MATH 1310 (College Mathematics for Liberal Arts) - Final Exam Review (Revised: Fall 2016)

This Review is comprehensive but should not be the only material used to study for the Final Exam. It should not be considered a preview of the Final Exam. Studying your previous tests, quizzes, homework, class notes, text discussions, etc. will prepare you to do well on the Final Exam. There may be questions on the Final Exam that are unlike questions on this Review, and vice versa. No question on this Review will be duplicated exactly on the Final Exam. This review is much longer than the Final Exam. You may obtain help working on this Review in the Math Lab located in 925-N

1. Identify a pattern in the list of numbers. Then use this pattern to find the next number.
(a) 25, 21, 17, 13, 9, _____ (b) 3, 6, 18, 72, _____

2. A publishing company sold 38,268,591 books last year. Round the number of books sold to the nearest million.
A. 40,000,000 **B.** 38,270,000 **C.** 38,000,000 **D.** 30,000,000

3. In a town in Nebraska, the average consumption of soft drinks per day per elementary school student is 14.049 ounces. Round this value to the nearest tenth.
A. 14.1 ounces **B.** 14.0 ounces **C.** 14.04 ounces **D.** 14.05 ounces

4. A couch sells for $940. Instead of paying the total amount at the time of purchase, the same couch can be bought by paying $300 down and $70 a month for 12 months. How much is saved by paying the total amount at the time of purchase?
A. $200 **B.** $100 **C.** $970 **D.** $20

5. Determine if the set is the empty set.
(a) { x | x is a number less than 5 or greater than 7} **(b)** { x | x is a number less than 5 and greater than 7}

6. Determine whether the statement is true or false.
(a) $15 \in \{2,4,6,\ldots,20\}$ **(b)** $7 \notin \{1,2,3,...,40\}$

7. Express the set using the roster method.
(a) { x | x ∈ N and x is greater than 12} **(b)** { x | x ∈ N and x lies between 2 and 6}

8. Find the cardinal number for the set.
(a) {x|x is a day of the week that begins with the letter N} **(b)** {a, e, I, o, u}

9. Are the given sets equivalent? **(a)** {p,q,r,s} = {q,s,r,p} **(b)** A = {14,16,18,20,22} B = {15,17,19,21,23}

10. Are the given sets equal? **(a)** {p,q,r,s} = {q,s,r,p} **(b)** A = {15,17,19,21,23} B = {16,18,20,22,24}

11. Write $\subseteq$ or $\nsubseteq$ in the blank so that the resulting statement is true.
{red,blue,green} _____ {blue,green,yellow,black}

12. List all the subsets of the given set. **(a)** {1} **(b)** {a, b, c}

13. Calculate the number of subsets and the number of proper subsets for the set. {1,3,5,7,9,11}

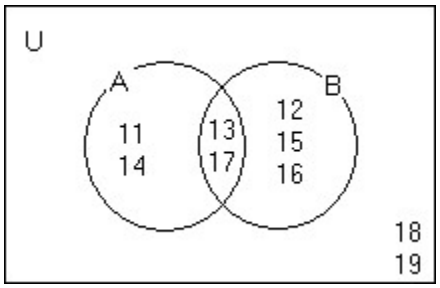
14. Let U = {1,2,4,5,a,b,c,d,e}. Use the roster method to write the complement of the set, T= {2,4,b,d}.
A. {1,2,4,5,a,b,c,d,e} **B.** {1,5,a,e} **C.** {1,5,a,c,e} **D.** {1,3,5,a,c,e}

15. Let U = {q,r,s,t,u,v,w,x,y,z}, A = {q,s,u,w,y}, and B = {q,s,y,z}. List the elements in the set, $(A \cap B)'$.
A. {t,v,x} **B.** {s,u,w} **C.** {q,s,t,u,v,w,x,y} **D.** {r,t,u,v,w,x,z}

16. Let U = {q,r,s,t,u,v,w,x,y,z}, A = {q,s,u,w,y}, and B = {q,s,y,z}. List the elements in the set $A' \cup B$.

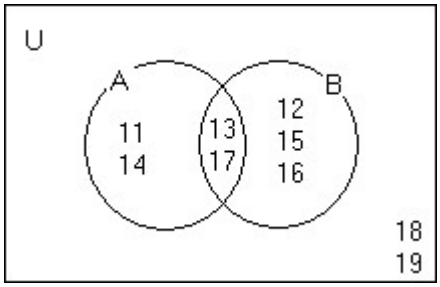
A. {s,u,w} **B.** {r,s,t,u,v,w,x,z} **C.** {q,s,t,u,v,w,x,y} **D.** {q,r,s,t,v,x,y,z}

17. Use the Venn diagram to list the elements of set A in roster form.



A. {11,13,14,17} **B.** {11,14} **C.** {12,15,16} **D.** {11,12,13}

18. Use the Venn diagram below to list the elements in each of the sets.



(a) $A \cup B$

A. {11,12,14,15,16} **B.** {11,12,13,14,15,16,17} **C.** {13,17} **D.** {11,12,13,14,15,16,17,18,19}

(b) $A \cap B$

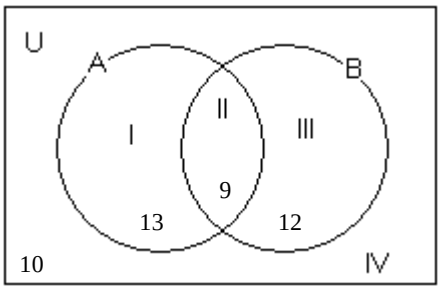
A. {11,12,14,15,16} **B.** {13,17} **C.** {11,12,13,14,15,16,17,18,19} **D.** {11,12,13,14,15,16,17}

(c) A'

A. {12,15,16,18,19} **B.** {11,13,14,17} **C.** {12,15,16} **D.** {11,14,18,19}

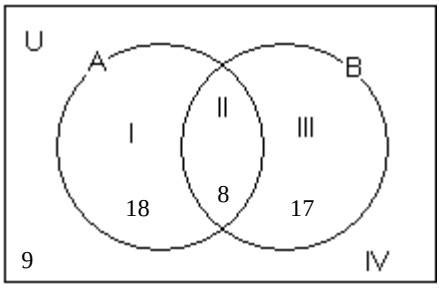
19. Use the Venn diagram below showing the number of elements in regions I through IV to determine the number of elements that belong to set B, but not set A.

A. 12 **B.** 10 **C.** 13 **D.** 9



20. Use the Venn diagram below showing the number of elements in regions I through IV to determine the number of elements that belong to neither set A nor set B.

A. 18 **B.** 8 **C.** 9 **D.** 17



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21. Form the negation of the statement, “Today is July 19”.

A. Today is not July 19.

B. It is not true that today is July 20.

C. Today is not July 20.

D. Yesterday was not July 17.

22. Let p and r represent the following statements:

p: One plays hard. r: It is not true that the car is working.

(a) Express the following statement symbolically: “The car is working.”

A. r **B.** ~ r

(b) Express the symbolic statement ~ p in words.

A. No one plays the guitar hard. **B.** One does not play hard.

23. Write the negation of the quantified statement: “Some drinks are not liquids.”

A. All drinks are not liquids.

B. No drinks are liquids.

C. All liquids are drinks.

D. All drinks are liquids.

24. Given that p and q each represents a simple statement, write the indicated compound statement in its symbolic form.

p: Spartacus is a film. q: Rambo is a film.

Spartacus is a film and Rambo is not a film.

A. $p \wedge \sim q$

B. $p \rightarrow \sim q$

C. $p \wedge q$

D. $p \vee \sim q$

25. Given that p and q each represents a simple statement, write the indicated compound statement in its symbolic form.

p: He works out. q: He builds up his strength.

He works out or he builds up his strength.

A. $p \vee \sim q$

B. $p \rightarrow q$

C. $p \vee q$

D. $p \wedge q$

26. Given that p and q each represents a simple statement, write the indicated symbolic statement in words.

p: Emilio dislikes Laura q: Laura dislikes Emilio

$\sim p \wedge q$

A. Emilio does not dislike Laura, but Laura dislikes Emilio.

B. It is not true that Emilio dislikes Laura and Laura dislikes Emilio.

C. Emilio and Laura do not dislike each other.

D. Emilio does not dislike Laura, or Laura dislikes Emilio.

27. Write the compound statement in symbolic form. Let letters assigned to the simple statements represent English sentences that are not negated. Use the dominance of connectives to show grouping symbols (parentheses) in symbolic statements.

If I like the song or the DJ is entertaining then I do not change the station.

A. $(p \vee q) \rightarrow r$ p: I like the song

B. $p \vee (q \rightarrow r)$ q: The DJ is entertaining

C. $p \vee (q \rightarrow \sim r)$ r: I change the station.

D. $(p \vee q) \rightarrow \sim r$

28. Let p represent a true statement, let q represent a false statement, and let r represent a true statement. Find the truth value of the given compound statements.

(a) $p \wedge (q \vee p)$ **(b)** $\sim (p \vee \sim q)$ **(c)** $p \wedge (q \rightarrow \sim r)$

29. Evaluate the function at the given values of the variable.

$f(x) = x - 9$ **(a)** $f(-4)$ **(b)** $f(-7)$

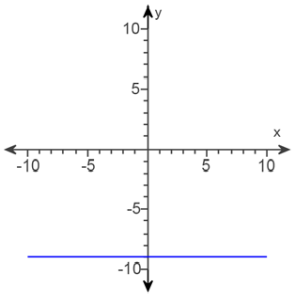
A. $-36, -63$ **B.** $36, 63$ **C.** $5, 2$ **D.** $-13, -16$

30. Evaluate the function at the given values of the variable.

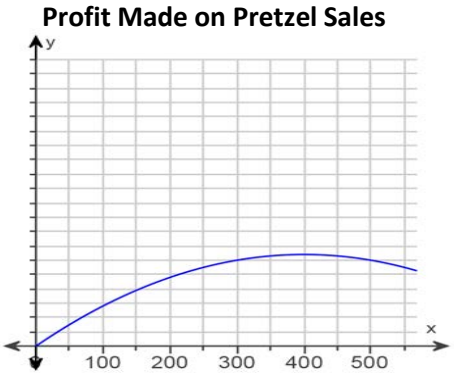
$f(x) = x^2 + 3$ **(a)** $f(3)$ **(b)** $f(-7)$

A. $12, 52$ **B.** $27, 147$ **C.** $9, -11$ **D.** $18, -42$

31. Use the vertical line test to determine if y is a function of x.



32. The profit that the vendor makes per day by selling x pretzels is given by the function $P(x) = -2x^2 + 1{,}600x - 400$. Find the number of pretzels that must be sold to maximize profit.



A. 800 pretzels

B. 100 pretzels

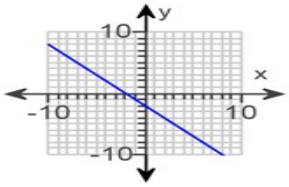
C. 200 pretzels

D. 400 pretzels

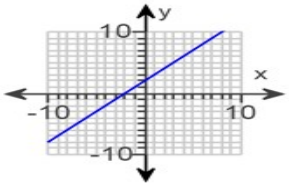
33. Use the x-and y-intercepts to graph the linear equation.

$y - x = -2$

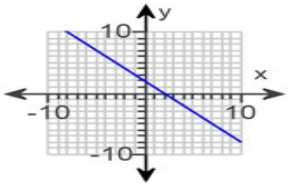
A.



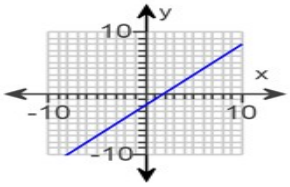
B.



C.



D.



34. Calculate the slope of the line passing through the given points. If the slope is undefined, so state. Then indicate whether the line rises, falls, is horizontal, or is vertical.

(a) (2, − 5), (2, − 2)

A. 0, is horizontal **B.** $-\frac{7}{4}$, falls **C.** $-\frac{3}{4}$, falls **D.** undefined, is vertical

(b) (5,3), (4,3)

A. $\frac{2}{3}$, rises **B.** − 6, falls **C.** 0, is horizontal **D.** undefined, is vertical

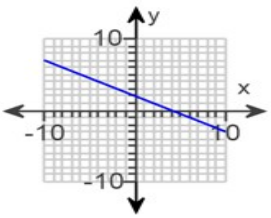
(c) (6,10), (15, − 2)

A. $-\frac{3}{4}$, falls **B.** $\frac{4}{21}$, rises **C.** $-\frac{4}{3}$, falls **D.** $\frac{4}{3}$, rises **E.** undefined, is vertical

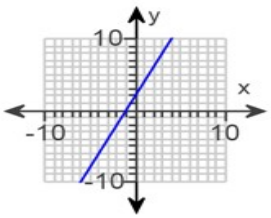
35. Graph the linear function using the slope and y-intercept.

$y = 2x + 2$

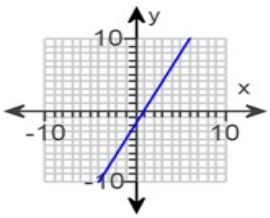
A.



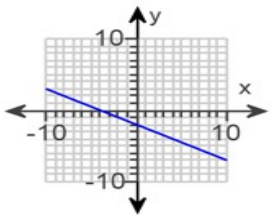
B.



C.



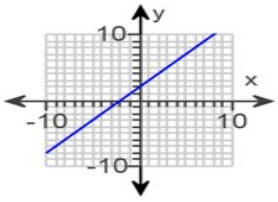
D.



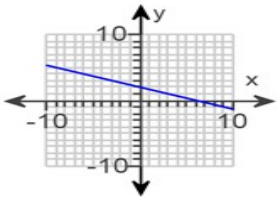
36. Graph the linear function using the slope and y-intercept.

$y = -\frac{1}{3}x + 2$

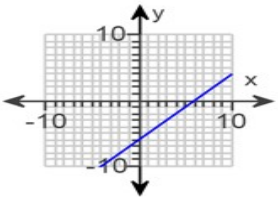
A.



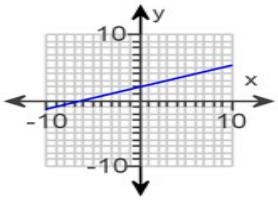
B.



C.



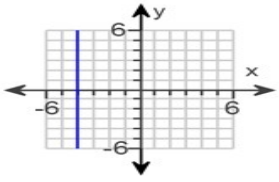
D.



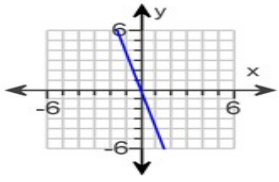
37. Graph the horizontal or vertical line.

$y = -4$

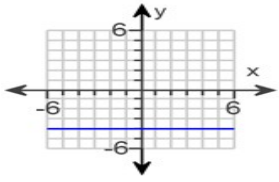
A.



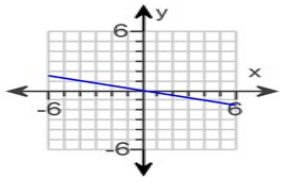
B.



C.



D.



38. Determine if the parabolas whose equations are given opens upward or downward.
(a) $y = x^2 - 2x - 4$ **(b)** $y = -2x^2 - 2x - 2$

39. Find the y-intercepts for the parabolas whose equations are given.

(a) $y = -x^2 + 9x - 20$

A. (0, 20) **B.** (0, 4) **C.** (0, − 20) **D.** (0, − 4)

(b) $y = 2x^2 + 18x + 16$

A. (0, − 1) **B.** (0, − 8) **C.** (0, 16) **D.** (0, − 16)

40. Find the vertex for the parabola whose equation is given.

(a) $y = -3x^2 - 6x + 3$

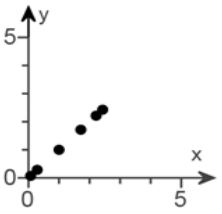
A. (− 2, 3) **B.** (− 1, 6) **C.** (1, − 6) **D.** (0, 6)

(b) $y = x^2 - 4x$

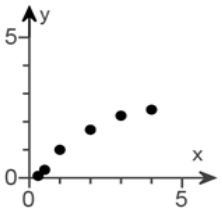
A. (0, 4) **B.** (2, − 4) **C.** (0, 0) **D.** (4, − 16)

41. First, create a scatter plot for the data in the table. Then, use the shape of the scatter plot given to determine if the data are best modeled by a linear function, an exponential function, a logarithmic function, or a quadratic function.

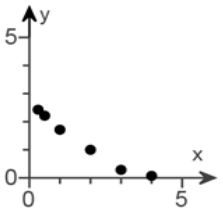
A.



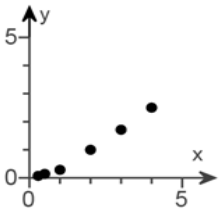
B.



C.



D.



x	y
0.3	0.1
0.5	0.3
1	1
2	1.7
3	2.2
4	2.4

linear function logarithmic function exponential function quadratic function

42. The principal P = $700 is borrowed at simple interest rate r = 8.25% for a period of time t = 3 months. Find the simple interest owed for the use of the money. Assume 360 days in a year and round to the nearest cent.

A. $14.44 **B.** $15.75 **C.** $7.25 **D.** $173.25

43. The principal P is borrowed at simple interest rate r for a period of time t. Find the loan's future value, A, or the total amount due at time t. Round answer to the nearest cent.

P = $3,000, r = 8%, t = 1 year

A. $5,400.00 **B.** $1,080.00 **C.** $3,240.00 **D.** $3,008.00

44, The principal P is borrowed at simple interest rate r for a period of time t. Find the loan's future value, A, or the total amount due at time t. Round answer to the nearest cent.

P = $140, r = 8%, t = 4 years

A. $184.80 **B.** $151.20 **C.** $1,044.80 **D.** $172.00

45. Determine the present value, P, you must invest to have the future value, A, at simple interest rate r after time t. Round answer to the nearest dollar.

A = $212.80, r = 11%, t = 3 years

A. $163 **B.** $167 **C.** $160 **D.** $193

46. How much money should be deposited today in an account that earns 8% compounded semiannually so that it will accumulate to $1,000 in 10 years? Round to the nearest cent.

A. $463.19 **B.** $543.61 **C.** $456.39 **D.** $480.24

47. Find the value of the annuity and the interest. Round to the nearest dollar.

Periodic Deposit: $1000 at the end of each year Rate: 4.5% compounded annually Time: 6 years

A. $28,939; $22,939 **B.** $2,769; $3,231 **C.** $6,717; $717 **D.** $5,471; $529

48. Suppose that at age 25, you decide to save for retirement by depositing $95 at the end of every month in an IRA that pays 5.25% compounded monthly. How much will you have from the IRA when you retire at age 65? Round to the nearest dollar.

A. $153,202 **B.** $1,007,756 **C.** $154,798 **D.** $176,512

49. There are 4 roads leading from Bluffton to Hardeeville, 9 roads leading from Hardeeville to Savannah, and 4 roads leading from Savannah to Macon. How many ways are there to get from Bluffton to Macon?

A. 288 **B.** 144 **C.** 36 **D.** 17

50. License plates in a particular state display 3 letters followed by 4 numbers. How many different license plates can be manufactured? (Repetitions are allowed.)

A. 12 **B.** 36 **C.** 26 **D.** 175,760,000

51. There are 7 performers who are to present their acts at a variety show. One of them insists on being the first act of the evening. If this request is granted, how many different ways are there to schedule the appearances?

A. 42 **B.** 49 **C.** 5,040 **D.** 720

52. You want to arrange 8 of your favorite CD's along a shelf. How many different ways can you arrange the CD's assuming that the order of the CD's makes a difference to you?

A. 5,040 **B.** 64 **C.** 56 **D.** 40,320

53. Evaluate each expression.

(a) 7! **(b)** ${}_8P_5$ **(c)** ${}_5P_5$ **(d)** ${}_{11}C_7$ **(e)** ${}_8C_0$

54. A club elects a president, vice-president, and secretary-treasurer. How many sets of officers are possible if there are 8 members and any member can be elected to each position? No person can hold more than one office.

A. 168 **B.** 336 **C.** 112 **D.** 1,680

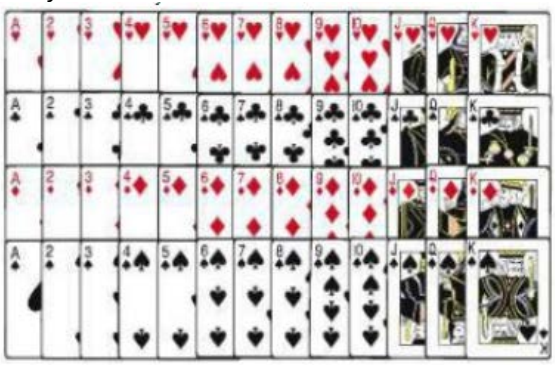
55. A club receives a service-learning grant to send 3 members to a regional student conference to present their project. If there are 9 members of the club who participated in the service-learning project, how many different ways can the club select the 3-member team?

A. 504 **B.** 27 **C.** 84 **D.** 3

56. A die is rolled. The set of equally likely outcomes is {1, 2, 3, 4, 5, 6}. Find the probability of getting a 1 or a 6. Express the probability as a fraction reduced to lowest terms

A. $\frac{1}{6}$ **B.** $\frac{1}{4}$ **C.** $\frac{1}{3}$ **D.** $\frac{1}{12}$

57. You are dealt one card from a standard 52-card deck. Find the probability of being dealt a jack. Express the probability as a fraction reduced to lowest terms.



A. $\frac{1}{4}$ **B.** $\frac{1}{13}$ **C.** $\frac{1}{3}$ **D.** $\frac{1}{12}$

58. A single die is rolled twice. Find the probability of getting two numbers whose sum is less than 6. Express the probability as a fraction reduced to lowest terms.

First Roll \ Second Roll	⚀	⚁	⚂	⚃	⚄	⚅
⚀	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
⚁	(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
⚂	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
⚃	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
⚄	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
⚅	(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

A. $\frac{1}{9}$ **B.** $\frac{5}{18}$ **C.** $\frac{1}{6}$ **D.** $\frac{1}{2}$

59. A committee consisting of 6 people is to be selected from eight parents and four teachers. Find the probability of selecting three parents and three teachers.

A. $\frac{8}{33}$ **B.** $\frac{3}{11}$ **C.** $\frac{1}{6}$ **D.** $\frac{1}{2}$

60. A random sample of 20 college students is selected. Each student is asked how much time he or she spent on final exam preparations during the previous week. The following times (in hours) are obtained.

9, 7, 8, 3, 4, 8, 7, 9, 9, 3, 6, 5, 8, 9, 4, 6, 7, 5, 5, 3

Construct a frequency distribution for the data.

Hours Studied	Freq.
3	
4	
5	
6	
7	
8	
9	

61. Find the mean for the group of data items. Round to the nearest hundredth, if necessary.

4, 6, 9, 2, 10, 3, 12, 9

A. 7.86 **B.** 6.88 **C.** 5.75 **D.** 6.57

62. Find the median for the group of data items.

10, 8, 4, 0, 1, 1, 1, 0, 0

A. 0 **B.** 5 **C.** 1 **D.** 4

63. Find the mode for the group of data items. If there is no mode, so state.

100, 100, 94, 46, 74, 100

A. 46 **B.** 94 **C.** 100 **D.** no mode

64. Find the midrange and the range for the group of data items.

7, 8, 9, 10, 11

A. 7, 8 **B.** 7, 11 **C.** 9, 11 **D.** 9, 4

65. Find the standard deviation for the group of data items. Round to the nearest hundredth.

13, 13, 13, 16, 19, 19, 19

A. 3.00 **B.** 9.00 **C.** 2.85 **D.** 8.14

ANSWER KEY

1. (a) 5
   (b) 360
2. C
3. B
4. A
5. (a) No
   (b) Yes
6. (a) False
   (b) False
7. (a) {13, 14, 15, ….}
   (b) {3,4,5}
8. (a) 0
   (b) 5
9. (a) Yes
   (b) Yes
10. (a) Yes
    (b) No
11. $\not\subset$
12. (a) { }, {1}
    (b) { }, {a}, {b}, {c}, {a,b}, {a,c}, {b,c}, {a,b,c}
13. 2^6 *or* 64, $2^6 - 1$ *or* 63
14. C
15. D
16. D
17. A
18. (a) B
    (b) B
    (c) A
19. A
20. C
21. A
22. (a) B
    (b) B
23. D
24. A
25. C
26. B
27. D
28. (a) True
    (b) False
    (c) True
29. D
30. A
31. Yes
32. D
33. D
34. (a) D
    (b) C
    (c) C
35. B
36. B
37. C
38. (a) Upward
    (b) Downward
39. (a) C
    (b) C
40. (a) B
    (b) B
41. B
42. A
43. C
44. A
45. C
46. C
47. C
48. C
49. B
50. D
51. D
52. D
53. (a) 5040
    (b) 6720
    (c) 120
    (d) 330
    (e) 1
54. B
55. C
56. C
57. B
58. B
59. A
60.

Hours Studied	Freq.
3	3
4	2
5	3
6	2
7	3
8	3
9	4

61. B
62. C
63. C
64. D
65. A