Clark County School District

K–12 Mathematics

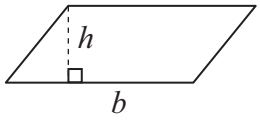
High School Practice Proficiency Examination Fall 2010

Curriculum and Professional Development Division
Southern Nevada Regional Professional Development Program

Formula Sheet

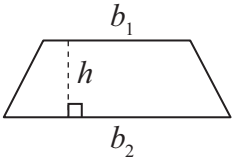
Note to Student: You may use these formulas throughout this entire test. Feel free to use this Formula Sheet as needed during your testing time.

Parallelogram



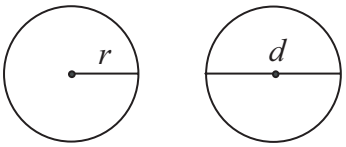
Area $A = bh$

Trapezoid



Area $A = \frac{1}{2}h(b_1 + b_2)$

Circle

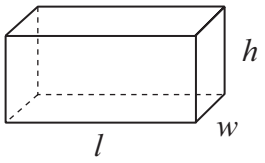


Circumference $C = 2\pi r$

$C = \pi d$

Area $A = \pi r^2$

Rectangular Solid

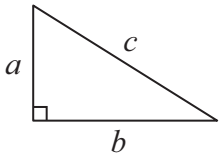


Volume $V = lwh$

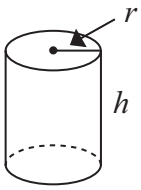
Surface Area $SA = 2lw + 2lh + 2hw$

Pythagorean Theorem

$a^2 + b^2 = c^2$

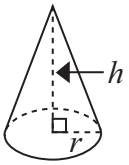


Cylinder



Volume $V = \pi r^2 h$

Cone



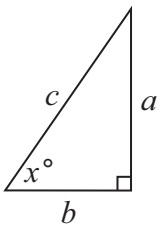
Volume $V = \frac{1}{3}\pi r^2 h$

Trigonometric Ratios

$\sin x = \frac{a}{c}$

$\cos x = \frac{b}{c}$

$\tan x = \frac{a}{b}$



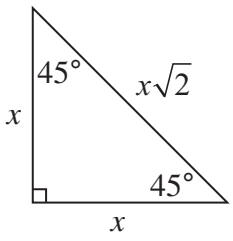
Permutations

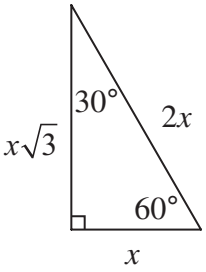
$${}_n\mathrm{P}_k = \frac{n!}{(n-k)!}$$

Combinations

$${}_n\mathrm{C}_k = \frac{n!}{k!(n-k)!}$$

Special Right Triangles





Temperature Formulas

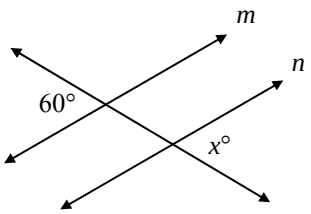
$$°\mathrm{F} = \frac{9}{5}\mathrm{C} + 32$$

$$°\mathrm{C} = \frac{5}{9}(\mathrm{F} - 32)$$

CCSD Practice Proficiency Exam

Fall 2010

1. In the diagram below, line *m* is parallel to line *n*.



What is the value of *x*?

A. 30

B. 60

C. 120

D. 150

2. The first five terms of a sequence are shown below.

1 3 5 7 9

What is the 11th term of the sequence?

A. 10

B. 11

C. 20

D. 21

3. The table below shows the numbers of snacks sold at a concession stand during two different games.

	Basketball Game		**Football Game**	
Item	**Small**	**Large**	**Small**	**Large**
Popcorn	24	14	62	51
Nachos	18	11	28	19
Soda	31	27	54	65

How many small sodas were sold altogether?

A. 23

B. 31

C. 54

D. 85

4. Brock borrows $2,000 from his father and repays the money after 2 years, plus 5% simple interest. How much interest does Brock pay on the loan?

A. $100

B. $200

C. $1,000

D. $2,000

5. Multiply.

$$\mathbf{3}\begin{bmatrix} \mathbf{5} & \mathbf{-2} \\ \mathbf{-1} & \mathbf{0} \end{bmatrix}$$

A. $\begin{bmatrix} 15 & -6 \\ -3 & 0 \end{bmatrix}$

B. $\begin{bmatrix} 15 & -2 \\ -3 & 0 \end{bmatrix}$

C. $\begin{bmatrix} 15 & -6 \\ -1 & 0 \end{bmatrix}$

D. $\begin{bmatrix} 15 & 6 \\ 3 & 0 \end{bmatrix}$

6. A four-character password consists of one letter from the word MATH, followed by three digits which may be 1, 2, or 3. If the digits may be used more than once, how many **more** passwords can be made than if the numbers are used only once?

A. 12

B. 24

C. 84

D. 108

7. An inequality is shown below.

$$\mathbf{3}x - \mathbf{8} \geq \mathbf{13}$$

What is the solution of the inequality?

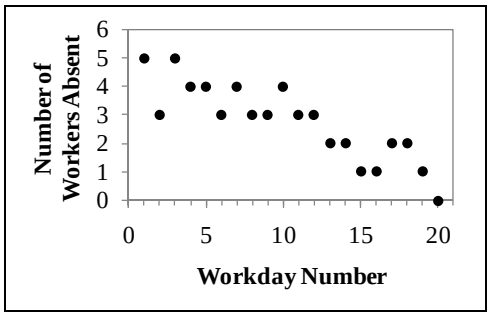
A. $x \geq 18$

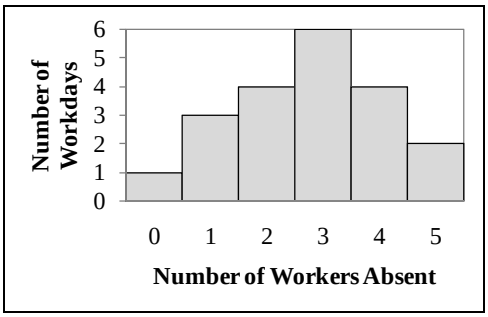
B. $x \geq 15$

C. $x \geq 7$

D. $x \geq \frac{5}{3}$

8. A large company charted employee absences for the past month (20 workdays). The company represented the data in a scatterplot and a histogram. The charts are shown below.





What fact is obvious from the scatterplot that is not obvious from the histogram?

A. A typical employee was absent an average of 3 days this month.

B. More workers were absent early in this month than late in the month.

C. On most days this month, there were 2 to 4 workers absent.

D. Next month, fewer than 2 workers will probably be absent on any given day.

9. The weight (w) of a package is measured in ounces. Each package must be in the range below.

$$\mathbf{14.20 < w < 14.30}$$

What is the tolerance for the weight of the package?

A. 14.20 ± 0.05 oz

B. 14.20 ± 0.10 oz

C. 14.25 ± 0.05 oz

D. 14.25 ± 0.10 oz

10. Two linear equations are given below.

$$\textbf{Equation 1: } 2x - y = 3$$

$$\textbf{Equation 2: } 4x + 3y = 21$$

For which equation(s) is the point $(3, 3)$ a solution?

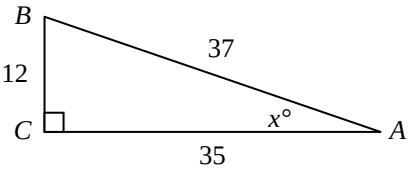
A. Equation 1 only.

B. Equation 2 only.

C. Both equations 1 and 2.

D. Neither equation 1 nor 2.

11. Look at the diagram below.



What is $\sin x°$?

A. $\frac{12}{35}$

B. $\frac{12}{37}$

C. $\frac{35}{37}$

D. $\frac{37}{12}$

12. Five numbers are shown below.

$$\mathbf{30 \quad 50 \quad \sqrt{30} \quad \sqrt{50} \quad 7^2}$$

Which is a true statement about the numbers?

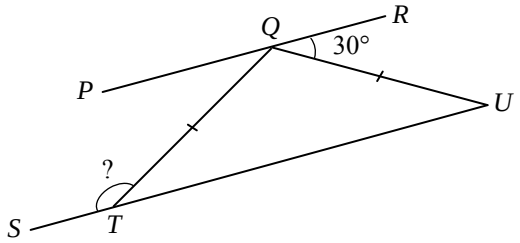
A. $50 - \sqrt{30} < 7^2$

B. $50 + \sqrt{30} < 7^2$

C. $\sqrt{50} - 30 > 7^2$

D. $\sqrt{50} + 30 > 7^2$

13. In the diagram below, $\overline{PR}$ is parallel to $\overline{SU}$, and $\overline{QT}$ is congruent to $\overline{QU}$.



What is the measure of $\angle STQ$?

A. 30°

B. 120°

C. 150°

D. 165°

14. You buy a lawn mower for $280. You charge $20 to mow a lawn. How many lawns will you have to mow to pay for the lawn mower plus show a profit of $60?

A. 3 lawns

B. 11 lawns

C. 14 lawns

D. 17 lawns

15. A donut display case has 6 glazed, 3 chocolate, and 3 sugar donuts. A customer randomly selects 3 donuts, without replacement. What is the probability of choosing 2 glazed donuts and 1 sugar donut?

A. $\frac{6}{12}\cdot\frac{6}{12}\cdot\frac{3}{12}$

B. $\frac{6}{12}\cdot\frac{6}{11}\cdot\frac{6}{10}$

C. $\frac{6}{12}\cdot\frac{5}{12}\cdot\frac{3}{12}$

D. $\frac{6}{12}\cdot\frac{5}{11}\cdot\frac{3}{10}$

16. The ratio of the length (L) to width (w) of a certain building is equal to the ratio of the height (h) to girth (g) of a man. Which equation represents the man's height?

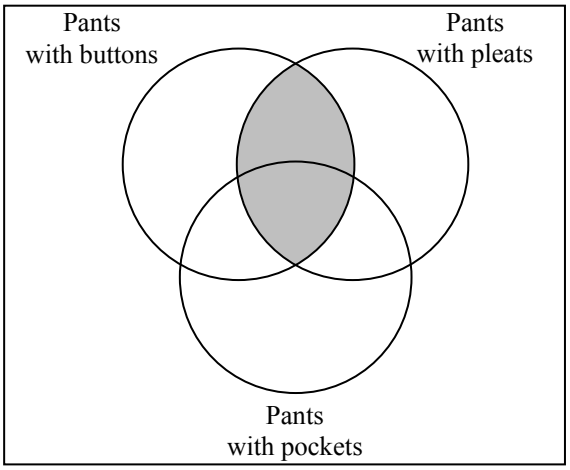
A. $h = g\left(\frac{L}{w}\right)$

B. $h = g\left(\frac{w}{L}\right)$

C. $h = \frac{1}{g}\left(\frac{L}{w}\right)$

D. $h = \frac{1}{g}\left(\frac{w}{L}\right)$

17. The Venn diagram below represents pants with different characteristics.



What is represented by the shaded region?

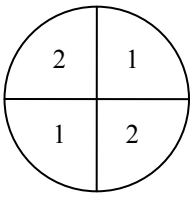
A. Pants with pockets, buttons, and pleats.

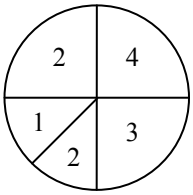
B. Pants with pockets and buttons, but without pleats.

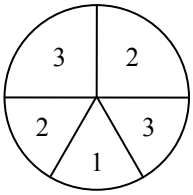
C. Pants with buttons and pleats; some pants may have pockets.

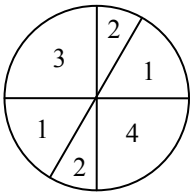
D. Pants with pockets and buttons; some pants may have pleats.

18. Which spinner, when spun once, has the highest probability of landing on the numeral 1?

A. 

B. 

C. 

D. 

19. Factor.

$$x^2 - 64$$

A. $(x-1)(x+64)$

B. $(x-4)(x+16)$

C. $(x-8)(x+8)$

D. $(x-8)^2$

20. Which is the **best** approximation of $\sqrt[3]{65}$?

A. 4.0

B. 4.5

C. 8.0

D. 8.5

21. Which is the most precise measurement?

A. 1.54 kilometers

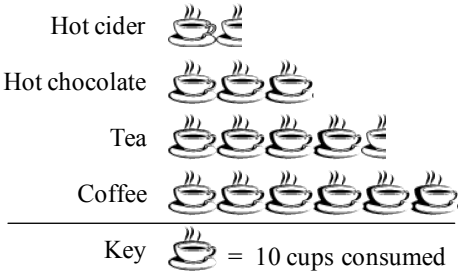
B. 1.54 meters

C. 1.54 centimeters

D. 1.54 millimeters

22. The pictograph below shows the number of hot beverages consumed at a restaurant.

Hot Beverage Consumption



How many more cups of coffee than cups of hot cider were consumed?

A. 15

B. 40

C. 45

D. 60

23. Use the functions below.

$$f(x) = -2x$$
$$g(x) = x^2$$

Which elements are in the range of *f* and also in the range of *g*?

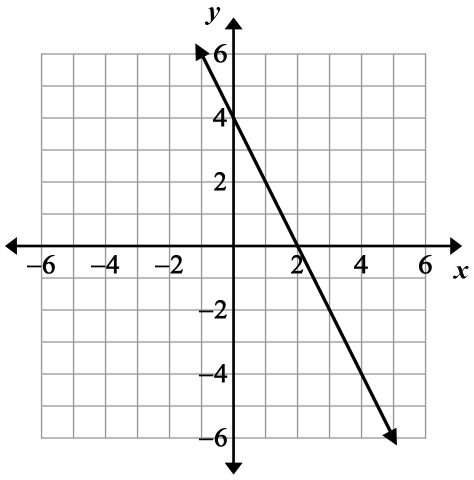
A. All real numbers

B. All positive real numbers

C. All negative real numbers

D. No real numbers

24. Look at the graph below.



What is the slope of the line?

A. –2

B. $-\frac{1}{2}$

C. $\frac{1}{2}$

D. 2

25. The figures shown below are constructed from toothpicks.

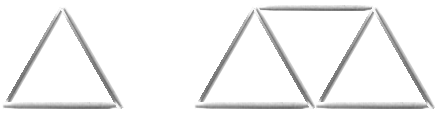


Figure 1 Figure 2

Figure 3

Which expression represents the number of toothpicks in Figure *n*?

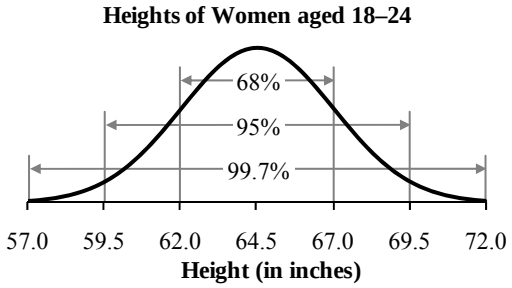
A. $3n$

B. $n+6$

C. $2n-1$

D. $4n-1$

26. The heights of women aged 18–24 years can be described with a normal distribution. A graph of the distribution is shown below.



Based on the graph, which statement is correct?

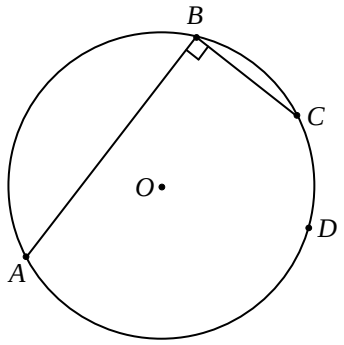
A. There are more women in this age group taller than 69.5 inches than there are shorter than 59.5 inches.

B. Most women who are older than 24 years are taller than 72 inches.

C. Less than one-third of the women in this age group are taller than 64.5 inches.

D. There are about as many women in this age group shorter than 62 inches as there are taller than 67 inches.

27. Look at the figure below.



What is the measure of $\overset{\frown}{ADC}$?

A. 45°

B. 90°

C. 180°

D. 360°

28. A class has 25 students. The teacher randomly chooses 3 students to form a line. If the order of selection is important, how many different lines could be created?

    A. $25!(3!)$

    B. $\frac{25!}{(25-3)!}$

    C. $\frac{25!}{3!(25-3)!}$

    D. $25!$

29. The table below shows Jeremy's monthly expenses.

Monthly Expense	Percent of Monthly Income
Food and Clothing	22%
Housing and Utilities	33%
Transportation	13%
Health & Personal Care	6%
Savings	9%
Miscellaneous	17%

    Jeremy earned $4,500 last month. How much did he pay for transportation?

    A. $163

    B. $180

    C. $346

    D. $585

30. A polynomial is shown below.

$$x^2 - 12x + N$$

    What value of *N* makes the polynomial a perfect trinomial square?

    A. –6

    B. –36

    C. 6

    D. 36

31. What is the measure of an exterior angle of a regular octagon?

    A. 22.5°

    B. 45°

    C. 90°

    D. 135°

32. The data below are the player ratings of 11 members of a golf team.

6	**8**	**13**	**15**	**15**	**20**
21	**22**	**23**	**29**	**34**	

    What is the interquartile range of the ratings?

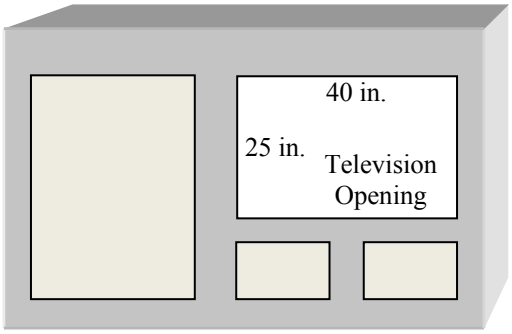
    A. 10

    B. 14

    C. 20

    D. 28

33. The entertainment center shown below has a 25-inch by 40-inch opening for a television.



    A television is measured by the length of its diagonal. Which is the largest television set that would fit in the opening?

    A. 36 inches

    B. 42 inches

    C. 50 inches

    D. 65 inches

34. The table below shows favorite foods of students in three different classes.

	Burritos	**Hamburgers**	**Pizza**
Class 1	6	9	10
Class 2	7	9	13
Class 3	11	10	9

Which matrix represents the total number of students who favor burritos, hamburgers, and pizzas?

A. $\begin{bmatrix}25 & 29 & 30\end{bmatrix}$

B. $\begin{bmatrix}32 & 28 & 24\end{bmatrix}$

C. $\begin{bmatrix}10 & 13 & 9\end{bmatrix}$

D. $\begin{bmatrix}24 & 28 & 32\end{bmatrix}$

35. Use the absolute value function below.

$$y = |x - 1| - 2$$

What is the range of the function?

A. $y \geq 0$

B. $y \geq 2$

C. $y \geq -1$

D. $y \geq -2$

36. A student scored 98, 84, and 90 on three exams this semester. There is one exam remaining. What score does the student need to achieve on the last exam to have an overall mean of 88 on his exams?

A. 80

B. 89

C. 90

D. 91

37. What property is demonstrated by $(3 + 10x) + 4x = 3 + (10x + 4x)$?

A. associative

B. commutative

C. distributive

D. identity

38. Two jobs offer different pay packages.

- Job A pays an annual salary of \$38,000 plus a commission of 3% of sales (s).
- Job B pays an annual salary of \$43,000 plus a commission of 1% of sales (s).

What system of equations would be used to find the amount of sales that makes the pay (P) for Job A equal to Job B?

A. $\begin{aligned} P &= 38000 + 0.01s \\ P &= 43000 + 0.03s \end{aligned}$

B. $\begin{aligned} P &= 38000 + 0.03s \\ P &= 43000 + 0.01s \end{aligned}$

C. $\begin{aligned} s &= 38000 + 0.01P \\ s &= 43000 + 0.03P \end{aligned}$

D. $\begin{aligned} P &= 38000 + 43000 \\ s &= 0.03 + 0.01 \end{aligned}$

39. Swimming pools X and Y are similar rectangular prisms. The ratio of the surface area of Pool X to Pool Y is 4:9. What is the capacity of Pool X in terms of the capacity of Pool Y?

A. $X = \frac{8}{27}Y$

B. $X = \frac{27}{8}Y$

C. $X = \frac{4}{9}Y$

D. $X = \frac{9}{4}Y$

40. There are 10 cats in a pet show. A group of 3 cats will be selected as finalists. How many different groups of cats could be finalists?

A. 13

B. 30

C. 120

D. 720