

CASIO EDUCATION

SUPPORT MATERIALS



PRAIRIE STATE ACHIEVEMENT EXAM

PLAN[®] TEST
SAMPLE QUESTIONS



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**PUT VALUE BACK
IN THE EQUATION.**



AFFORDABILITY



FUNCTIONALITY



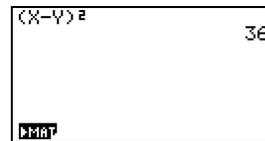
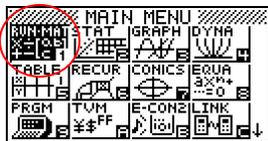
SUPPORT

The following are sample items from the Illinois Explorer and Plan exam. More sample items can be found at <http://actstudent.org/plan/pdf/sample.pdf>.

1. What is the value of the expression $(x - y)^2$ when $x = 5$ and $y = 1$?
- A. 4
 - B. 6
 - C. 16
 - D. 24
 - E. 36

Students should be able to substitute and evaluate numerical values into expressions. The *fx-9750GII* has the ability to assist students with assigning numerical values to variables used in expressions. The objective is to store numerical values into variables x and y , then type in the desired expression.

- Select the RUN icon from the icon menu system.
- Enter $\boxed{5} \rightarrow \boxed{X, \theta, T} \boxed{EXE}$ to store $x = 5$ and $\boxed{-} \boxed{1} \rightarrow \boxed{ALPHA} \boxed{-} \boxed{EXE}$ to store $y = 1$.
- Enter $\boxed{(} \boxed{X, \theta, T} \boxed{-} \boxed{ALPHA} \boxed{-} \boxed{)} \boxed{x^2} \boxed{EXE}$ to evaluate the expression $(x - y)^2$.

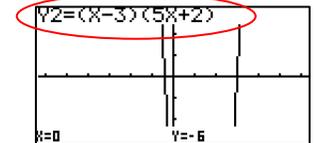
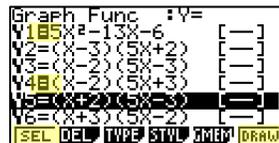


Correct Answer: E.

2. Which of the following is a factored form of the expression $5x^2 - 13x - 6$?
- A. $(x - 3)(5x + 2)$
 - B. $(x - 2)(5x - 3)$
 - C. $(x - 2)(5x + 3)$
 - D. $(x + 2)(5x - 3)$
 - E. $(x + 3)(5x - 2)$

Students should realize that polynomials are invariant under factorization. This realization allows the *fx-9750GII* to assist students in visualizing all expressions as their graphical representations. The objective is to graph each expression as a function to determine which is identical to the original expression.

- Select the GRAPH icon from the icon menu system.
- Type the original expression into **Y1:** and the products into **Y2:** through **Y5:**
- Use **F1** (SEL) to systematically choose the original expression and one of the possible products.
- Use **F6** (DRAW) to produce each graph.
- Continue the process of comparing the graph of the original expression and each possible response until the original expression and the product are identical.

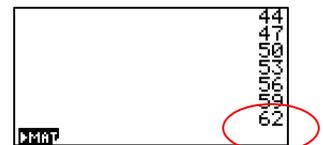
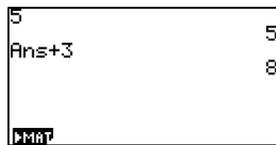
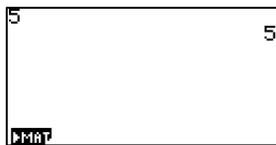


Correct Answer: **A**, because the graph of $5x^2 - 13x - 6$ and $(x - 3)(5x + 2)$ are identical; $(x - 3)(5x + 2)$ must be the complete factorization of $5x^2 - 13x - 6$.

3. On the first day of school, Mr. Vilani gave his third grade students 5 new words to spell. On each day of school after that, he gave the students 3 new words to spell. In the first 20 days of school, how many new words had he given the students to spell?
- A. 28
 B. 62
 C. 65
 D. 68
 E. 152

The answer memory capability of the *fx-9750GII* allows students to use the results of one calculation as the argument in the next calculation. In this case, we have a starting value of 5 that increases by an increment of 3.

- Select the RUN icon from the icon menu system.
- Enter the starting value of **5** and press **EXE** to calculate the first day.
- Press **+ 3 EXE** to calculate the second day.
- Continue to press **EXE** while counting the number of presses until 20 is reached. The total number of new words will be displayed on screen.



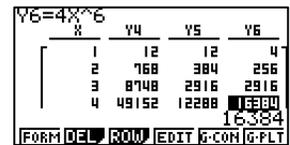
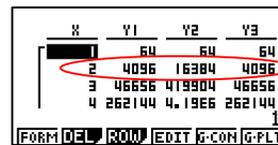
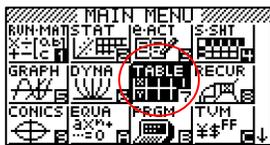
Correct Answer: **B**.

4. Which of the following is equivalent to $(4x^2)^3$?

- A) $64x^8$
- B) $64x^6$
- C) $12x^6$
- D) $12x^5$
- E) $4x^6$

The *fx-9750GII* has the functionality to assist students in accessing the numerical or tabular representation of functions. The objective is to create a table of values for each answer choice then determine which output is identical to the output in the question.

- Select the TABLE icon from the icon menu system.
- Enter the given expression and all possible responses in Y1: through Y6:
- Select **F6** (TABL) to display results.
- Use the values in the x-column to identify possible responses in Y2: through Y6: that match the values in Y1: use     to navigate.
- Carefully read the results in each column of the table to identify the correct function.



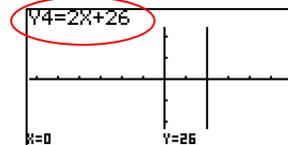
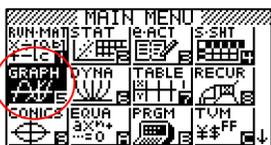
Correct Answer: B.

5. Which of the following is an equivalent simplified expression for $2(4x + 7) - 3(2x - 4)$?

- A) $x + 2$
- B) $2x + 2$
- C) $2x + 26$
- D) $3x + 10$
- E) $3x + 11$

The distributive property is typically applied in this situation. Alternatively, students should realize that a product is equivalent to its factored form. This realization allows the *fx-9750GII* to assist students in visualizing all expressions as their graphical representations. The objective is to graph each expression as a function to determine which is identical to the original expression.

- Select the GRAPH icon from the icon menu system.
- Enter the original expression into **Y1:** and the products into **Y2:** through **Y6:**
- Use **F1** (SEL) to systematically choose the original expression and one of the possible products.
- Use **F6** (DRAW) to produce each graph
- Use **SHIFT F2** (ZOOM) **F4 EXE** (OUT) to properly see each graph.
- Continue the process of comparing the graph of the original expression and each possible response until the original expression and the product match.

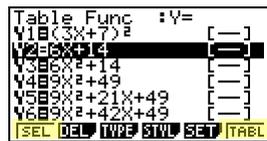


Correct Answer: C.

6. For all x , $(3x+7)^2$?
- A) $6x+14$
 - B) $6x^2+14$
 - C) $9x^2+49$
 - D) $9x^2+21x+49$
 - E) $9x^2+42x+49$

The *fx-9750GII* has the functionality to assist students in accessing the numerical or tabular representation of functions. The objective is to create a table of values for each answer choice and determine which output is identical to the output in the given expression.

- Select the TABLE icon from the icon menu system.
- Enter the given expression and all possible responses in to **Y1:** through **Y6:** and select **[F6]** (TABL) to display results.
- Use the values in the x -column to identify those possible responses in **Y2:** through **Y6:** that match the values in **Y1:** Use the \leftarrow \rightarrow \uparrow \downarrow to navigate.
- Carefully read the results in each column of the table to identify the correct function.



X	Y1	Y2	Y3
1	100	20	20
2	169	26	38
3	256	32	68
4	361	38	110

X	Y4	Y5	Y6
1	58	78	100
2	85	127	169
3	130	193	256
4	193	277	361

Correct Answer: **E**.

7. What is the slope of the line that passes through $(-5,2)$ and $(6,7)$?

- A) 9
- B) 5
- C) -5
- D) $\frac{5}{11}$
- E) $-\frac{5}{11}$

Deriving the equation of a line in slope-intercept form can be accomplished by performing a regression on the two given coordinates. The linear regression between two points will always correlate perfectly using the *fx-9750GII*.

- Select the STATISTICS icon from the icon menu system.
- Enter the points into List 1 and List 2 accordingly.
- Press **F2** (CALC), **F3** (REG), then **F1** (X) for linear regression.
- Carefully read the results of the computation.
- Use the RUN mode to convert answer choice D and E into decimal form.

	List 1	List 2	List 3	List 4
SUB				
1	-5	2		
2	6	7		
3				
4				

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	List 1	List 2	List 3	List 4
SUB				
1	-5	2		
2	6	7		
3				
4				

1VAR 2VAR REG

	List 1	List 2	List 3	List 4
SUB				
1	-5	2		
2	6	7		
3				
4				

X Med X^2 X^3 X^4

LinearReg(ax+b)	
a	=0.45454545
b	=4.27272727
r	=1
r ²	=1
MSe	=
y=ax+b	

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Correct answer: D, because $\frac{5}{11}$ is equivalent to 0.4545.

8. When $\frac{1}{3}k + \frac{1}{4}k = 1$, what is the value of k ?

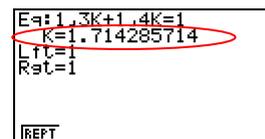
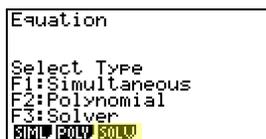
- A) $\frac{1}{7}$
- B) $\frac{12}{7}$
- C) $\frac{7}{2}$
- D) 6
- E) 12

The *fx-9750GII* has an equation mode that allows equations to be entered as they appear in textbooks or quizzes and exams; any variable may be solved for. This mode produces one solution at a time, based on an initial estimate for the solution.

- Select the EQUATION icon from the icon menu system.
- Press **F3** to access the SOLVER functionality.
- To input the equation, enter the following:

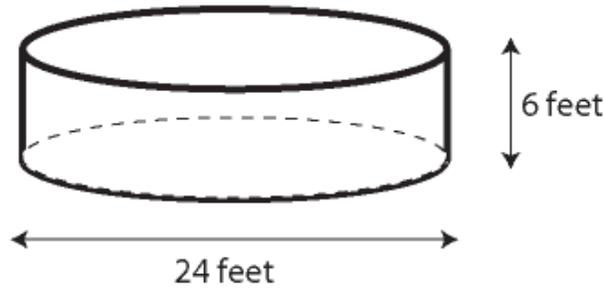
1 **$\frac{\square}{\square}$** **3** **ALPHA** **,** **+** **1** **$\frac{\square}{\square}$** **4** **ALPHA** **,** **SHIFT** **.** **1** **EXE**

- Use **▲** **▼** to highlight $k = 0$ and press **F6** (SOLV).



Correct Answer: **B**. Notice that the decimal form of the other responses are not reasonable.

9. The youth center has installed a swimming pool on level ground. The pool is a right circular cylinder with a diameter of 24 feet and a height of 6 feet. A diagram of the pool is shown below?



To the nearest cubic foot, what is the volume of water that will be in the pool when it is filled with water to a depth of 5 feet?

(Note: The volume of a cylinder is given by $V = \pi r^2 h$, where r is the radius and h is the height.)

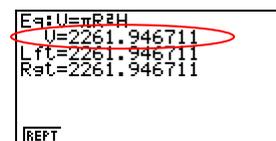
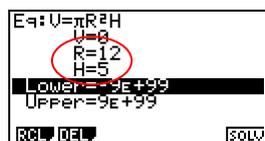
- A) 942
- B) 1,885
- C) 2,262
- D) 9,047
- E) 11,310

The fx-9750GII has an equation mode that allows literal equations and formulas to be entered as they appear in textbooks or on quizzes and exams; any variable may be solved for. This mode produces one solution at a time for one unknown variable, when values are assigned to all other variables.

- Select the EQUATION icon from the icon menu system.
- Press **F3** to access the SOLVER functionality
- Input the formula for the volume of a circular cylinder $V = \pi r^2 h$ by entering:



- Use **▲** **▼** to highlight $V = 0$ and press **F6** (SOLV).



Correct Answer: C.

10. What is the median of the following 7 scores?

42, 67, 33, 79, 33, 89, 21

- A) 42
- B) 52
- C) 54.5
- D) 56
- E) 79

The *fx-9750GII* can be used to calculate central tendency statistics like mean, mode, and median. Entering data into a list and accessing the appropriate functions will accomplish this.

- Select the STATISTICS icon from the icon menu system.
- Enter the data **List 1**, pressing **EXE** after each entry.
- Press **F2** (CALC) then **F1** (1VAR).
- Use **▲** **▼** to scroll through the available statistical data.

	List 1	List 2	List 3	List 4
SUB				
1	42			
2	67			
3	33			
4	79			

	List 1	List 2	List 3	List 4
SUB				
4	79			
5	33			
6	89			
7	21			

1-Variable	
\bar{x}	=52
Σx	=364
Σx^2	=23034
σx	=24.2192367
sx	=26.1597655
n	=7

1-Variable	
minX	=21
Q1	=33
Med	=42
Q3	=79
maxX	=89
Mod	=33

Correct Answer: **A**.