Math 119 Final Review – version 1

For problems 1 – 2, use inductive reasoning to find a pattern and then find the next number in the sequence.

1.   0, 3, 8, 15, 24, _____

   a.   33   b.   36   c.   35   d.   50

2. $\frac{1}{3}$, $\frac{1}{9}$, $\frac{1}{27}$, $\frac{1}{81}$, _____

   a. $\frac{1}{243}$ b. $\frac{1}{729}$ c. $\frac{1}{129}$ d. $-\frac{1}{243}$

For problems 3 – 6, Let $= \{11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$, $A = \{14, 15, 16, 17\}$,

$B = \{11, 13, 15, 17, 19\}$, $C = \{12, 14, 15, 19, 20\}$. **Find each set.**

3. $A' \cap B$

   a. $\{15, 17\}$ b. $\{11, 13, 19\}$ c. $\{11, 12, 13, 15, 17, 18, 19, 20\}$ d. $\{\ \}$

4. $A \cup (B \cap C)$

   a. $\{14, 15, 16, 17, 19\}$ b. $\{14, 15, 17\}$ c. $\{11, 12, 13, 15, 18, 19, 20\}$ d. $\{15\}$

5. $(A' \cup B)' \cup C'$

   a. $\{11,\ 13, 14, 16, 17, 18\}$ b. $\{16\}$ c. $\{11, 13, 17, 18\}$ d. $\{12, 15, 19, 20\}$

6. $(A \cup B) \cap (A' \cup C')$

   a. $\{11, 13, 15, 17\}$ b. $\{14, 15, 16, 17\}$ c. $\{11, 13, 16, 17, 19\}$ d. $\{14, 15, 16, 17, 19\}$

Use a Venn diagram to solve problems 7 – 8.

In a class of 25 students, 18 were Math majors, 12 were Computer Science majors, and 7 were Dual majors in both Math and Computer Science.

7.   How many students were majoring in only Math?

   a.   18   b.   25   c.   23   d.   11

8.   How many students were not Math or Computer Science majors?

   a.   2   b.   0   c.   23   d.   9

For problems 9 – 10, evaluate the expression for the given value of the variable(s).

9. $x^2 + y^2 - 2xy$, when $x = 1$ and $y = -1$

   a.   2   b.   -2   c.   4   d.   0

10. $\dfrac{4\,x^2 - 12}{x+5}$, when $x = -3$

   a.   -24   b.   3   c.   -6   d.   12

For problems 11 – 15, solve the equations.

11. $3(x - 4) + 2 = x + 2(x - 5)$

   a. $x = 0$ b. $x = -\dfrac{10}{3}$ c. $\{x | x \text{ is a real number}\}$ d. No Solution

12. $\dfrac{3}{x-1} + \dfrac{3}{10} = \dfrac{5}{2x-2}$

   a. $x = \dfrac{2}{3}$ b. $x = -\dfrac{2}{3}$ c. $x = \dfrac{52}{3}$ d. $x = -\dfrac{4}{3}$

13. $\dfrac{x-2}{x-4} = \dfrac{2}{x-4}$

    a. $x = 4$ b. $x = 0$ c. $\{x | x \text{ is a real number}\}$ d. No Solution

14. $x^2 + 6x - 5 = 0$

    a. $x = 2, 3$ b. $x = -3 \pm \sqrt{14}$ c. $x = -3 \pm \dfrac{\sqrt{12}}{2}$ d. $x = -1, -5$

15. $5x^2 + 27x = 18$

    a. $x = \dfrac{3}{5}, -6$ b. $x = -\dfrac{3}{5}, 6$ c. $x = -\dfrac{3}{5}, -6$ d. $x = \dfrac{5}{3}, -6$

16. Identify the graph of the following line: $y = \dfrac{1}{2}x - 4$

a.

b.

c.

d.
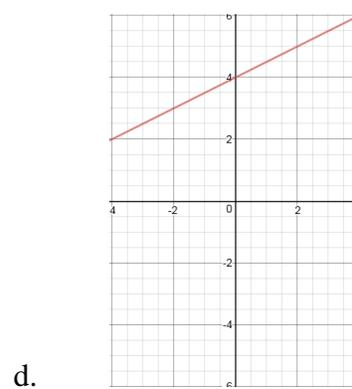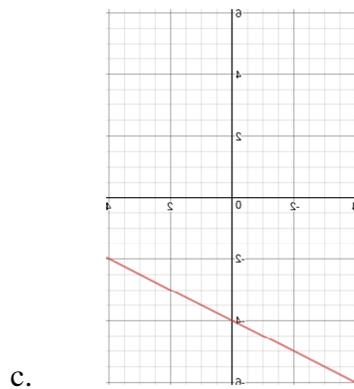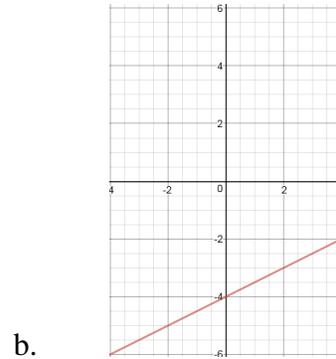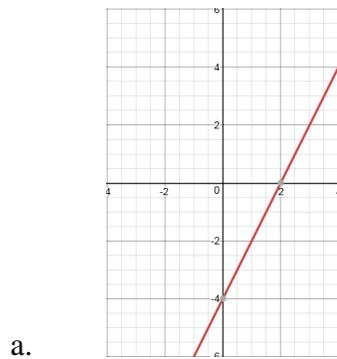
17. Identify the graph of the following parabola: $y = x^2 + 6x + 9$

a.

b.

c.

d.
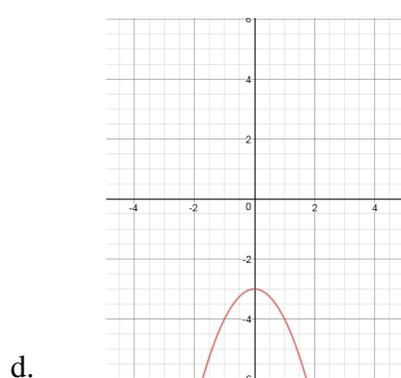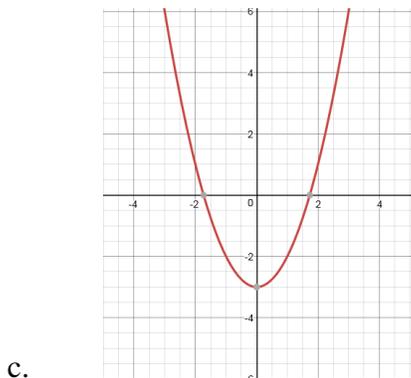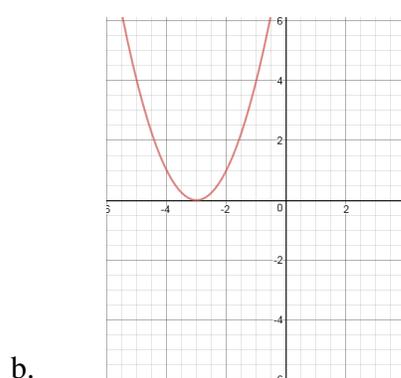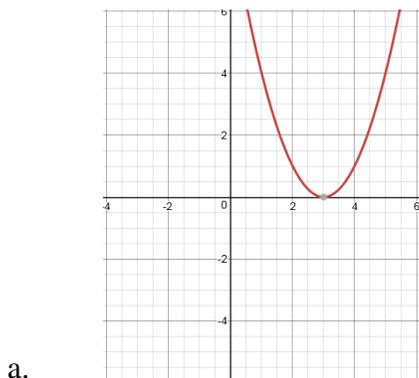
For 18 – 21, solve the application problems.

18. A small beverage company has 832 bottles of water to ship. If there are 6 bottles per case, how many cases are needed and how many bottles will be left over?

    a.   104 cases   b.   138 cases   c.   138 cases   d.   139 cases
          0 left over   2 left over   4 left over   2 left over

19. The wages per hour for three cooks and eight food servers is $65.51. If the cooks receive $2.00 an hour more than the food servers, how much do the cooks make per hour?

    a. $5.41   b. $4.50   c. $6.50   d. $7.41

20. An online vendor that sells boxes of computer paper has a weekly revenue that is given by the function $(x) = 2{,}400x - 60x^2$, where x is the number of boxes sold in hundreds. How many boxes need to be sold to maximize the weekly revenue?

   a.   400 boxes   b.   2400 boxes   c.   40 boxes   d.   20 boxes

21. A house is purchased for $140,000 in January 2004. Assume the function $f(x) = 140\,e^{0.068t}$ models the value of the home. In what year will the home be worth $300,000?

   a.   2015   b.   2011   c.   2116   d.   2020

22. Find the measure of angle y in the figure below.
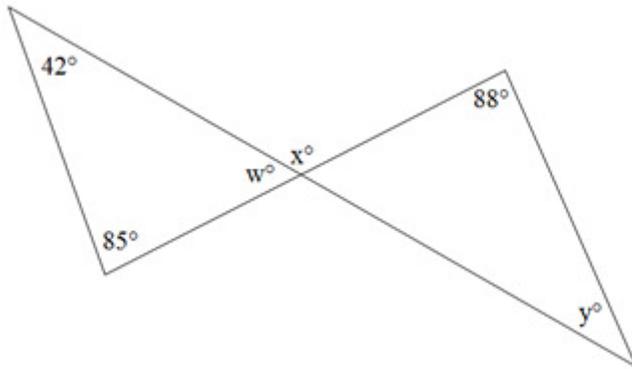
   a.   29°   b.   41°   c.   39°   d.   51°

23. Use the picture below to solve for x.
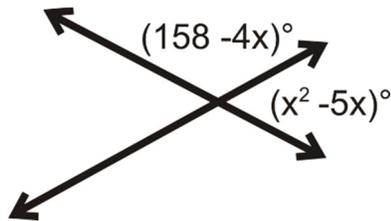
   a. $x = 2°$ b. $x = 11°$ c. $x = 22°$ d. $x = 31°$

24. Use similar triangles to solve for y.
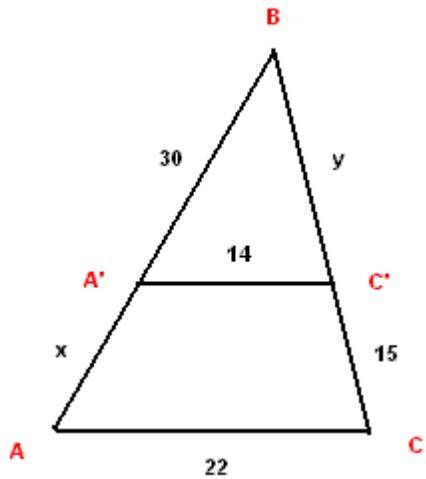
a. $y = 30$ b. $y = 20$ c. $y = 17$ d. $y = 26.25$

25. Find the perimeter of the figure below.
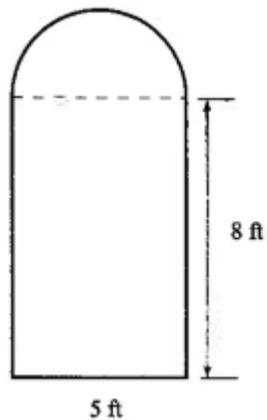
a. $(40 + 6.25\,\pi)ft$ b. $(21 + 2.5\,\pi)ft$ c. $(21 + 5\,\pi)ft$ d. $(26 + 2.5\,\pi)ft$

26. You walk 100 yards due south, then 120 yards due west, and then 30 yards due north. How far are you from your starting point?

a. 250 yds.   b. 76 yds   c. 177 yds   d. 139 yds

27. Find the area of the figure below.

6 yd

2 yd   5 yd

2 yd

12 yd
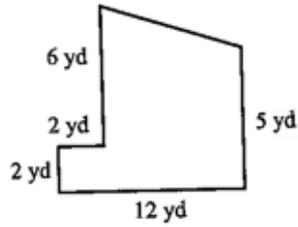
a. $69\ yds^2$ b. $60\ yds^2$ c. $78\ yds^2$ d. $84\ yds^2$

28. A rectangular swimming pool 30 feet long by 15 feet wide is surrounded by a uniform concrete sidewalk 5 feet wide. The pool and surrounding concrete are positioned inside a circular grassy region of diameter 60 feet. Find the area of the grassy region.

sidewalk

pool

grass
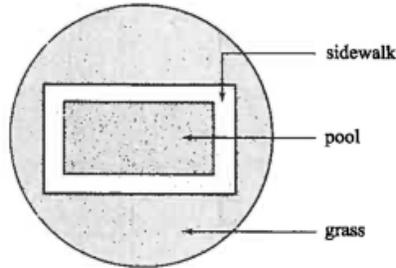
a. $(900\pi - 450)ft^2$ b. $(900\pi - 1000)ft^2$ c. $(120\pi - 700)ft^2$ d. $(3600\pi - 1000)ft^2$

29. Find the volume of the solid pictured below.

14 ft

20 ft

12 ft
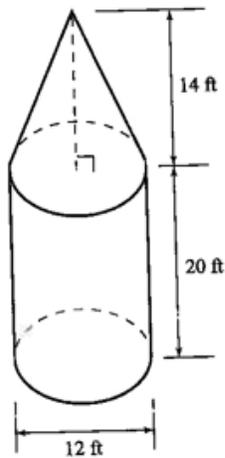
a. $888\pi\ ft^3$ b. $972\pi\ ft^3$ c. $1224\pi\ ft^3$ d. $552\pi\ ft^3$

30. Find the volume of the solid pictured below.
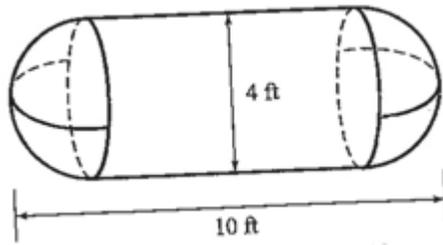
a. $56\pi\ ft^3$ b. $\frac{80}{3}\pi\ ft^3$ c. $28\pi\ ft^3$ d. $\frac{104}{3}\pi\ ft^3$

31. Find the volume of the solid pictured below.
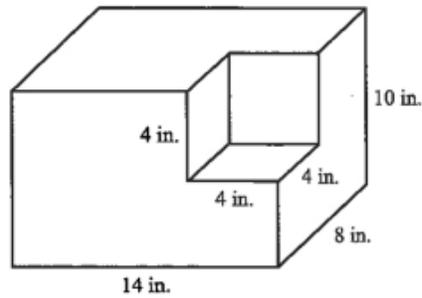
a. $1184\ in^3$ b. $1104\ in^3$ c. $1056\ in^3$ d. $1120\ in^3$

32. Evaluate $_{10}P_6$

a. 210   b. 5040   c. 151,200   d. 3,628,800

33. Evaluate $_7C_5$

a. 5040   b. 2520   c. 42   d. 21

Solve the following application problems:

34.   Shana has 18 contacts in her cell phone. How many ways can she set the first 5 speed-dial contacts?

   a.   8,568   b.   90   c.   1,028,160   d.   51,891,840

35.   A Communication class contains twenty-five students. Five of them will be chosen to give a speech during their next class. In how many different ways can the teacher chose the 5 students if the order they give their speeches in does not matter?

   a.   53,130   b.   3,000   c.   6,375,600   d.   120

36.   John buys one raffle ticket for $5. 1000 total raffle tickets are sold at this price. One $500 prize, one $250 prize, and five $50 prizes will be drawn. What is John's expected value by participating in the raffle?

   a. $0.97   b. $5.93   c.   - $4.00   d. $4.00

37.   There are 20 students waiting in line at registration. Among the twenty are 5 Math majors, 2 Chemistry majors, 6 History majors, 1 Business Major, and 6 English majors. The registrar clerk randomly calls two names. Find the probability that they are both History majors.

   a. $\dfrac{1}{10}$ b. $\dfrac{1}{19}$ c. $\dfrac{9}{100}$ d. $\dfrac{3}{38}$

38.   A magician requests an audience member to pull a card at random from a standard 52-card deck. What is the probability that the card is an Ace, given that it is a Diamond?

   a. $\dfrac{4}{13}$ b. $\dfrac{1}{13}$ c. $\dfrac{1}{52}$ d. $\dfrac{1}{4}$

39.   The average height for a man in the United States is 69.4 inches with a standard deviation of 3.1 inches. The average height for a woman in the United States is 63.8 inches with a standard deviation of 2.8 inches. Steve is 75 inches tall. Sally is 69 inches tall. Who is taller relative to their gender?

   a.   Steve   b.   Sally   c.   Neither   d. Not enough info

40. You are randomly dealt 5 cards from a standard deck of 52 cards. What is the probability that you are dealt a flush (five cards of the same suit)?

    a.   0.05%   b.   5%   c.   1%   d.   0.01%

41. At a popular lunch buffet, there are 3 different appetizers, 6 different main courses, and 4 different desserts. If you select one appetizer, one main course, and one dessert, how many different combinations of meals could you create?

    a.   13   b.   24   c.   72   d.   1440

42. In a group of 30 olympic track athletes, 5 are throwers, 9 are jumpers, and 10 are sprinters, and 6 are long distance runners. If 6 athletes are chosen at random, find the probability that 2 are jumpers and 4 are sprinters.

    a.   1.0%   b.   6.1%   c.   1.3%   d.   13%

43. The scores on a Math test are normally distributed with a standard deviation of 7. If the score that was 3 standard deviations below the mean was 54, what was the mean score on the test?

    a.   57   b.   82   c.   68   d.   75

44. Find the median for the set of data below:

Data:	114	106	202	139
	156	175	170	215

    a.   156   b.   163   c.   170   d.   160

45. For a given data set that is normally distributed, if the mean is 60 and the standard deviation is 4, what data values would represent the range that incorporates 68% of the data?

    a.   56 – 64   b.   52 – 68   c.   41 – 79   d.   48 - 72

46.   The midrange for a group of data is 15. If the lowest value was 6, what was the highest
        value in the data set?

   a.   21   b.   20   c.   24   d.   27

47.   The average age of a CEO is 56 years old with a standard deviation of 4 years. Assume
        that CEO ages are normally distributed. Find the z-score of a CEO who is 48 years old.

   a.   2   b.   -0.5   c.   -2   d.   0.5

48.   The average cost for two people to go to a movie is $22. The standard deviation is $2.
        Assume that the cost is normally distributed. What is the probability that at any given
        theater, the cost will be more than $26 for two people to go to a movie?

   a.   4.56   b.   0.0228   c.   0.0456   d.   2.28

49.   Use the table of z-scores and percentiles to find the area under the standard normal
        distribution between z = 0.50 and z = 1.50.

   a.   62.5%   b.   12.1%   c.   24.1%   d.   31.3%

50.   Which correlation coefficient would most closely indicate a positive linear relationship
        between two data sets?

   a.   -1   b.   1   c.   -0.1   d.   0.1

Answers

1.	C	26.	D
2.	A	27.	A
3.	B	28.	B
4.	A	29.	A
5.	A	30.	D
6.	C	31.	C
7.	D	32.	C
8.	A	33.	D
9.	C	34.	C
10.	D	35.	A
11.	C	36.	C
12.	B	37.	D
13.	D	38.	B
14.	B	39.	B
15.	A	40.	A
16.	B	41.	C
17.	B	42.	C
18.	C	43.	D
19.	D	44.	B
20.	D	45.	A
21.	A	46.	C
22.	C	47.	C
23.	B	48.	B
24.	D	49.	C
25.	B	50.	B