Solving Math Problems by Using

CASIO FX-CG50 CALCULATOR

ACT-TEST

Casio Middle East - GAKUHAN

The **ACT** (originally the American College Test) is standardized tests accepted by most colleges and universities for admissions purposes. The exam has a multiple-choice section covering math, English, reading, and science.

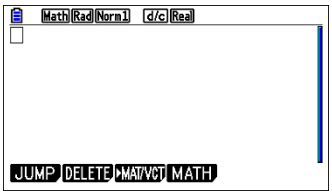
ACT Mathematics Test: 60 questions related to high school mathematics.

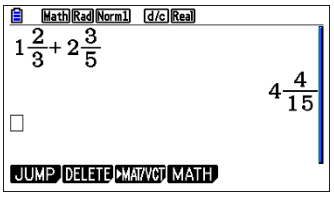
Topics covered include Algebra, Geometry, Statistics, Modeling, Functions, and more. Students can use an approved calculator, Total time: 60 minutes.

1. Mary walked $1\frac{2}{3}$ miles on Wednesday and $2\frac{3}{5}$ miles on Thursday. What was the total distance, in miles, Shannon walked during those 2 days?

A. $3\frac{5}{8}$ B. $3\frac{2}{5}$ C. $4\frac{4}{15}$ D. $4\frac{1}{3}$ E. $5\frac{1}{3}$

To find the total distance in miles that Shannon walked, add the $1\frac{2}{3}$ and $2\frac{3}{5}$ together.

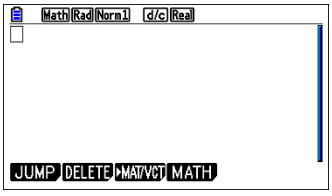


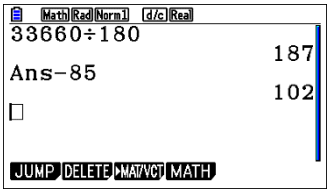


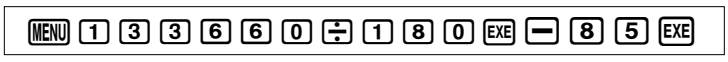
2. Mr. Wilk is a high school math teacher whose salary is $33,660 for this school year, which has 180 days. In Mr. Wilk's school district, substitute teachers are paid $85 per day. If Mr. Wilk takes a day off without pay and a substitute teacher is paid to teach his classes, how much less does the school district pay in salary by paying a substitute teacher instead of Mr. Wilk for that day?

A. 57$ B. 85$ C. 102$ D. 114$ E. 187$

To find Mr. Wilk's pay per day, divide his annual salary, $33,660, by the total number of days he works.



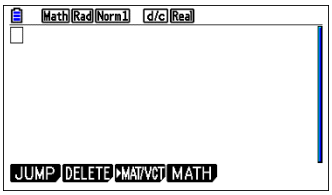


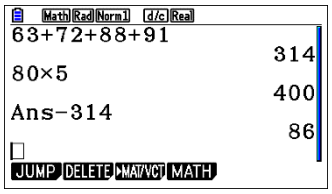


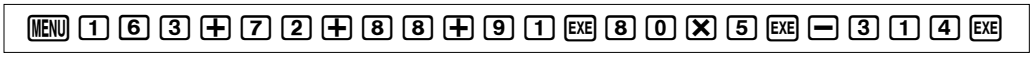
3. A student has earned the following scores on four 100-point tests this marking period: 63, 72, 88, and 91. What score must the student earn on the fifth and final 100-point test of the marking period to earn an average test grade of 80 for the five tests?

A. 79 B. 86 C. 89 D. 94 E. *Can't earn an average of* 80

To find the score on the fifth 100-point test that will yield an average score of 80, the total score of all 5 tests must be 80×5.



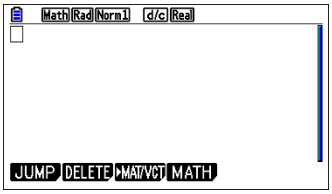


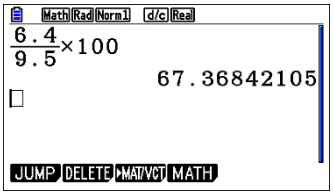


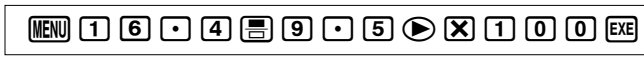
4. The oxygen saturation of a lake is found by dividing the amount of dissolved oxygen the lake water currently has per liter by the dissolved oxygen capacity per liter of the water, and then converting that number into a percent. If the lake currently has 6.4 milligrams of dissolved oxygen per liter of water and the dissolved oxygen capacity is 9.5 milligrams per liter, what is the oxygen saturation level of the lake, to the nearest percent?

A. 64% B. 67% C. 70% D. 89% E. 95%

To find the oxygen saturation level, divide the current number of milligrams per liter by the capacity milligrams per liter then convert the result into a percent.



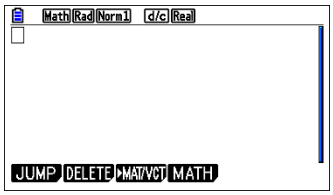


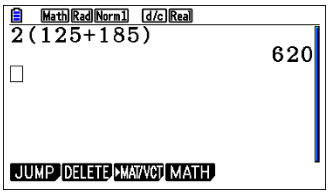


5. A rectangular lot that measures 125 feet by 185 feet is completely fenced. What is the length, in feet, of the fence?

A. 310 B. 435 C. 620 D. 740 E. 1240

To find the length of fence needed to surround a rectangular, calculate the perimeter.

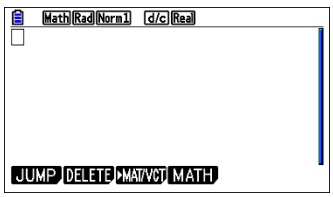


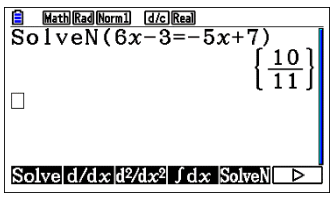


MENU 1 2 (1 2 5 + 1 8 5) EXE

6. If $6x - 3 = -5x + 7$, then $x =$?

A. $\frac{4}{11}$ B. $\frac{10}{11}$ C. $\frac{11}{10}$ D. $\frac{1}{2}$ E. 10



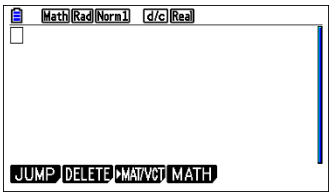


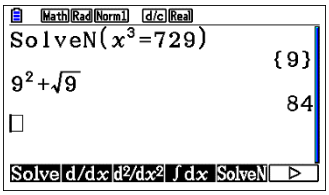
MENU 1 OPTN F4 F5 6 X,θ,T − 3 SHIFT · − 5 X,θ,T + 7) EXE EXIT

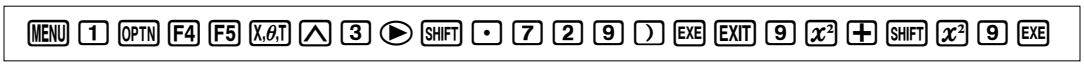
7. *If x is a real number such that $x^3 = 729$, then $x^2 + \sqrt{x} = ?$*

A. 9 B. 27 **C. 30** D. 84 E. 90

The solution is the cube root of 729, which is 9. Substitute 9 into the original expression

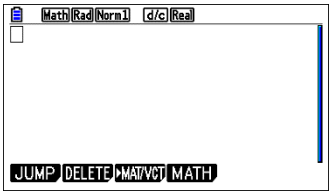


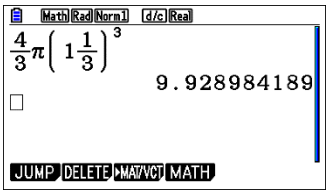




8. The formula for the volume, V, of a sphere with radius r is $V = \frac{4}{3}\pi r^3$. If the radius of a baseball is $1\frac{1}{3}$ inches, what is the volume to the nearest cubic inch?

A. 6 **B. 8** C. 10 D. 14 E. 15

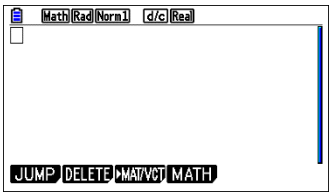


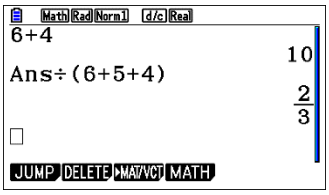


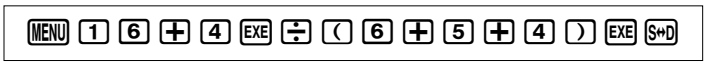
9. If a gumball is randomly chosen from a bag that contains exactly 6 yellow gumballs, 5 green gumballs, and 4 red gumballs, what is the probability that the gumball chosen is NOT green?

A. $\frac{2}{3}$ B. $\frac{1}{3}$ C. $\frac{2}{5}$ D. $\frac{3}{5}$ E. $\frac{14}{5}$

The number of times a yellow or red gumball can be chosen) divided by the number of total outcomes.







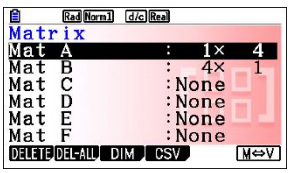
10. The number of students participating in fall sports at a certain high school can be shown with the table below.
The athletic director estimates the ratio of the number of sports awards that will be earned to the number of students participating with the table below.
Given these tables, what is the athletic director's estimate for the number of sports awards that will be earned for these fall sports?

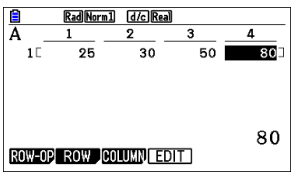
Tennis	Soccer	Cross-Country	Football
25	30	50	80

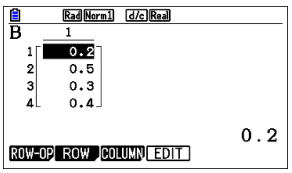
Tennis	0.2
Soccer	0.5
Cross-Country	0.3
Football	0.4

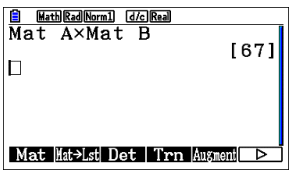
A. 55 B. 60 C. 65 D. 67 E. 70

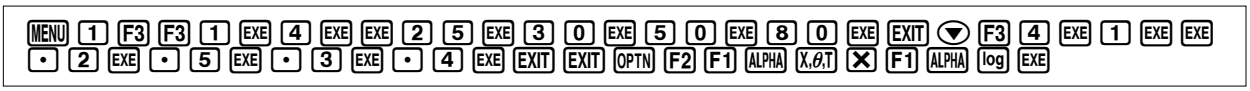
To find the number of sports awards earned, multiply the number of participants in each sport by the ratio for that sport, and then add these 4 products (This is a matrix multiplication).









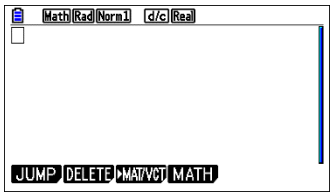


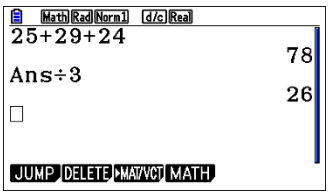
11. The following chart shows the current enrollment in all social studies classes—Geography, US History, World Cultures, and Government—at Iron Mountain High School.
What is the average number of students enrolled per section in US History?

Course title	Section	Period	Enrollment
Geography	A	1	23
	B	2	24
US History	A	2	25
	B	3	29
	C	4	24
World Cultures	A	3	27
Government	A	4	26
	B	6	27

A. 25 B. 26 C. 27 D. 29 E. 34

find the total number of students in all sections and divide by the number of sections.



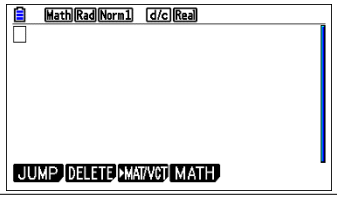


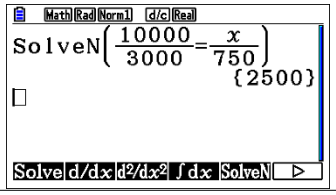
MENU 1 2 5 + 2 9 + 2 4 EXE ÷ 3 EXE

12. At a bottling plant, 10,000 liters of carbonated water are needed to produce 3,000 bottles of soda.
How many liters of carbonated water are needed to produce 750 bottles of soda?

A. 225 B. 1500 C. 2500 D. 4000 E. 5000

solve the problem using ration as the following.





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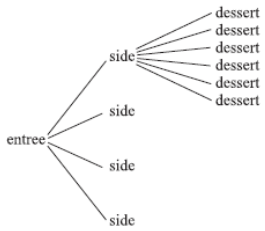
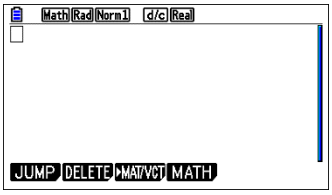
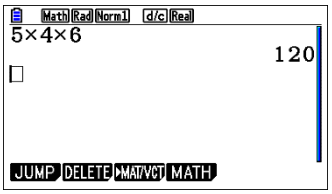
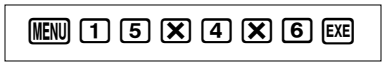
13. Reggie knows how to make 5 different entrees, 4 different side dishes, and 6 different desserts. How many distinct complete meals, each consisting of an entrée, a side dish, and a dessert, can Reggie make?

A. 16 B. 26 C. 72 D. 120 E. 144





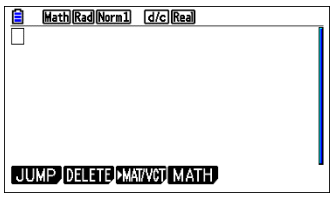


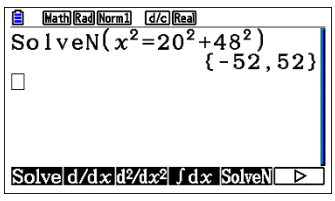


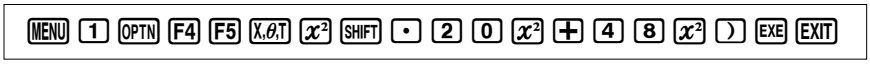
14. If a rectangle measures 20 meters by 48 meters, what is the length, in meters, of the diagonal of the rectangle?

A. 52 B. 68 C. 72 D. 112 E. 2704

To find the length of the diagonal, apply the Pythagorean Theorem.

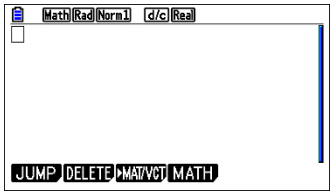


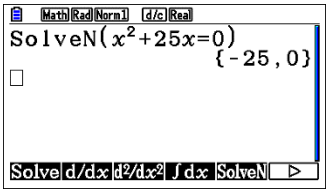


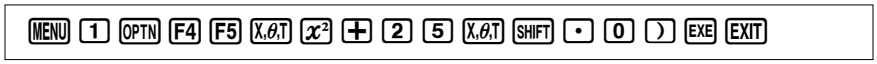


15. Which of the following is a solution to the equation $x^2 + 25x = 0$?

A. 50 B. 25 C. 5 D. -25

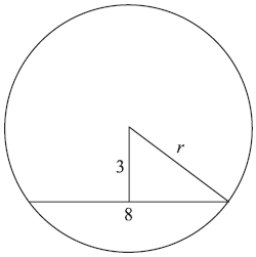




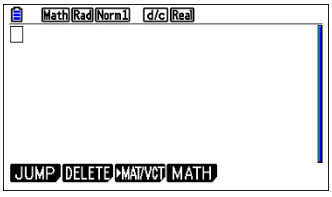


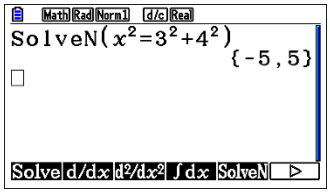
16. . A chord 8 inches long is 3 inches from the center of a circle, as shown below. What is the radius of the circle, to the nearest tenth of an inch?

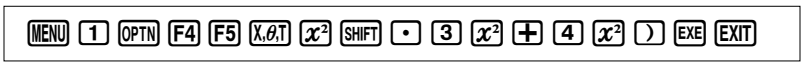
A. 4.0 B. 4.3 C. 5.0 D. 6.9 E. 8.5



Half of the length of the chord is 4 inches to find r , apply the Pythagorean Theorem.

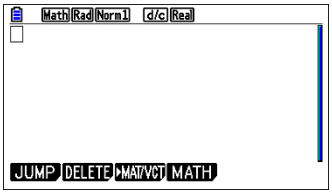


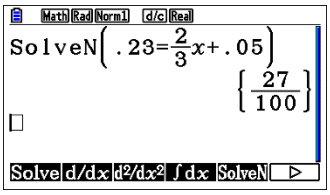




17. The length L, in meters, of a spring is given by the equation $L = \frac{2}{3}F + 0.05$, where F is the applied force in newtons. Approximately what force, in newtons, must be applied for the spring's length to be 0.23 meters?

A. 0.12 B. 0.18 C. 0.20 D. 0.24 E. 0.27





18. After a snowstorm, city workers removed an estimated 12,000 cubic meters of snow from the downtown area. If this snow were spread in an even layer over an empty lot with dimensions 62 meters by 85 meters, about how many meters deep would the layer of snow be?

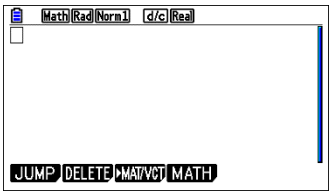
A. *less than* 1

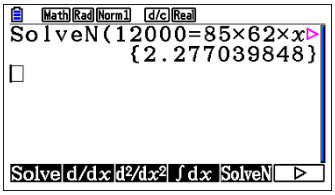
B. *between* 1 *and* 2

C. *between* 2 *and* 3

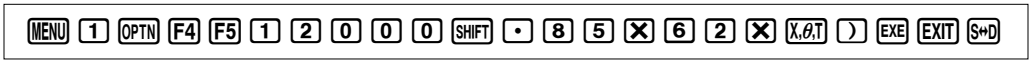
D. *between* 2 *and* 3

E. *more than* 4





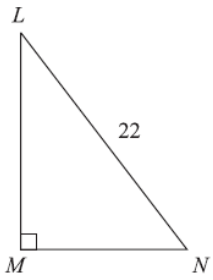
To find the uniform depth, use the formula for volume, V, of a rectangular prism with the height h, length l, and width w, V = (l)(w)(h). Substitute the given values for the variables and solve for h.

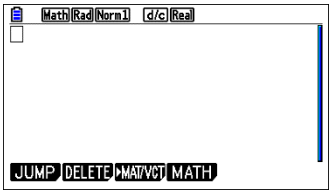


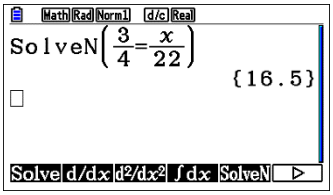
19. The hypotenuse of the right triangle LMN shown below is 22 feet long. The cosine of angle L is $\frac{3}{4}$. How many feet long is the segment LM?

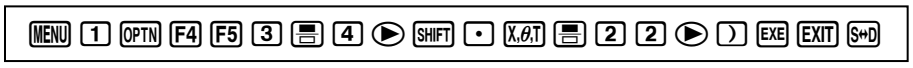
A. 18.4 **B. 16.5** C. 11.0 D. 6.7 E. 4.7

Use the definition of cosine, which is the ratio of the length of the adjacent side to the length of the hypotenuse.



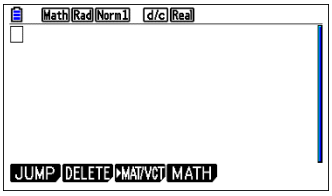


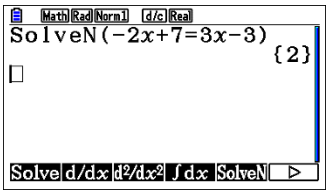


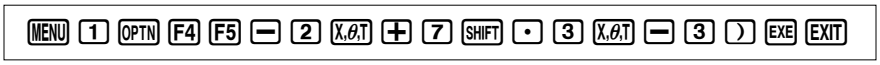


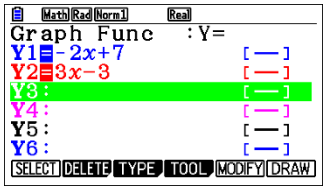
20. What is the x-coordinate of the point in the standard (x, y) coordinate plane at which the two lines $y = -2x + 7$ *and* $y = 3x - 3$ intersect?

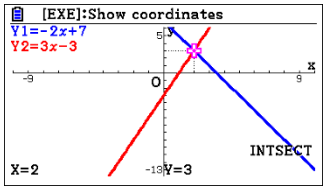
A. 10 B. 5 C. 3 **D. 2** E. 1

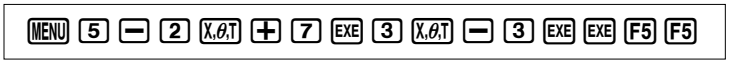








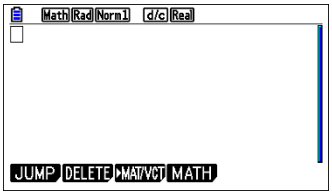


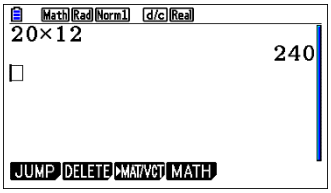


21. Parallelogram ABCD, with dimensions in inches, is shown in the diagram below. What is the area of the parallelogram, in square inches?

A. 60 B. 72 C. 180 D. 240 E. 260

The area for a parallelogram with base b and corresponding height h is (b)(h)





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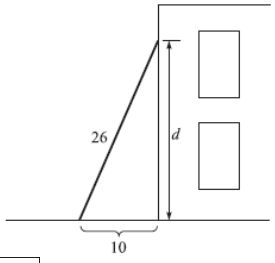
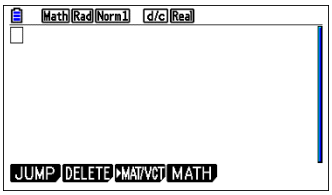
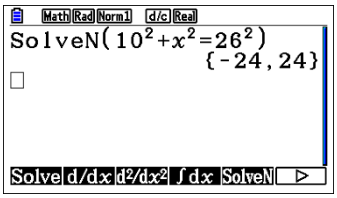
22. Members of the fire department lean a 26-foot ladder against a building. The side of the building is perpendicular to the level ground so that the base of the ladder is 10 feet away from the base of the building. To the nearest foot, how far up the building does the ladder reach?

A. 12 B. 15 C. 20 D. 22 E. 24

As you can see, the ladder forms the hypotenuse of a right triangle with a length of 26, and the base of the ladder is 10 feet away from the building. By using the Pythagorean Theorem.



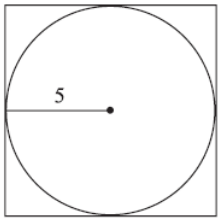




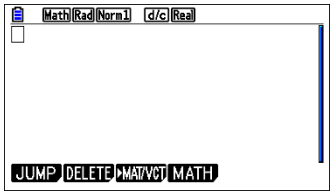
MENU 1 OPTN F4 F5 1 0 x^2 + X,θ,T x^2 SHIFT • 2 6 x^2) EXE EXIT

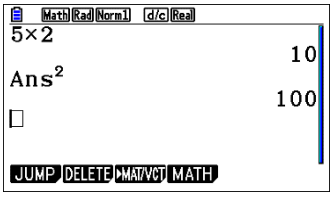
23. A square is circumscribed about a circle of a 5-foot radius, as shown below. What is the area of the square, in square feet?

A. 144 B. 100 C. 25π D. 50 E. 25



Recall that the area of a square with side s is s^2. Finding the diameter of the circle, the side of the square is equal to the diameter of the circle.



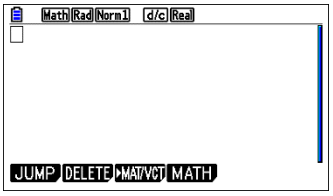


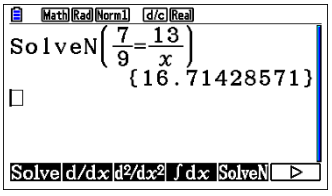
5 × 2 EXE x^2 EXE

24. The ratio of the side lengths for a triangle is exactly 7:11:13. In a second triangle similar to the first, the shortest side is 9 inches long. To the nearest tenth of an inch, what is the length of the longest side of the second triangle?

A. 14.1 B. 15 C. 16.7 D. 17.3 E. *Cannot be determined*

To find the length of the longest side of the second triangle, use ratios of corresponding sides of each triangle.





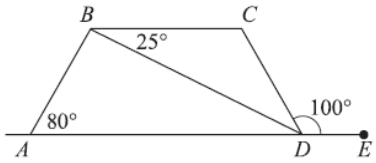
MENU 1 OPTN F4 F5 7 ▤ 9 ▶ SHIFT • 1 3 ▤ X,θ,T ▶) EXE EXIT S⇔D

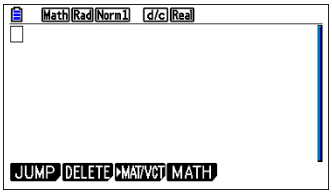
25. In the figure below, ABCD is a trapezoid. E lies on line AD, and angle measures are as marked. What is the measure of angle CDB?

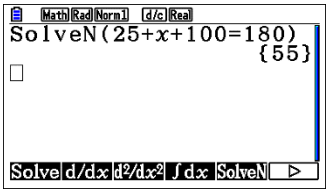
To find the measure of angle CDB in the figure, it is helpful to recognize that the sides BC and AD are parallel (definition of trapezoid) and are connected by the transversal BD. Angles CBD and ADB are alternate interior angles, and thus are equal and

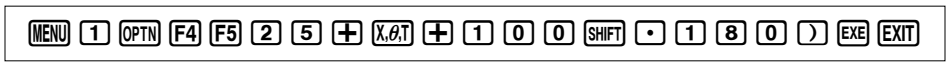
A. 25 B. 30 C. 55 D. 80 E. 100

both measure 25◦. Because A, D, and E all lie along the same line, angle ADE = 180◦.





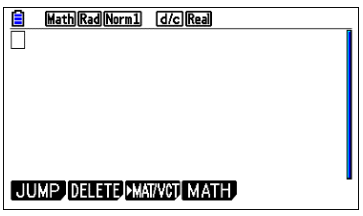


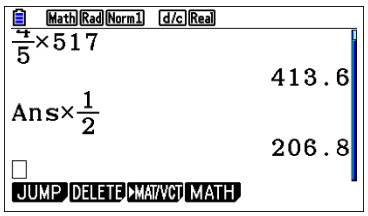


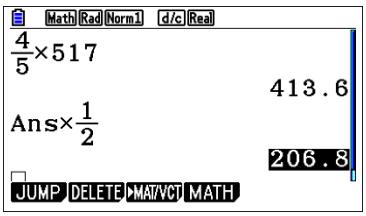
26. Of the 517 graduating seniors at Brighton High School, approximately $\frac{4}{5}$ will be attending college, and approximately $\frac{1}{2}$ of those going to college will be attending a state college. Which of the following is the closest estimate of the number of graduating seniors who will be attending a state college?

first find how many are going to college. The total number of graduating seniors (517) will be attending college. then calculate the number of those seniors who are going to a state college.

A. 170 B. 200 C. 260 D. 300 E. 320



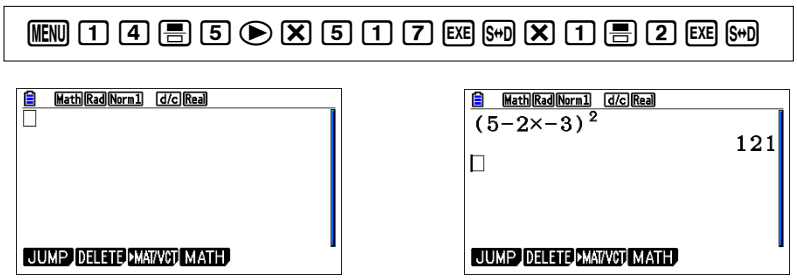


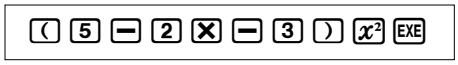


27. Let $x \circ y = (x - 2y)^2$ for all integers x and y. Which of the following is the value of $5 \circ (-3)$?

A. 121 B. 64 C. 41 D. 1 E. -31

To do this, simply replace x with 5, and y with −3,

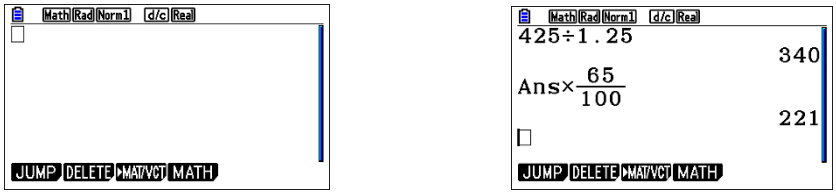


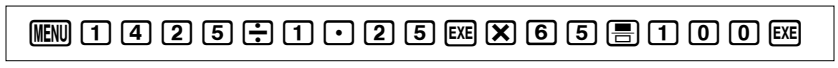


28. If 125% of a number is 425, what is 65% of the number?

A. 221 B. 276 C. 284 D. 308 E. 340

Because 125% of "the number" is 425, then "the number" is 425 ÷ 1.25, which equals 340.

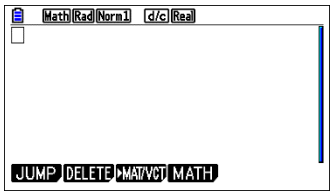


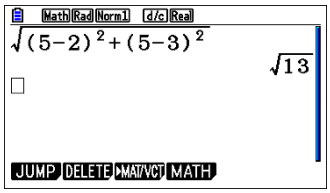


29. What is the distance in the standard (x, y) coordinate plane between the points (2,3) and (5,5)?

A. 5 B. 3 C. $\sqrt{11}$ D. $\sqrt{13}$ E. $\sqrt{25}$

To find the distance between 2 points in the standard (x, y) coordinate plane, use the distance formula.

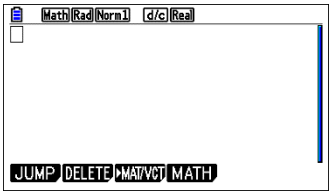


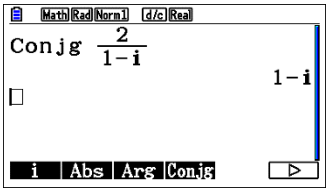


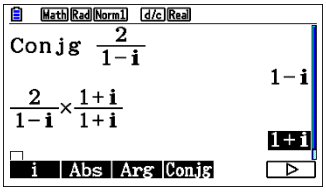
MENU 1 SHIFT x^2 (5 − 2) x^2 + (5 − 3) x^2 EXE

30. Using the complex number i, where $i^2 = -1$, $\frac{2}{(1-i)} \times \frac{(1+i)}{(1+i)} = ?$

A. $1+i$ B. $i-1$ C. $1-i$ D. $2(1+i)$ E. $2(1-i)$







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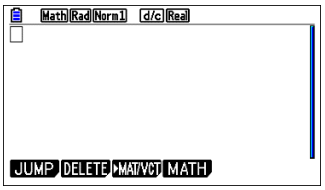
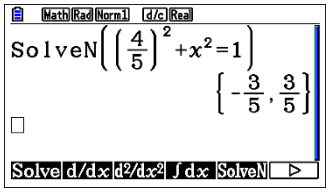
2 ▣ 1 − SHIFT 0 ▶ × ▣ 1 + SHIFT 0 ▼ 1 + SHIFT 0 EXE

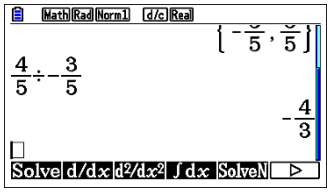
31. *If* $\sin\theta = \frac{4}{5}$ *and* $\frac{\pi}{2} < \theta < \pi$, *then* $\tan\theta = ?$

A. $\frac{-5}{4}$ B. $\frac{-4}{3}$ C. $\frac{-3}{5}$ D. $\frac{4}{3}$ E. $\frac{3}{4}$

To find tan θ given that sin θ and find cos θ by Pythagorean theorem.



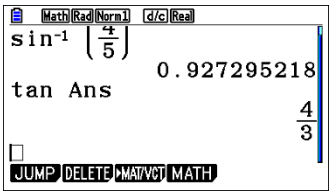




MENU 1 OPTN F4 F5 (4 ▪/▫ 5 ▶) x^2 + X,θ,T x^2 SHIFT • 1) EXE EXIT

Or another way

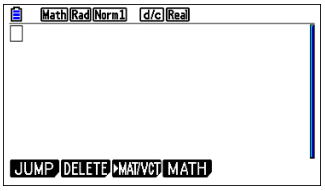
SHIFT sin (4 ▪/▫ 5 ▶) EXE tan SHIFT (−) EXE S⇔D

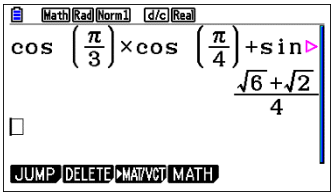


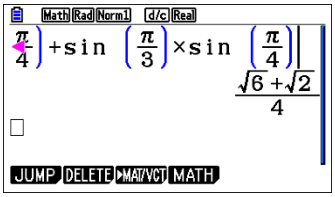
32. *What is* $\cos\frac{\pi}{12}$ *given that* $\frac{\pi}{12} = \frac{\pi}{3} - \frac{\pi}{4}$ *and that :*

$$\cos(\alpha - \beta) = (\cos\alpha)(\cos\beta) + (\sin\alpha)(\sin\beta)?$$

A. $\frac{1}{4}$ B. $\frac{1}{2}$ C. $\frac{\sqrt{6}+\sqrt{2}}{4}$ D. $\frac{\sqrt{3}+\sqrt{2}}{2}$ E. $\frac{\sqrt{6}+2}{4}$







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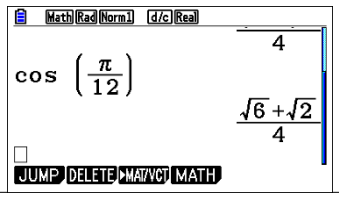
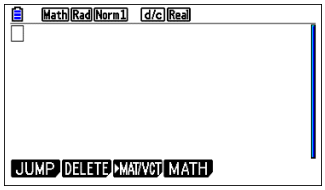


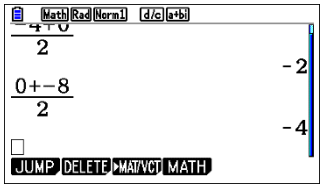
MENU 1 cos (SHIFT x10ˣ ▪/▫ 3 ▶) × cos (SHIFT x10ˣ ▪/▫ 4 ▶) + sin (SHIFT x10ˣ ▪/▫ 3 ▶) × sin (SHIFT x10ˣ ▪/▫ 4 ▶) EXE

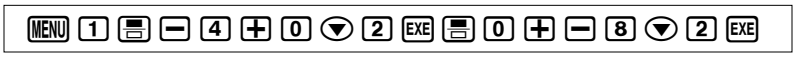
33. In the standard (x,y) coordinate plane, point X has coordinates (−4,0) and point Y has coordinates (0,−8). What are the coordinates of the midpoint of XY?

A. $(-6,-1)$ B. $(-2,-4)$ C. $(0,2)$ D. $(2,4)$ E. $(6,-1)$

To find the midpoint of two points, you can take the average of the x and y coordinates



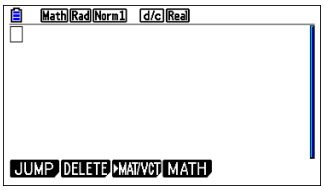


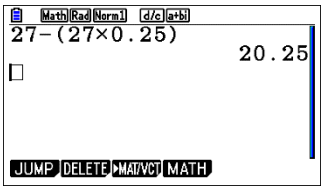


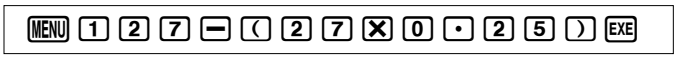
34. A carton of paper is priced at $27.00 now. If the paper goes on sale for 25% off the current price, what will be the sale price of the carton?

A. 6.75$ B. 20.25$ C. 22.00$ D. 26.75$ E. 33.75$

To solve this problem is to take 25% of the original price and deduct it from the original price.



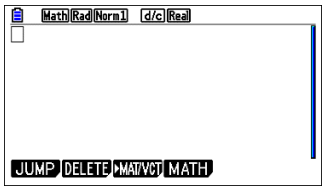


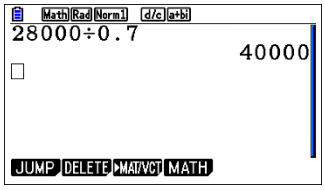


35. Andrew won a cash prize on a game show. Andrew paid taxes of 30% on the original cash prize and had $28,000 remaining. How much was the original cash prize?

A. 19600$ B. 28300$ C. 36400$ D. 40000$ E. 84000$

In order to solve this problem, you must realize that if Andrew had $28,000 remaining after paying 30% in taxes, then the $28,000 constitutes 100%–30% or 70% of the original prize, P.



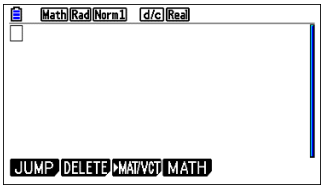


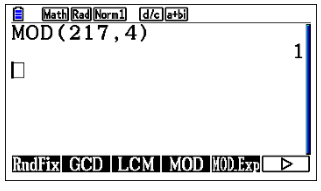
MENU 1 2 8 0 0 0 ÷ 0 • 7 EXE

36. What is the 217th digit after the decimal point in the repeating decimal $\overline{0.3456}$?

A. 0 B. 3 C. 4 D. 5 E. 6

To solve this problem, recognize that the repeating decimal has four places (0.3456), and that the fourth place is occupied by the number 6. Therefore, every place that is a multiple of 4 will be represented by the number 6. Since 217 is not divisible by 4, you know that the 217th digit cannot be 6.



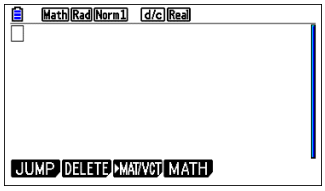


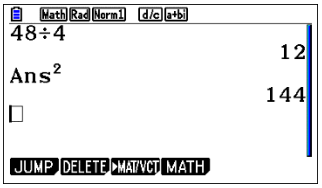
MENU 1 OPTN F6 F4 F6 F4 2 1 7 , 4) EXE

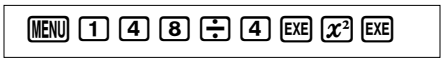
37. The perimeter of a square is 48 centimeters. What is its area, in square centimeters?

A. 12 B. 96 C. 144 D. 192 E. 2

If a square has side x, then its perimeter is 4x; this is because a square is defined as a rectangle where all four sides are of equal length.

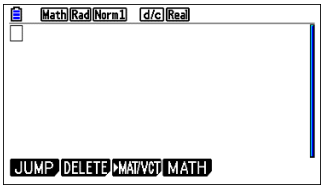


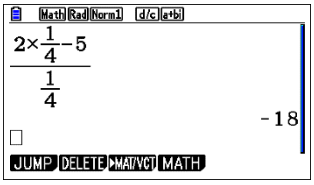


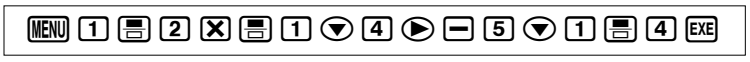


38. When n = $\frac{1}{4}$, what is the value of $\frac{2n-5}{n}$?

A. 18 B. 9 C. −3 D. −9 E. −18



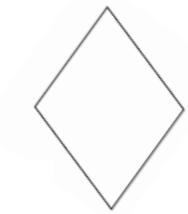


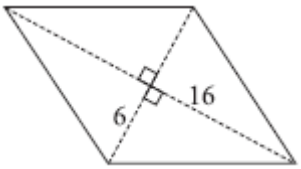


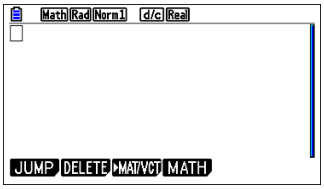
39. All sides of a rhombus are the same length, as shown below. If one diagonal is 12 inches long and the other is 32 inches long, how many inches long, to the nearest hundredth of an inch, is a side of the rhombus?

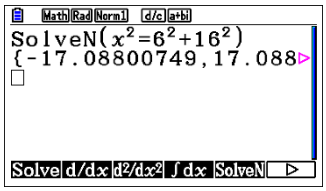
A. 8.54 B. 17.09 C. 34.17 D. 35.78 E. 48.00

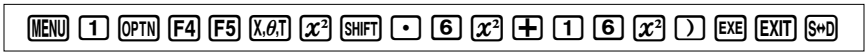
The diagonals of a rhombus intersect at their midpoints and form right angles as shown below. Since the diagonals meet at their midpoints and form right angles, they form a right triangle with legs, To find the length of a side of the rhombus, you can simply use the Pythagorean Theorem.







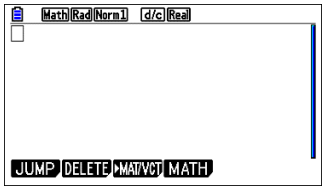


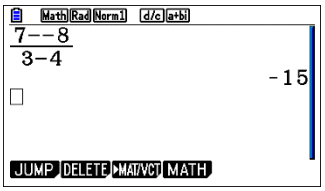


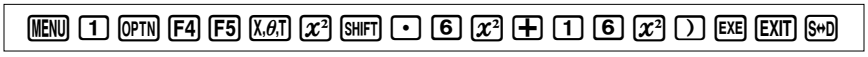
40. In the standard (x, y) coordinate plane, what is the slope of the line joining the points (3,7) and (4,−8)?

A. − 15 B. −1 C. 15 D. $\frac{-1}{7}$ E. $\frac{21}{32}$

To find the slope of the line between any two points (x1, y1) and (x2, y2), you can use the equation $\frac{(y_2 - y_1)}{(x_2 - x_1)}$



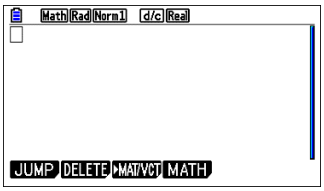


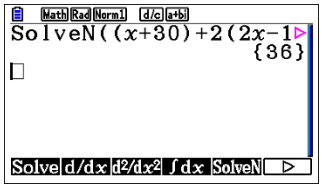


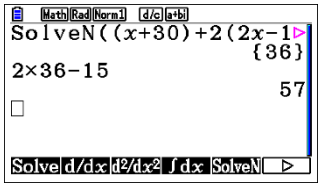
41. The measure of the vertex angle of an isosceles triangle is (a + 30) ◦. The base angles each measure (2a − 15) ◦. What is the measure in degrees of one of the base angles?

A. 36 B. 45 C. 66 **D. 57** E. 90

To solve this problem, you must remember that in an isosceles triangle, the base angles have the same measure. Since the sum of angles is 180◦ for all triangles, first find a.



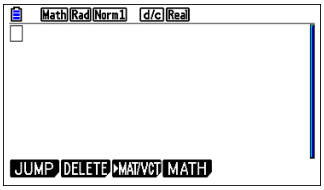


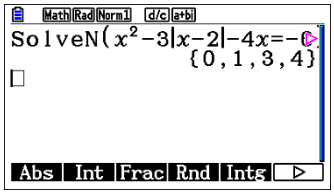


MENU 1 OPTN F4 F5 (X,θ,T + 3 0) + 2 (2 X,θ,T − 1 5) SHIFT • 1 8 0) EXE EXIT

42. Solve for x , $x^2 - 3|x - 2| - 4x = -6$

A. {0,1,2,3,4} **B. {0,1,,3,4}** C. {0,,4} D. {0,1,} E. {,3,4}



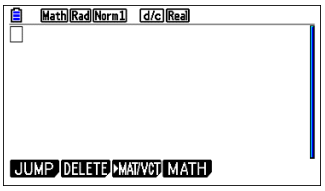


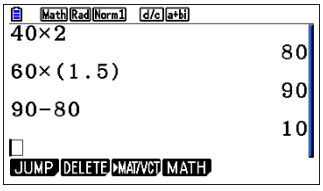
MENU 1 − 1 × 6 EXE 4 × − 3 EXE 5 × − 2 EXE

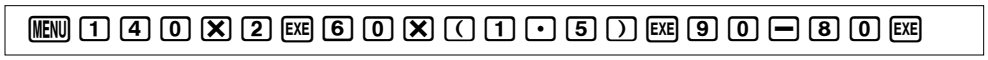
43. Bus X travels 40 miles per hour for 2 hours; Bus Y travels 60 miles per hour for $1\frac{1}{2}$ hours. What is the difference, in miles, between the number of miles traveled by Bus X and the number of miles traveled by Bus Y?

A. 10 B. 20 C. 50 D. 80 E. 90

First find the distance traveled by each bus. Distance equals rate multiplied by time



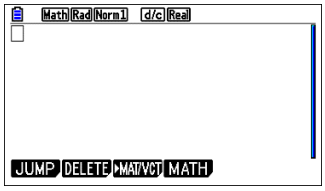


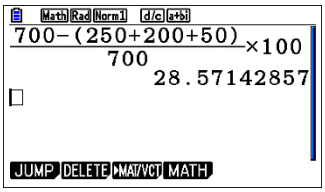


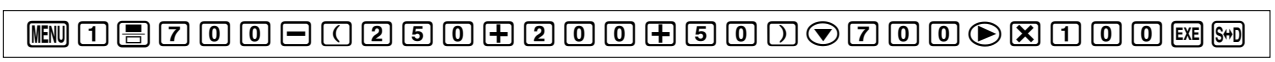
44. A survey is conducted among 700 high-school students to see who their favorite college basketball teams are. If 250 students like the Hawks, 200 students like the Vikings, 50 students like the Bears, and the remaining students like the Warriors, approximately what percentage of the 700 high school students answered that the Warriors were their favorite team? (round to the nearest tenth of a percentage point)

A. 14.3% B. 28.6% C. 42.9% D. 56.2% E. 78.6%

To find the percentage of the 700 high-school students who answered that the Warriors were their favorite team, divide the number of students who answered Warriors by 700 and multiply by 100%. To find the number of students who answered Warriors, add the total number of students who answered that they liked a different team and subtract that quantity from 700.

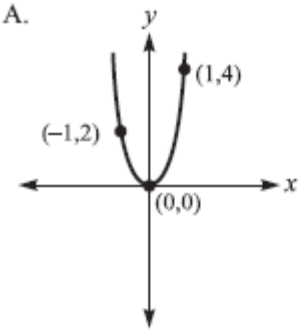




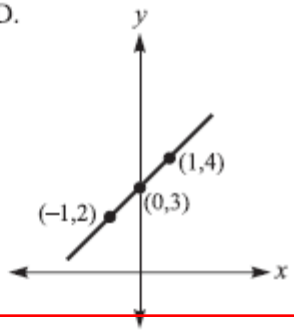


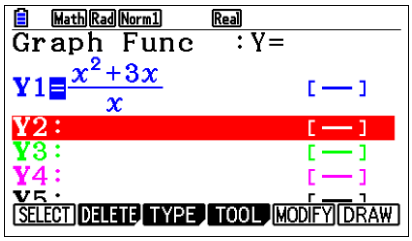
45. Which of the following is the graph, in the standard (x, y) coordinate plane, of $y = \dfrac{x^2 + 3x}{x}$?

A.

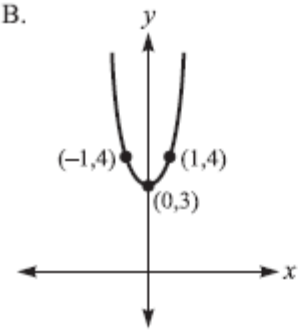


D.

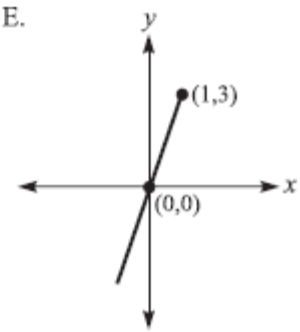


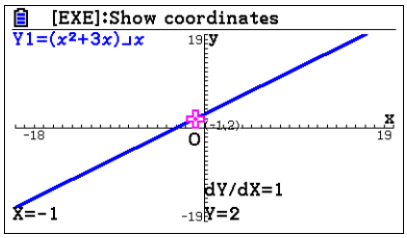


B.

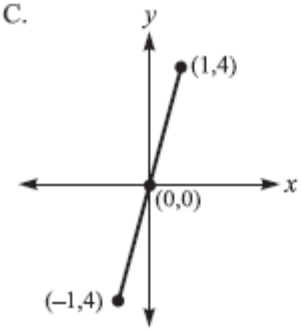


E.





C.



MENU 5 ▤ X,θ,T x² + 3 X,θ,T ▼ X,θ,T EXE EXE F3 F3 EXIT F6