

Given $h(x) = 5x + 2$ and $k(x) = \frac{6}{x-3}$, evaluate the following.

1. $(h-k)(2) = \boxed{18}$

$h(2) = 5 \cdot 2 + 2 = 12$
 $k(2) = \frac{6}{2-3} = \frac{6}{-1} = -6$

2. $h(k(6)) = \boxed{12}$

$12 - 6 = 6$
 $k(6) = \frac{6}{6-3} = \frac{6}{3} = 2$
 $h(2) = 5 \cdot 2 + 2 = 12$

3. $k(h(x)) = \frac{6}{5x-1}$

$k(5x+2) = \frac{6}{5x+2-3} = \frac{6}{5x-1}$

Find the inverse of the given functions, and determine if the inverse is a function.

4. $f(x) = 2x - 7$
 $x = 2y - 7$
 $x + 7 = 2y$
 $\frac{x+7}{2} = y$
 $f^{-1}(x) = \frac{x+7}{2}$

5. $f(x) = x^2 - 3$
 $x = y^2 - 3$
 $x + 3 = y^2$
 $\pm\sqrt{x+3} = y$
 $f^{-1}(x) = \pm\sqrt{x+3}$

Solve the system of equations. Show your work.

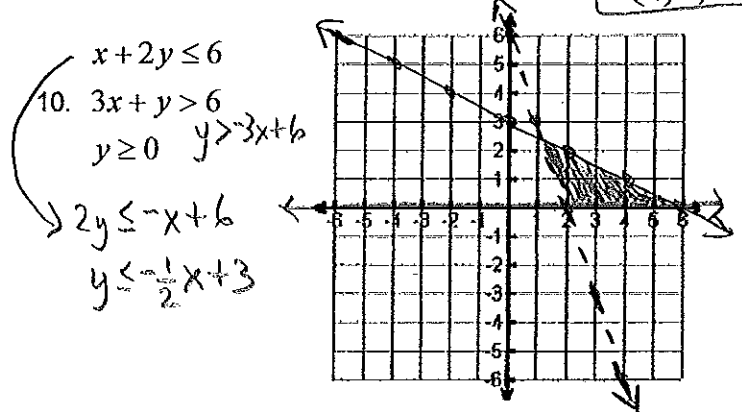
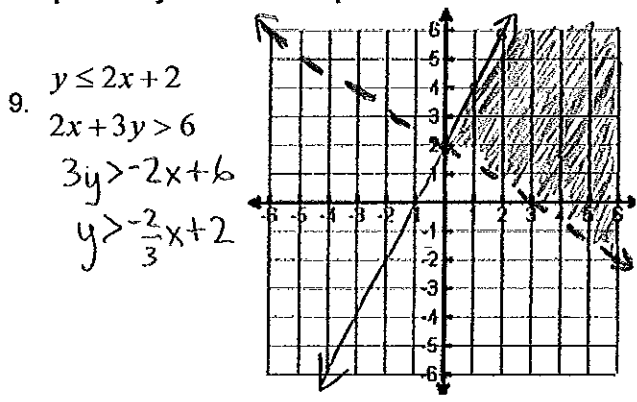
6. $2x + 3y = 7$
 $7x + 6y = 2$
 $\begin{bmatrix} 2 & 3 \\ 7 & 6 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7 \\ 2 \end{bmatrix}$
 $\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 & 3 \\ 7 & 6 \end{bmatrix}^{-1} \cdot \begin{bmatrix} 7 \\ 2 \end{bmatrix} = \begin{bmatrix} -4 \\ 5 \end{bmatrix}$
 $\boxed{(-4, 5)}$

$2x - y + 5z = 24$
 $7. y + 2z = 6$
 $z = 4$
 $\begin{bmatrix} 2 & -1 & 5 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 24 \\ 6 \\ 4 \end{bmatrix}$
 $\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 & -1 & 5 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{bmatrix}^{-1} \cdot \begin{bmatrix} 24 \\ 6 \\ 4 \end{bmatrix} = \begin{bmatrix} 1 \\ -2 \\ 4 \end{bmatrix}$
 $\boxed{(1, -2, 4)}$

8. The sum of three numbers is 21. If the third is subtracted from 3 times the first, the result is 5 less than the second. If twice the first is added to the second, their sum is 7 more than the third. What are the numbers?

$x + y + z = 21$
 $3x - z = y - 5$
 $2x + y = z + 7$
 $x + y + z = 21$
 $3x - y - z = -5$
 $2x + y - z = 7$
 $\begin{bmatrix} 1 & 1 & 1 \\ 3 & -1 & -1 \\ 2 & 1 & -1 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 21 \\ -5 \\ 7 \end{bmatrix}$
 $\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 & 1 & 1 \\ 3 & -1 & -1 \\ 2 & 1 & -1 \end{bmatrix}^{-1} \cdot \begin{bmatrix} 21 \\ -5 \\ 7 \end{bmatrix} = \begin{bmatrix} 4 \\ 8 \\ 9 \end{bmatrix}$
 $\boxed{(4, 8, 9)}$

Graph the systems of inequalities. Shade the solution set.



Find the central tendencies for the following data: 53, 52, 48, 44, 60, 48, 44, 57, 44

11. mean = $\frac{53+52+48+44+60+48+44+57+44}{9} = \boxed{50}$

12. median = $\frac{44, 44, 44, 48, 52, 53, 57, 60}{9} = \boxed{48}$

13. mode = $\boxed{44}$

14. range = $60 - 44 = \boxed{16}$

15. The table shows Ruben's report card for the 3rd Nine Weeks. Which of the following gives the highest value for Ruben's grades?

- A. Mean 86.571
- B. Median 86
- C. Mode 79
- D. Range 97 - 74 = 23

Class	Score
English 3	86
Chemistry	74
Algebra 2	96
US History	79
Art 2	97
Athletics	95
BCIS II	79

Find the mean, median, and standard deviation of the given data set. Round to the nearest tenth.

16. 6, 6, 4, 8, 10, 12, 18, 15, 12, 13

Mean = $\boxed{10.4}$
 Median = $\boxed{11}$
 Std Dev = $\boxed{4.2}$

Determine if the following sets of data are right skewed, left skewed, or normal.

17. 41, 63, 57, 75, 40, 54, 48

mean = 54
 median = 54 $\boxed{\text{Normal}}$

(mean = median \rightarrow Normal
 mean > median \rightarrow right skewed
 mean < median \rightarrow left skewed)

A set of data has a mean of 70 and a standard deviation of 10. Find the z-score of the given values.

$$z = \frac{x - \bar{x}}{\sigma}$$

18. 82

$z = \boxed{1.2}$ $\frac{82 - 70}{10} = \frac{12}{10} = 1.2$

A group of students were asked how long they studied for a particular test. Their answers, along with their scores on the test, are given in the following table.

Munites Studied	0	10	20	30	40	50	60	70	80	90
Test Score	32	60	48	75	60	94	50	83	87	97

19. Calculate the prediction equation for the given data.

$y = \boxed{.55x + 43.84}$

20. Find the correlation coefficient.

$\boxed{.76}$

21. What is the largest residual for the data?

$\boxed{-26.85}$

22. Using the prediction equation, what test score should be expected if the student studies for 40 minutes?

$\boxed{65.84}$

$65.84 - 26.85 = 38.99$, $65.84 + 26.85 = 92.69$ [39, 93]

Match the sampling method with each of the following.

- \boxed{D} 23. A radio station asks listeners to call in to answers questions.
- \boxed{A} 24. A wheel with 30 numbers on it is used to select participants from a group of 30 people.
- \boxed{B} 25. A teacher chooses one student from each row in the classroom.
- \boxed{B} 26. All the boys' names are put in one hat, and all the girls' names are put in another. Three names are drawn from each hat.

- A. Simple Random Sampling
- B. Stratified Random Sampling
- C. Convenience Sampling
- D. Voluntary Participation Sampling

(\boxed{C} A surveyor talks to the first 20 people he sees to ask them questions.)

Calculate.

27) 5!

$5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = \boxed{120}$

28) $\frac{8!}{4!3!}$

$\frac{8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{4 \cdot 3 \cdot 2 \cdot 1} = \boxed{280}$

29) ${}_{12}P_6$

$\frac{12!}{(12-6)!} = \frac{12!}{6!}$
 $= \frac{12 \cdot 11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6!}{6!} = \boxed{665,280}$

30) ${}_{16}C_4$

$\frac{16!}{4!(16-4)!} = \frac{16!}{4!12!}$
 $= \frac{16 \cdot 15 \cdot 14 \cdot 13 \cdot 12!}{4 \cdot 3 \cdot 2 \cdot 1 \cdot 12!} = \boxed{1820}$

31. Find the number of possible outcomes if you toss a coin and roll one dice. $2 \cdot 6 = \boxed{12}$

32. How many ways can the letters of the word FORMAT be arranged? $6! = \boxed{720}$

33. How many ways can the letters of the word FOOLPROOF be arranged? $\frac{9!}{4!2!} = \boxed{7560}$

34. You are to select a president and vice-president from a group of 25 students. How many ways can it be done?

$${}_{25}P_2 = 25 \cdot 24 = \boxed{600}$$

35. How many ways can a five person committee be made from a group of 16 people?

$${}_{16}C_5 = \frac{16!}{5!11!} = \frac{16 \cdot 15 \cdot 14 \cdot 13 \cdot 12}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = \boxed{4368}$$

Given set A = {1, 2, 3, 4, 5, 6} and set B = {5, 6, 7, 8, 9}, find:

36) $A \cap B$

$$\boxed{\{5, 6\}}$$

37) $A \cup B$

$$\boxed{\{1, 2, 3, 4, 5, 6, 7, 8, 9\}}$$

A jar contains 15 pennies, 12 nickels, 8 dimes, and 10 quarters. Two coins are selected at random, without replacement. Find the probability of the following.

38. P(2 pennies)

$$\frac{15}{45} \cdot \frac{14}{44} = \boxed{\frac{7}{66}}$$

39. P(a nickel, then a dime)

$$\frac{12}{45} \cdot \frac{8}{44} = \boxed{\frac{8}{165}}$$

40. P(2 quarters)

$$\frac{10}{45} \cdot \frac{9}{44} = \boxed{\frac{1}{22}}$$

41. P(a dime and a quarter, in either order)

$$\frac{8}{45} \cdot \frac{10}{44} + \frac{10}{45} \cdot \frac{8}{44} = \boxed{\frac{8}{99}}$$

Find the odds of an event happening, given the probability of the event.

42. $\frac{14}{15}$

$$\boxed{14:1}$$

43. $\frac{6}{13}$

$$\boxed{6:7}$$

Solve. Round answers to 3 decimal places.

$$P(x) = {}_n C_x \cdot p^x \cdot (1-p)^{n-x}$$

44. A multiple choice quiz has 10 questions, with each question having one correct answer in the four choices. What is the probability of guessing correctly on 6 questions?

$$P(6) = {}_{10}C_6 \cdot \left(\frac{1}{4}\right)^6 \cdot \left(\frac{3}{4}\right)^4 = \boxed{.016}$$

45. A die is rolled 4 times. What is the probability of getting at least three threes?

$$P(3) + P(4) = {}_4C_3 \cdot \left(\frac{1}{6}\right)^3 \cdot \left(\frac{5}{6}\right)^1 + {}_4C_4 \cdot \left(\frac{1}{6}\right)^4 \cdot \left(\frac{5}{6}\right)^0 = \boxed{.016}$$

.01543 + .00077