cdot \frac{x^2}{3}\, dx$

(b) $\int_{-1}^{2} (x - 1.25)^2 \cdot \frac{x^2}{3}\, dx$

(c) $\int_{-1}^{1} \frac{x^2}{3}\, dx$

16. (a) (*ii*)
(b) (*i*)
(c) (*iii*)
(d) (*i*) and (*iii*)
(e) (*v*)

17. (a) d
    (b) a

18. (a) (*iii*) and (*iv*)
    (b) (*i*) and (*ii*)
    (c) (*iv*) with (*i*); (*iii*) with (*ii*)

19. (a) 1
    (b) 20
    (c) 400
    (d) $\cong 0.7135$

20. (a) 0.6
    (b) 0.4
    (c) $P(2 \le X \le 5)$

21. (a) C
    (b) A
    (c) B
    (d) C

22. 0.3611

23. 45.78

24. (a) $f_X(x) = \begin{cases} 0 & \text{if } x < 0 \\ \frac{1}{5} & \text{if } 0 \le x \le 5 \\ 0 & \text{if } x > 5 \end{cases}$

    (b) $\int_0^x f_X(u)\,du = \begin{cases} 0 & \text{if } x < 0 \\ \frac{x}{5} & \text{if } 0 < x < 5 \\ 1 & \text{if } x > 5 \end{cases}$

    (c) $f_X(x)$

25. $1 - e^{-0.2 \cdot x}$

26. $F'(x) = \begin{cases} 0 & \text{if } x < 0 \\ \frac{1}{15} \cdot e^{-x/15} & \text{if } x > 0 \end{cases}$

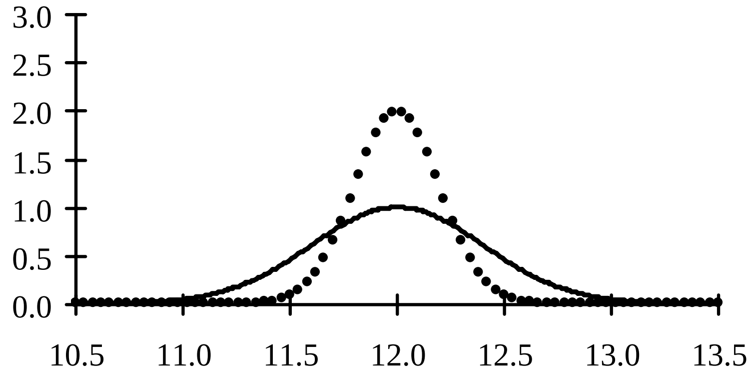
27. (a) 10.45
    (b) 2.035
    (c) 1.427

28. (a) 19
    (b) 64
    (c) 8

29. (a) 0.25
    (b) 14.25
    (c) $\cong 6.944$

30. (a) 30
    (b) 0.45
    (c) $\cong 0.671$
    (d) $\dfrac{\bar{x}-30}{6/\sqrt{80}}$
    (e) standard normal

31. (a) 0.2
    (b)



    (c) The standard deviation for the sample mean with a sample size of 16 is $0.4/4 = 0.1$. At $n = 16$, the confidence intervals, for any given level of confidence, for μ_X will be one-half the width of those for a sample size of 4.

32. (a) $\mu_{\bar{x}} = 0.3$; $\sigma_{\bar{x}} \cong 0.324$

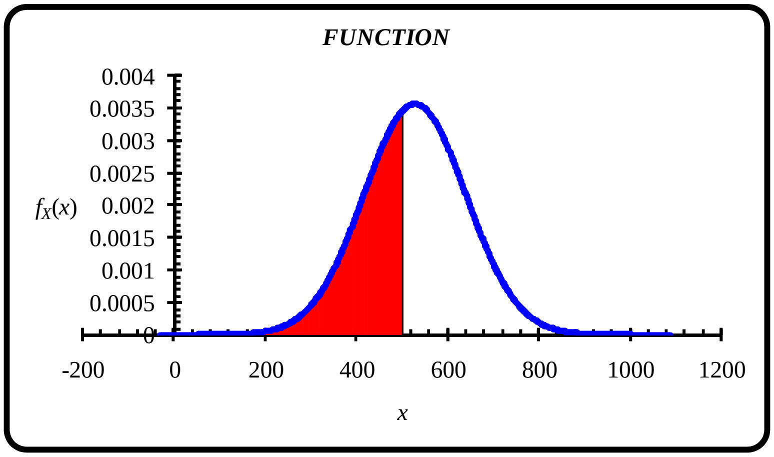
    (b)

s_2	-0.92582	0.61721	2.16025
$F_{S_2}(s_2)$	0.49	0.42	0.09

    (c) $\mu_{S_2} = 0$; $\sigma_{S_2} = 1$

33. (a) 6
    (b) 0.0512
    (c) $\cong 0.226$
    (d) $\dfrac{\overline{x}-6}{1.6/\sqrt{50}}$
    (e) standard normal

34. (a) $f_X(x) = \dfrac{1}{112 \cdot \sqrt{2 \cdot \pi}} \cdot e^{-0.5 \cdot \left(\frac{x-528}{112}\right)^2}$
    (b)



(c)

Definition	
Formula for $f(x)$	

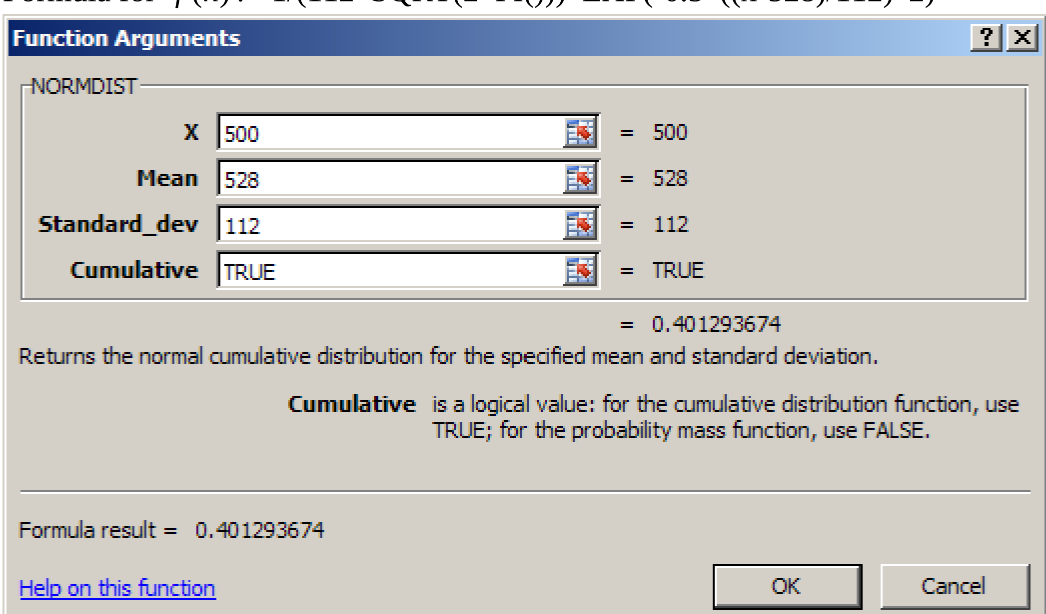
Computation	
x	***f(x)***

Plot Interval	
A	***B***
-32	1088

Integration Interval	
a	***b***
-32	500

Formula for $f(x)$: =1/(112*SQRT(2*PI()))*EXP(-0.5*((x-528)/112)^2)

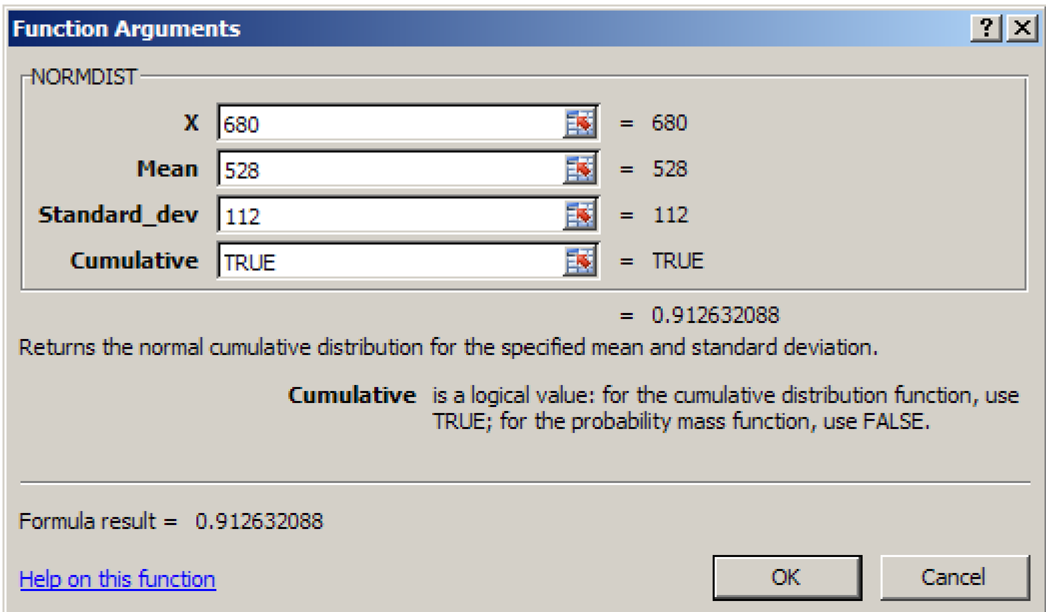
(d)



35. (a) $f_X(x) = \dfrac{1}{112 \cdot \sqrt{2 \cdot \pi}} \cdot e^{-0.5 \cdot \left(\frac{x-528}{112}\right)^2}$

(b) $\displaystyle\int_{-\infty}^{680} \frac{1}{112 \cdot \sqrt{2 \cdot \pi}} \cdot e^{-0.5 \cdot \left(\frac{x-528}{112}\right)^2} dx$

(c)

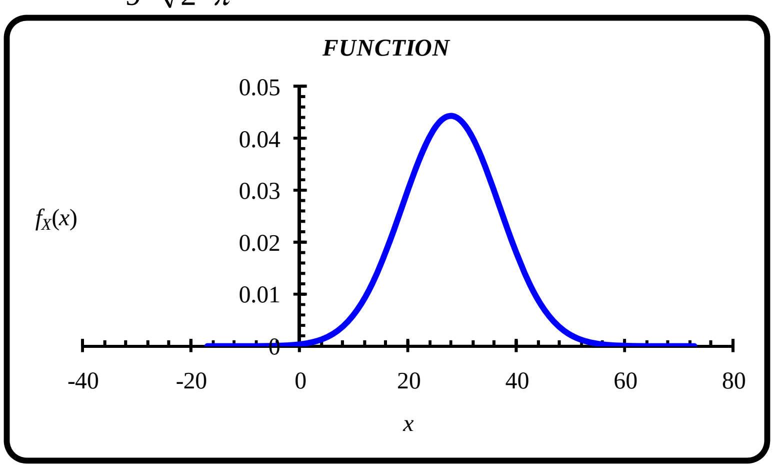


(d) 528

(e) 11.2

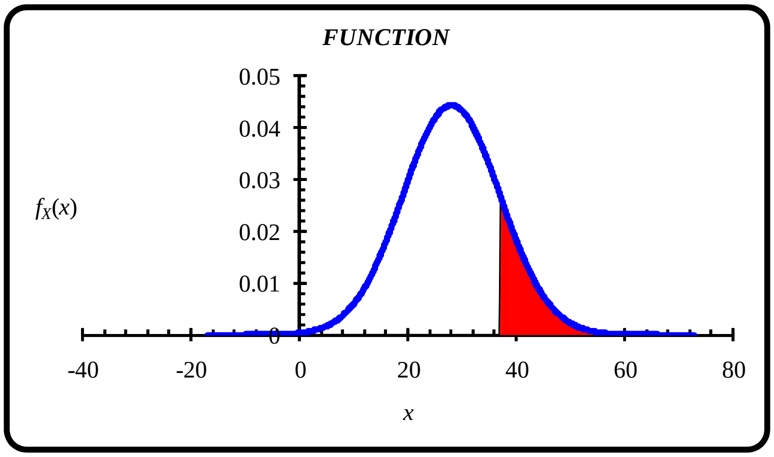
36. (a) $f_X(x) = \dfrac{1}{9 \cdot \sqrt{2 \cdot \pi}} \cdot e^{-0.5 \cdot \left(\frac{x-28}{9}\right)^2}$

(b)



(c) $\displaystyle\int_{37}^{\infty} \frac{1}{9 \cdot \sqrt{2 \cdot \pi}} \cdot e^{-0.5 \cdot \left(\frac{x-28}{9}\right)^2} dx$

(d)



(e) =NORMDIST(30,28,9,TRUE)

37. (a) $f_M(m) = \dfrac{1}{6{,}595 \cdot \sqrt{2 \cdot \pi}} \cdot e^{-0.5 \cdot \left(\frac{m - 38{,}142}{6{,}595}\right)^2}$

(b) $a = \$28{,}645.20$; $b = \$48{,}638.80$

38. (a) 15

(b) (395.6, 454.4)

39. (65.2, 79.6)

40. ($89.3 million, $96.7 million)

41. (1.56, 1.64)

42. 0.1359

43. (a) The probability that the weight of a randomly selected bag of potato chips will differ from 588 grams by no more than 12 grams is approximately 0.68.

(b) $\cong 0.1587$

44. (a) $\cong 0.34$

(b) $\cong 0.68$

(c) $\cong 0.68$

(d) 0.5

(e) $\cong 0.2$

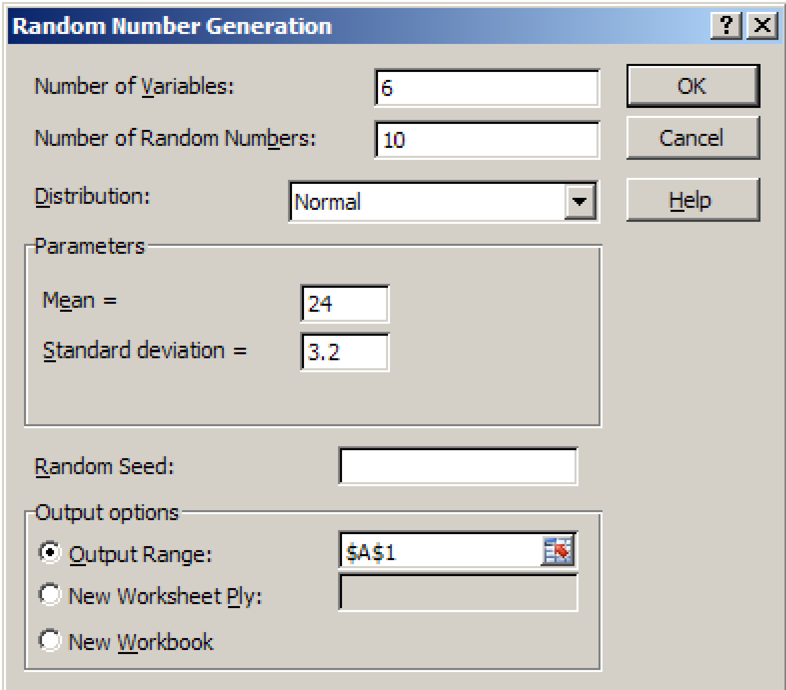
(f) $\cong 0.2$

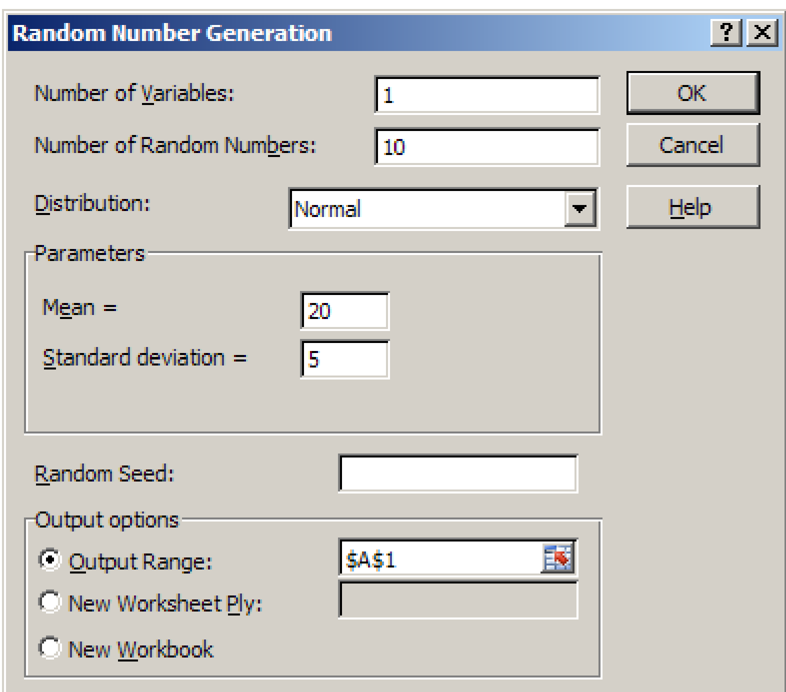
(g) $\cong 0.08$

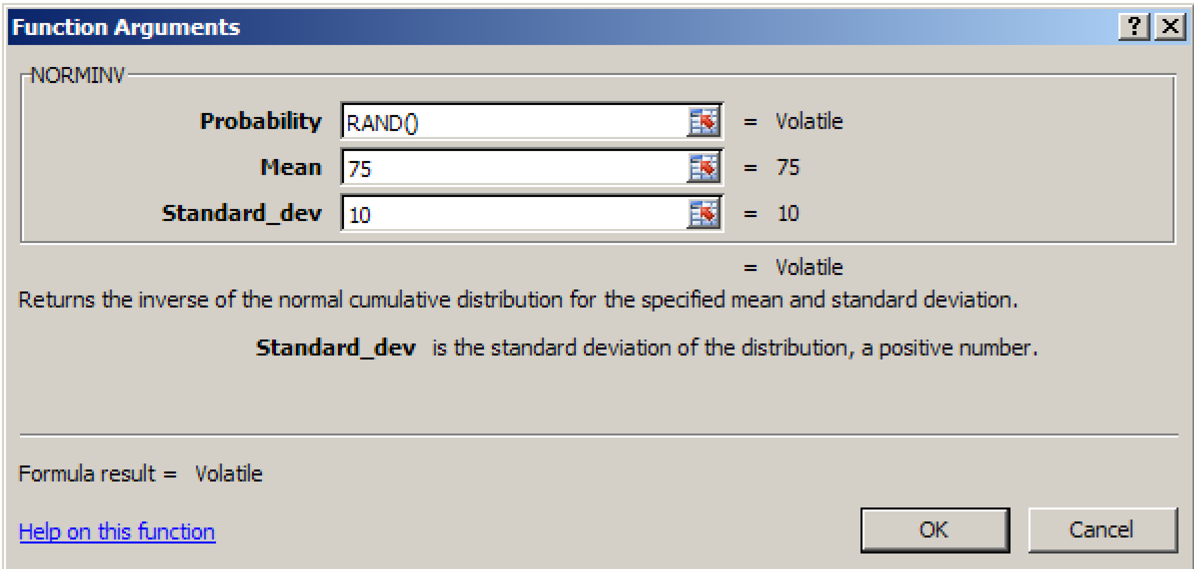
45. E

46. D

47. E

48. 
Random Number Generation
Number of Variables:
6
Number of Random Numbers:
10
Distribution:
Normal
OK
Cancel
Help
Parameters
Mean =
24
Standard deviation =
3.2
Random Seed:
Output options
Output Range:
A1
New Worksheet Ply:
New Workbook

49. 
Random Number Generation
Number of Variables:
1
Number of Random Numbers:
10
Distribution:
Normal
OK
Cancel
Help
Parameters
Mean =
20
Standard deviation =
5
Random Seed:
Output options
Output Range:
A1
New Worksheet Ply:
New Workbook



50. (a) $0.15 million
    (b) $4.472 million

51. (a) Geologist's estimate of the fair value of lease.

    (b)

Errors		
Company 1	Company 2	Company 3
– $3	– $2	– $1
– $7	$7	$0

    (c) $\bar{r} = -\$1;\ s = \$4.604$
    (d) $0

52. *V*: continuous random variable that gives the value (in millions of dollars) of a lease that is similar to those in the historical data

    S_V : continuous random variable that gives the signal (in millions of dollars) for a lease with proven value *v*

    R: continuous random variable that gives the error (in millions of dollars) in the signal for a lease

    C: continuous random variable that gives the largest value in a set of 19 observations of *R*

    B: continuous random variable that gives the difference between the largest and second largest values in a set of 19 observations of *$*

53. The assumption that the geologists employed by each of the bidding companies are all equally expert and can, on average, estimate the correct values of leases.

54. A2

55. B3