Solving Samples of Math Problems

Using

CASIO FX-CG50 CALCULATOR

SAT-EXAM

Done By Casio Middle East - GAKUHAN

The mathematics portion of the SAT is divided into two sections: Math Test – Calculator and Math Test – No Calculator. In total, the SAT math test is 80 minutes long and includes 58 questions: 45 multiple choice questions and 13 grid-in questions.[25] The multiple choice questions have four possible answers; the grid-in questions are free response and require the test taker to provide an answer.

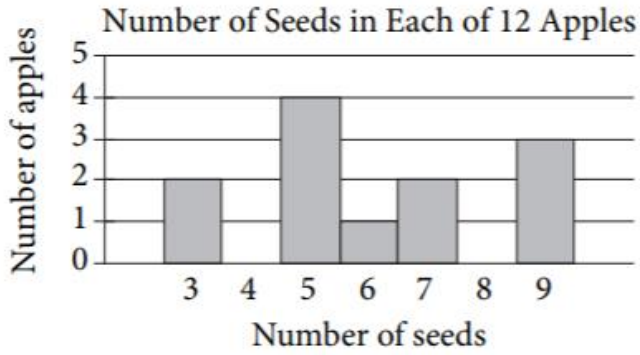
The Math Test – No Calculator section has 20 questions (15 multiple choice and 5 grid-in) and lasts 25 minutes.

The Math Test – Calculator section has 38 questions (30 multiple choice and 8 grid-in) and lasts 55 minutes.

Math 1 is designed for those who've taken two years of algebra and one year of geometry, while **Math 2** targets those who've also taken precalculus/trigonometry. Although they cover many of the same topics, **Math 1** involves more tricky applications of **math** concepts since the scope of the exam is narrower.

Topics and Subtopics	**% of Math 2 SAT Subject Test**	**Approximate # of Questions**
Number and Operations	**10-14%**	**5-7**
Operations, ratio and proportion, complex numbers, counting, elementary number theory, matrices, sequences, series, vectors		
Algebra and Functions	**48-52%**	**24-26**
Expressions, equations, inequalities, representation and modeling, properties of functions (linear, polynomial, rational, exponential, logarithmic, trigonometric, inverse trigonometric, periodic, piecewise, recursive, parametric)		
Geometry and Measurement	**28-32%**	**14-16**
Coordinate: lines, parabolas, circles, ellipses, hyperbolas, symmetry, transformations, polar coordinates	10-14%	5-7
Three-dimensional: solids, surface area and volume (cylinders, cones, pyramids, spheres, prisms), coordinates in three dimensions	4-6%	2-3
Trigonometry: right triangles, identities, radian measure, law of cosines, law of sines, equations, double angle formula	12-16%	6-8
Data Analysis, Statistics, and Probability	**8-12%**	**4-6**
Mean, median, mode, range, interquartile range, standard deviation, graphs and plots, least squares regression (linear, q		

Q.1.



Based on the histogram above, of the following, which is closest to the average (arithmetic mean) number of seeds per apple?

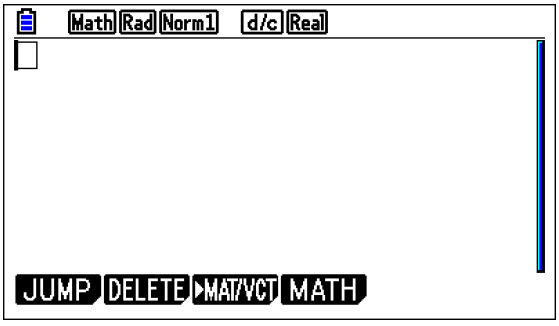
A) 4

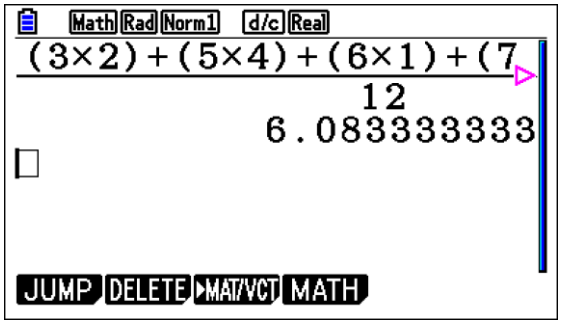
B) 5

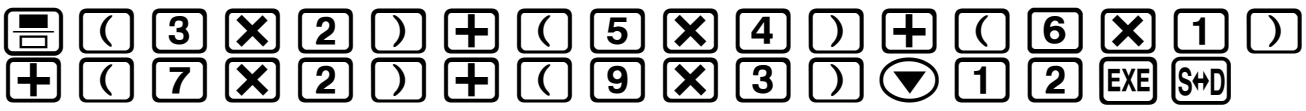
C) 6

D) 7

Note: The average number of seeds per apple is the total number of seeds in the 12 apples divided by the number of apples, which is 12. On the graph, the horizontal axis is the number of seeds per apple and the height of each bar is the number of apples with the corresponding number of seeds.







Answer : (c) 6

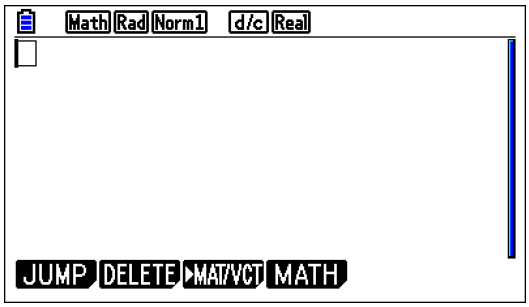
Q.2.

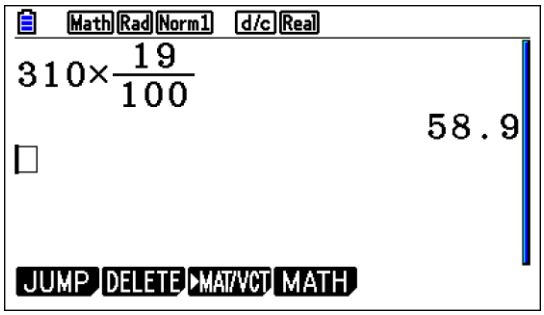
		Course			
		Algebra I	Geometry	Algebra II	Total
Gender	Female	35	53	62	150
	Male	44	59	57	160
	Total	79	112	119	310

A group of tenth-grade students responded to a survey that asked which math course they were currently enrolled in. The survey data were broken down as shown in the table above. Which of the following categories accounts for approximately 19 percent of all the survey respondents?

A) Females taking Geometry
B) Females taking Algebra II
C) Males taking Geometry
D) Males taking Algebra I

Note: From the table, there was a total of 310 survey respondents, and 19% of all survey respondents . And by calculations the closet answer is C.





3 1 0 × 1 9 ▭ 1 0 0 EXE S⇔D

Answer : (c) males taking geometry

Q.3. A food truck sells salads for $6.50 each and drinks for $2.00 each. The food truck's revenue from selling a total of 209 salads and drinks in one day was $836.50. How many salads were sold that day?

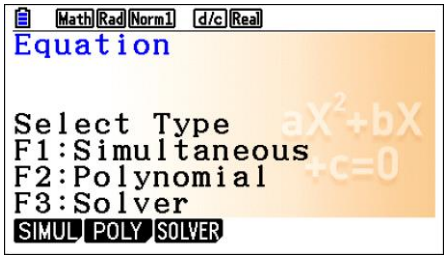
A) 77

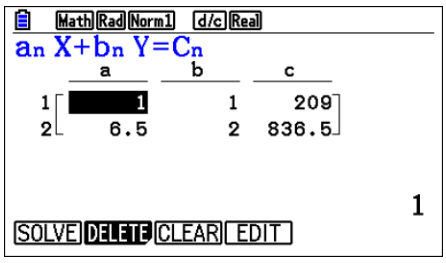
B) 93

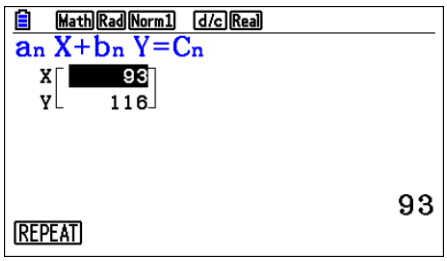
C) 99

D) 105

Note: To determine the number of salads sold, write and solve a system of two equations. Let x equal the number of salads sold and let y equal the number of drinks sold. Since the number of salads plus the number of drinks equals 209, then x + y = 209.
Since each salad cost $6.50, each drink cost $2.00, and the total revenue was $836.50, then 6.50x + 2.00y = 836.50







F1 F1 1 EXE 1 EXE 2 0 9 EXE 6 • 5 EXE 2 EXE 8 3 6 • 5 EXE EXE

Answer : (b) 93

Q.4.

Program	Year			
	2007	2008	2009	2010
Agriculture/natural resources	373,904	358,708	485,807	488,106
Education	2,164,607	2,413,984	2,274,514	3,008,036
General government	14,347,325	12,554,845	10,392,107	14,716,155
Highways and transportation	1,468,482	1,665,636	1,539,480	1,773,893
Human resources	4,051,050	4,099,067	4,618,444	5,921,379
Public safety	263,463	398,326	355,935	464,233

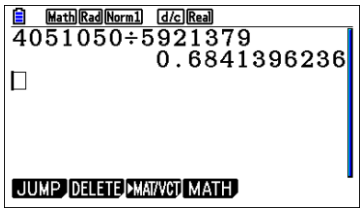
The table above lists the annual budget, in thousands of dollars, for each of six different state programs in Kansas from 2007 to 2010.

Of the following, which program's ratio of its 2007 budget to its 2010 budget is closest to the human resources program's ratio of its 2007 budget to its 2010 budget?

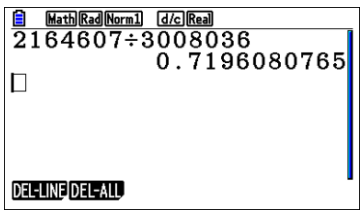
A) Agriculture/natural resources
B) Education
C) Highways and transportation
D) Public safety

Note: to solve this problem we need to find the ration of Human Resources 2007 to 2010 then the ratio for each program .

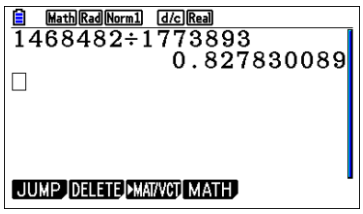
Answer : (b)



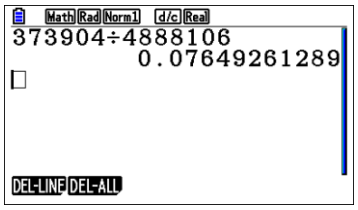
Human Resources



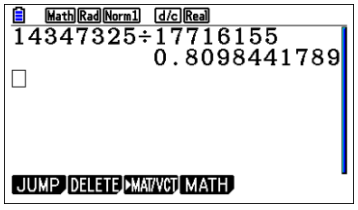
Education



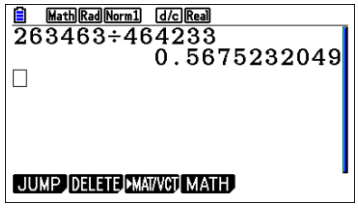
Highways and transportation



Agriculture /natural



General government



Public safety

Q.5. Which of the following is an equation of a circle in the xy-plane with center $(0, 4)$ and a radius with endpoint $\left(\frac{4}{3}, 5\right)$?

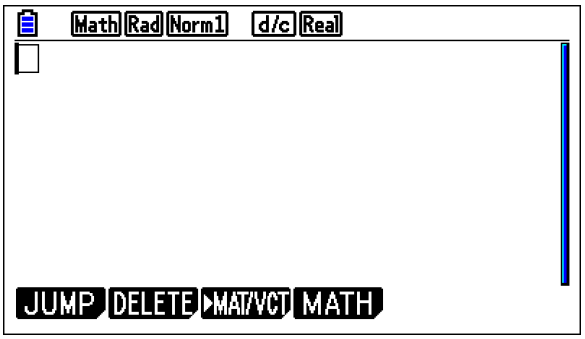
A) $x^2 + (y-4)^2 = \frac{25}{9}$

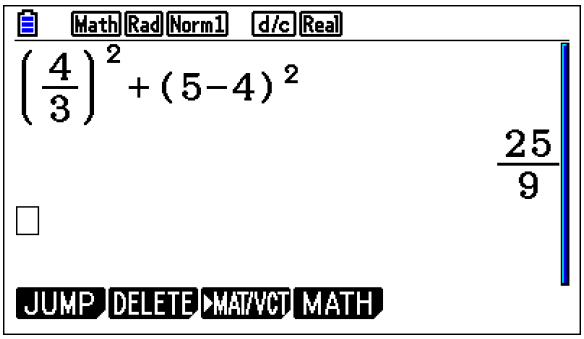
B) $x^2 + (y+4)^2 = \frac{25}{9}$

C) $x^2 + (y-4)^2 = \frac{5}{3}$

D) $x^2 + (y+4)^2 = \frac{3}{5}$

Note: $(x-h)^2 + (y-k)^2 = r^2$ is the equation of circle where (h.k) center and r^2 is the radius ($\frac{4}{3}$,5) endpoint on the circle are satisfy the equation $(x)^2 + (y-4)^2 = r^2$





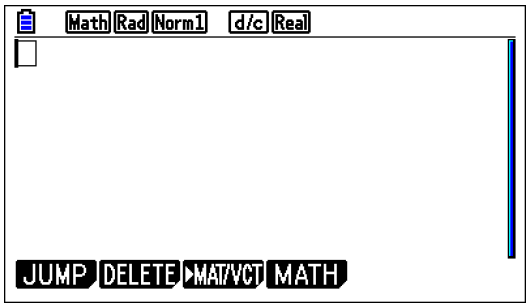
MENU 1 (4 3 ▶) x^2 + (5 − 4) x^2 EXE

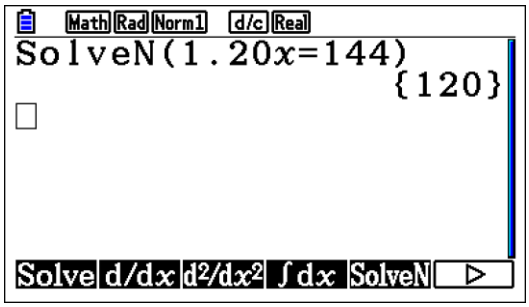
Answer : (a) $x^2 + (y-4)^2 = \frac{25}{9}$

Q.6. Katarina is a botanist studying the production of pears by two types of pear trees. She noticed that Type A trees produced 20 percent more pears than Type B trees did. Based on Katarina's observation, if the Type A trees produced 144 pears, how many pears did the Type B trees produce?

A) 115 B)120 C) 124 D) 173

Note: Let x represent the number of pears produced by the Type B trees. Then the Type A trees produce 20 percent more pears than x, which is type B trees will be x + 0.20x = 1.20x pears.





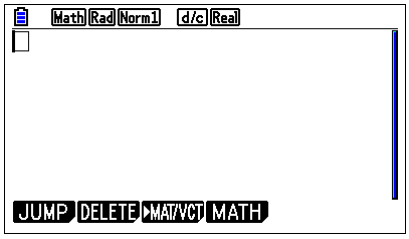
Answer : (b) 120

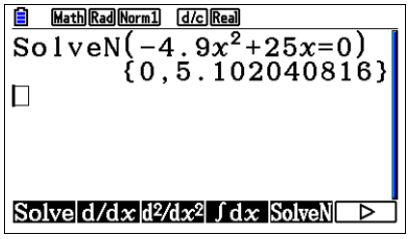
$$h = -4.9t^2 + 25t$$

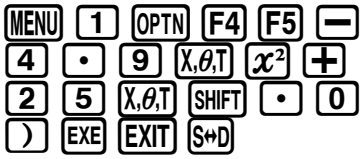
Q.7. The equation above expresses the approximate height h, in meters, of a ball t seconds after it is launched vertically upward from the ground with an initial velocity of 25 meters per second. After approximately how many seconds will the ball hit the ground?

A) 3.5 B) 4.0 C) 4.5 D) 5.0

Note: When the ball hits the around, its height is 0 meters. Substitute h=0 .







Answer : (d) 5

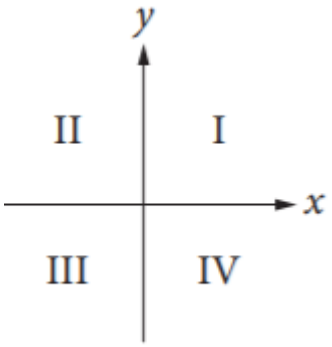
Q.8. If the system of inequalities $y \geq 2x + 1$ and $y > \frac{1}{2}x - 1$, is graphed in the xy-plane, which quadrant contains no solutions to the system?

A) Quadrant II

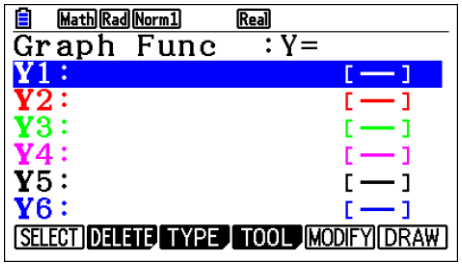
B) Quadrant III

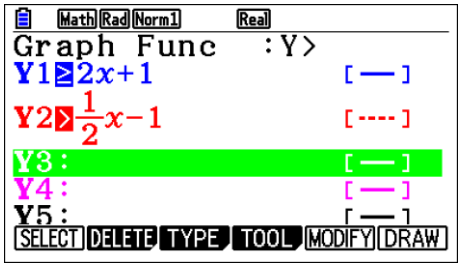
C) Quadrant IV

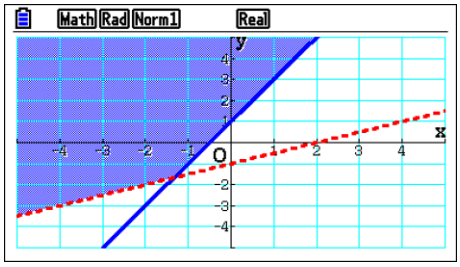
D) There are solutions in all four quadrants.



Note: just draw the inequalities







MENU 5 F3 F6 F3 2 X,θ,T + 1 EXE F3
F6 F1 1 ▭ 2 ▶ X,θ,T − 1 EXE EXE

Answer : (c) quadrant 4

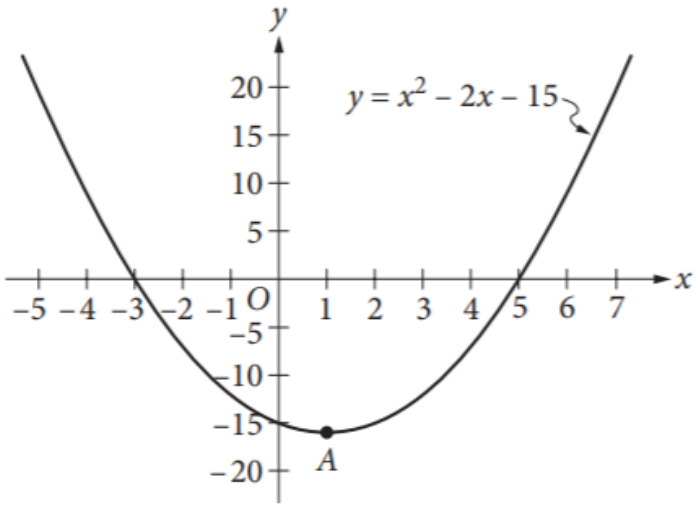
Q.9. Which of the following is an equivalent form of the equation of the graph shown in the xy-plane above, from which the coordinates of vertex A can be identified as constants in the equation?

A) $y = (x + 3)(x - 5)$

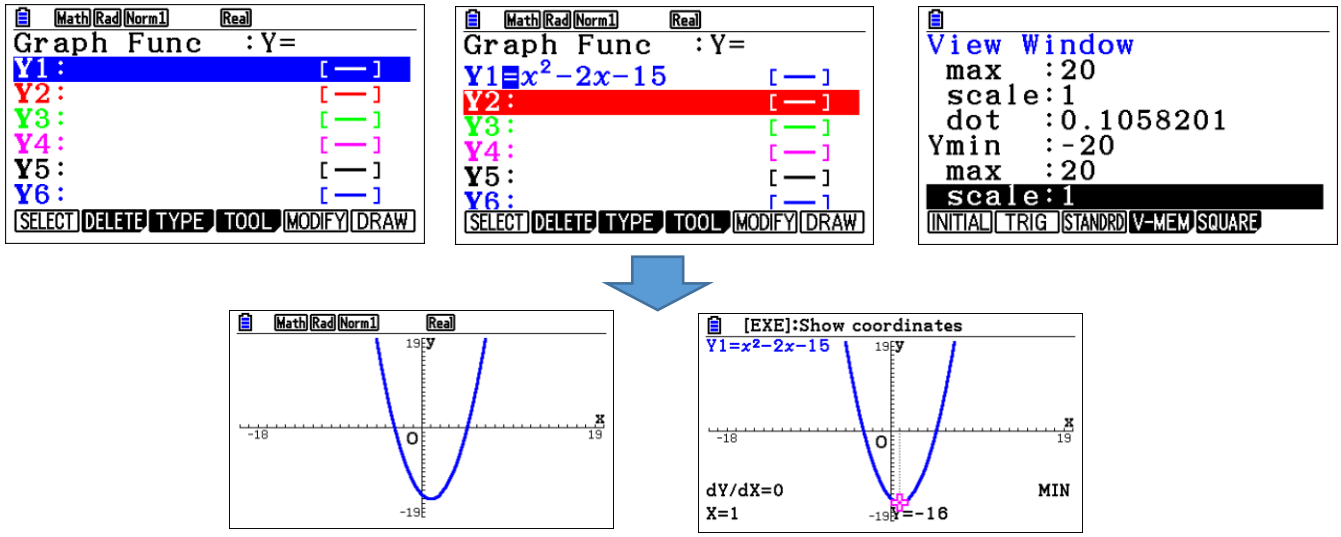
B) $y = (x - 3)(x + 5)$

C) $y = x(x - 2) - 15$

D) $y = (x - 1)^2 - 16$



Any quadratic function q can be written in the form $q(x) = a(x - h)^2 + k$, where a, h, and k are constants and (h, k) is the vertex of the parabola when q is graphed in the coordinate plane



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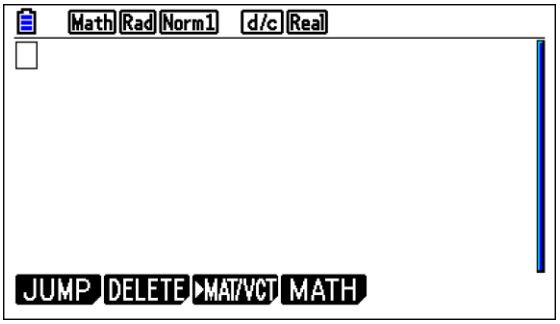
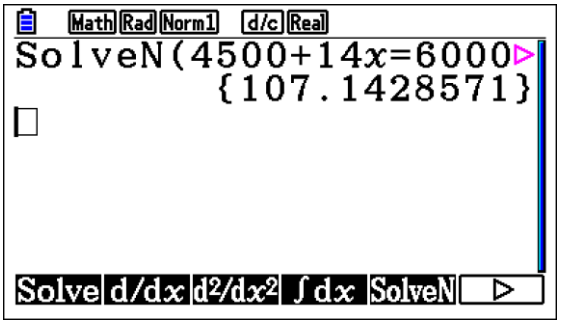
2 0 EXE 2 0 EXE ▼ ▼ − 2 0 EXE 2 0 EXE EXE EXE F5 F3

Answer : (d) $y = (x - 1)^2 - 16$

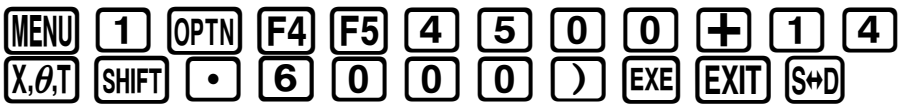
Q.10. The posted weight limit for a covered wooden bridge in Pennsylvania is 6000 pounds. A delivery truck that is carrying x identical boxes each weighing 14 pounds will pass over the bridge. If the combined weight of the empty delivery truck and its driver is 4500 pounds, what is the maximum possible value for x that will keep the combined weight of the truck, driver, and boxes below the bridge's posted weight limit?

Since the weight of the empty truck and its driver is 4500 pounds and each box weighs 14 pounds, the weight, in pounds, of the delivery truck, its driver, and x boxes is 4500 + 14x. This weight is below the bridge's posted weight limit of 6000 pounds if 4500 + 14x < 6000



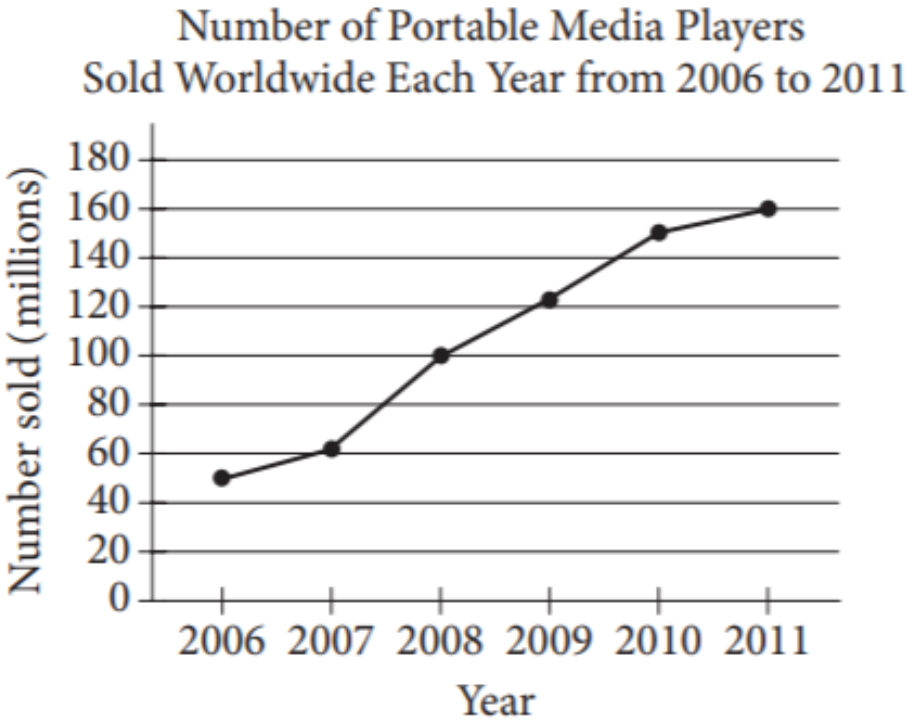


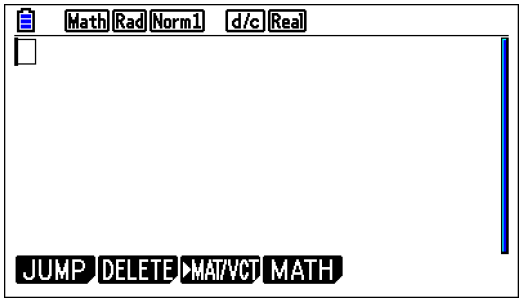
Since the number of packages must be an integer, the maximum possible value for x = 107

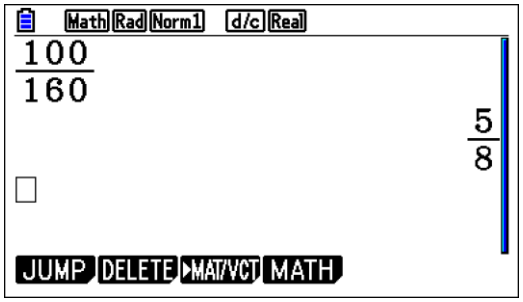


Answer : max =107

Q.11. According to the line graph above, the number of portable media players sold in 2008 is what fraction of the number sold in 2011 ?







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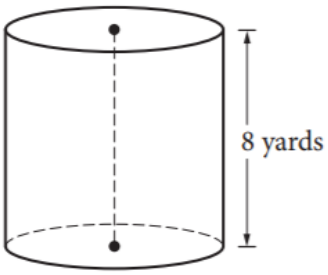
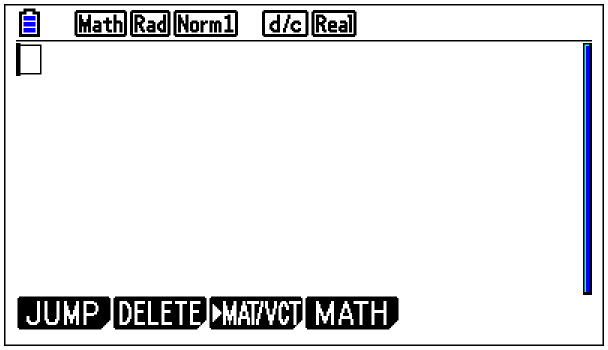
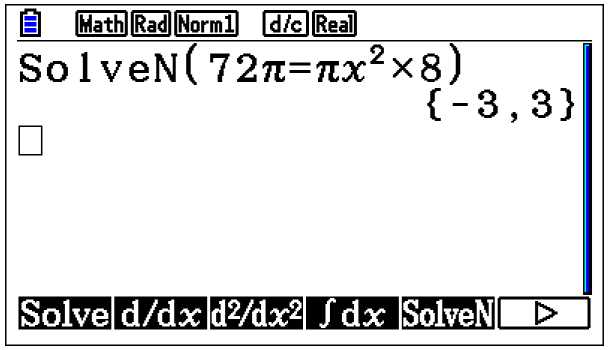
Answer : $\frac{5}{8}$

Q.12. A dairy farmer uses a storage silo that is in the shape of the right circular cylinder above. If the volume of the silo is 72π cubic yards, what is the diameter of the base of the cylinder, in yards?



The volume of a cylinder is $v = \pi r^2 h$, where r is the radius of the base of the cylinder and h is the height of the cylinder





The radius r = 3 therefore the diameter is 2r = 6

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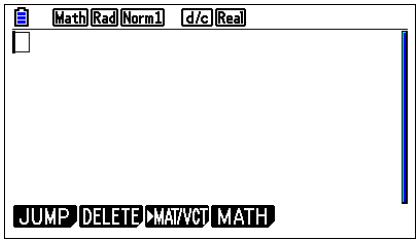
• SHIFT ×10^x X,θ,T x² × 8) EXE EXIT

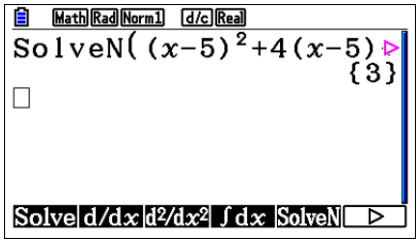
Answer : Diameter = 6

Q.13. For what value of x is the function h undefined?

$$h(x) = \frac{1}{(x-5)^2 + 4(x-5) + 4}$$

The function h(x) is undefined if the denominator is equal zero





The function h(x) is undefined at x=3

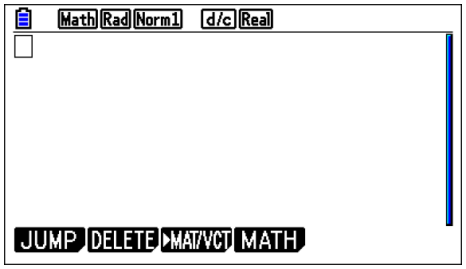
MENU 1 OPTN F4 F5 (X,θ,T − 5) x^2 + 4 (X,θ,T − 5) + 4 SHIFT • 0) EXE EXIT

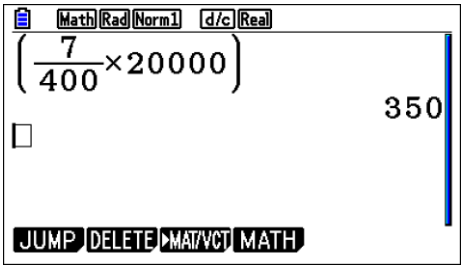
Answer : x=3

Q.14. A quality control manager at a factory selects 7 lightbulbs at random for inspection out of every 400 lightbulbs produced. At this rate, how many lightbulbs will be inspected if the factory produces 20,000 lightbulbs?

A) 300 B) 350 C) 400 D) 450

The quality control manager selects 7 lightbulbs at random for inspection out of every 400 lightbulbs produced. And we have20000 lightbulbs





MENU 1 (7 ÷ 4 0 0 ▶ × 2 0 0 0 0) EXE

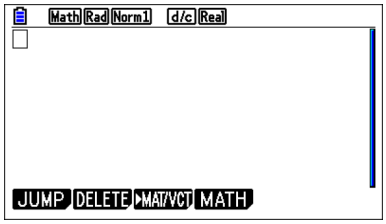
Answer : (b) 350

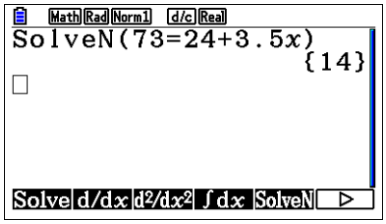
$$A = 24 + 3.5m$$

Q.15. One end of a spring is attached to a ceiling. When an object of mass m kilograms is attached to the other end of the spring, the spring stretches to a length of A centimeters as shown in the equation above. What is m when A is 73 ?

A) 14 B) 27.7 C) 73 D) 279.5

Note: substitute A=73 and solve the equation to get m



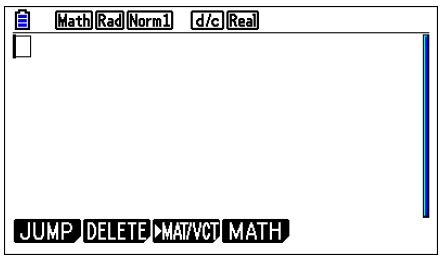


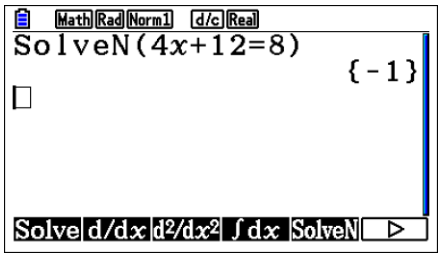
MENU 1 OPTN F4 F5 7 3 SHIFT • 2 4
+ 3 • 5 X,θ,T) EXE EXIT

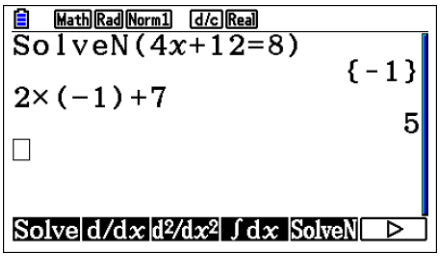
Answer : (a) 14

Q.16. When 4 times the number x is added to 12, the result is 8. What number results when 2 times x is added to 7 ?

A) −1 B) 5 C) 8 D) 9







MENU 1 OPTN F4 F5 4 X,θ,T +
1 2 SHIFT • 8) EXE EXIT

Answer : (b) 5

Q.17. The equation above represents a parabola in the xy-plane. Which of the following equivalent forms of the equation displays the x-intercepts of the parabola as constants or coefficients?

$$y = x^2 - 6x + 8$$

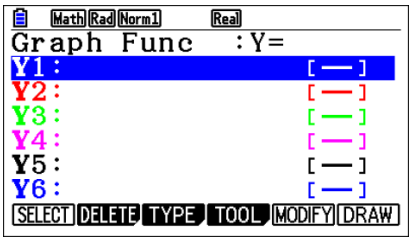
A) $y - 8 = x^2 - 6x$

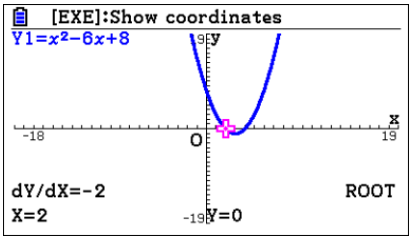
B) $y + 1 = (x - 3)^2$

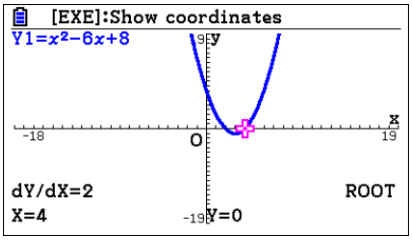
C) $y = x(x - 6) + 8$

D) $y = (x - 2)(x - 4)$

Note: the graph will show the roots {2,4} and clearly the choice D is correct answer







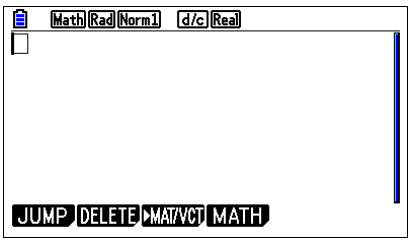
MENU 5 X,θ,T x^2 − 6 X,θ,T + 8 EXE EXE F5 F1 ▶

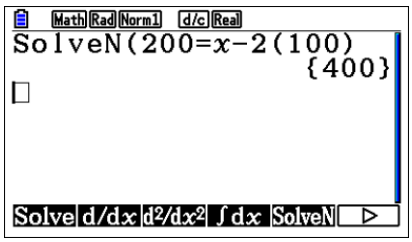
Answer : (d)

Q.18. In a video game, each player starts the game with k points and loses 2 points each time a task is not completed. If a player who gains no additional points and fails to complete 100 tasks has a score of 200 points, what is the value of k ?

A) 0 B) 150 C) 250 D) 400

Since a player starts with k points and loses 2 points each time a task is not completed, the player's score will be k − 2n





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

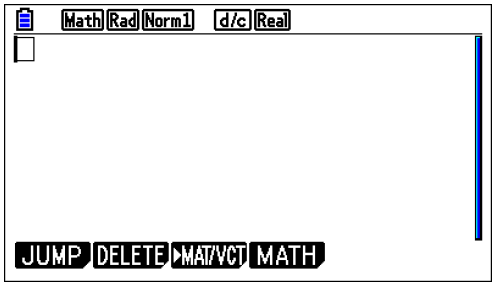
Answer : (d) 400

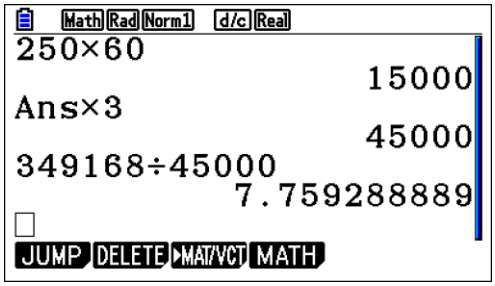
Q.19. Tony is planning to read a novel. The table shows information about the novel, Tony's reading speed, and the amount of time he plans to spend reading the novel each day. If Tony reads at the rates given in the table, which of the following is closest to the number of days it would take Tony to read the entire novel?

A) 6 B) 8 C) 23 D) 324

Number of hours Tony plans to read the novel per day	3
Number of parts in the novel	8
Number of chapters in the novel	239
Number of words Tony reads per minute	250
Number of pages in the novel	1,078
Number of words in the novel	349,168

Note: 3 hours per day , 250 words per minute = 15000 words per hour = 45000 words per day , The total words are 349168.



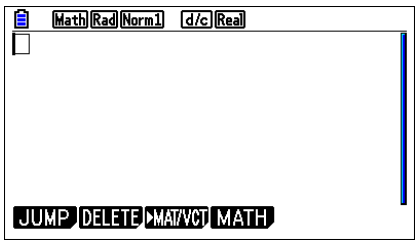


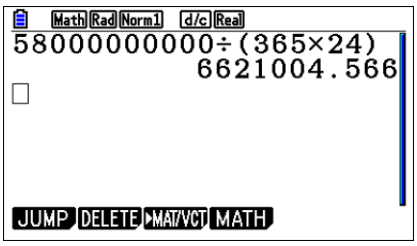
Answer : (b) 8

Q.20. The distance traveled by Earth in one orbit around the Sun is about 580,000,000 miles. Earth makes one complete orbit around the Sun in one year. Of the following, which is closest to the average speed of Earth, in miles per hour, as it orbits the Sun?

A) 66,000 B) 93,000 C) 210,000 D) 420,000

Note: the years 365 days and the day is 24 hours





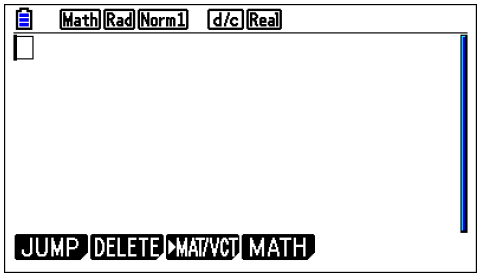
MENU 1 5 8 0 0 0 0 0 0 0 0 0 ÷ (3 6 5 × 2 4) EXE

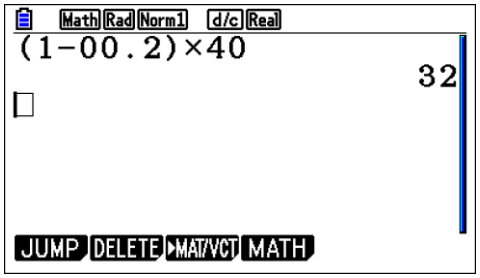
Answer : (a) 66000

Q.21. The atomic weight of an unknown element, in atomic mass units (AMU), is approximately 20% less than that of calcium. The atomic weight of calcium is 40 AMU. Which of the following best approximates the atomic weight, in AMU, of the unknown element?

A) 8 B) 20 C) 32 D) 48

To find the atomic weight of an unknown element that is 20% less than the atomic weight of calcium, multiply the atomic weight, in AMU, of calcium.





MENU 1 (1 − 0 0 • 2) × 4 0 EXE

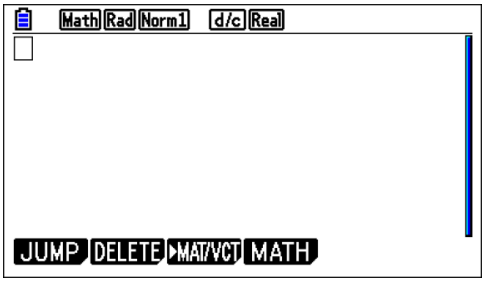
Answer : (c) 32

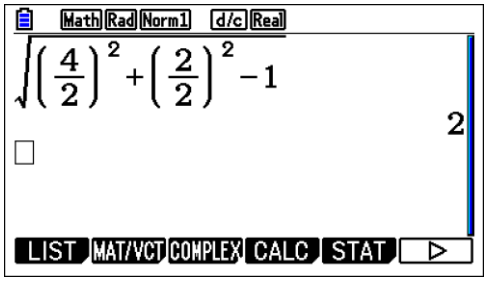
Q.21. The equation of a circle in the xy-plane is shown below . What is the radius of the circle?

A) 2 B) 3 C) 4 D) 9

$$x^2 + y^2 + 4x - 2y = -1$$

Note: for the circle equation with the formula $x^2 + y^2 + Ax + By + C = 0$ the radius $r = \sqrt{(\frac{A}{2})^2 + (\frac{B}{2})^2 - C}$



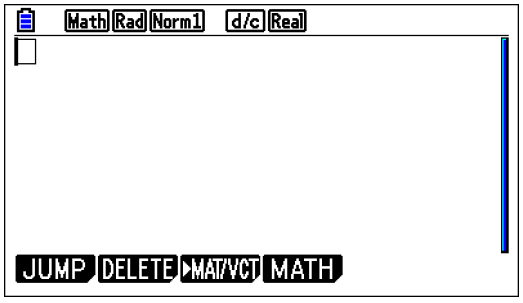


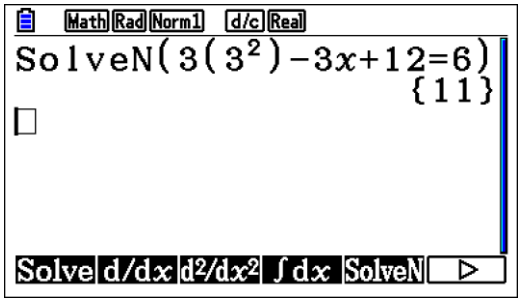
SHIFT x^2 (4 , 2 ▶) x^2 + (2 , 2 ▶) x^2 − 1 EXE

Answer : (a) 2

Q.22. In the xy-plane, the point (3, 6) lies on the graph of the function $f(x) = 3x^2 - bx + 12$. What is the value of b ?

Note: x=3, y=6 then substitute in the function to get b



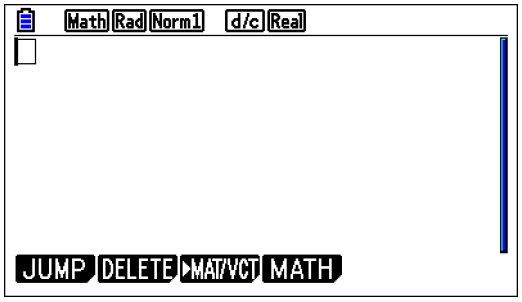


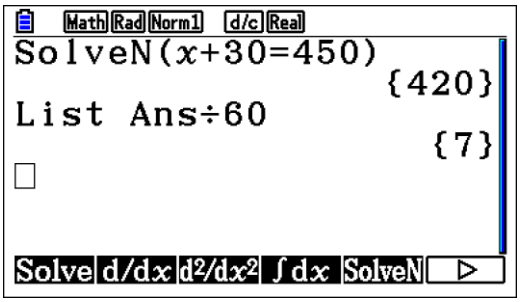
MENU 1 OPTN F4 F5 3 (3 x^2) −
3 X,θ,T + 1 2 SHIFT • 6) EXE EXIT

Answer : b=11

Q.23. If h hours and 30 minutes is equal to 450 minutes, what is the value of h?

There are 60 minutes in each hour, and so there are 60h minutes in h hours. Since h hours and 30 minutes is equal to 450 minutes



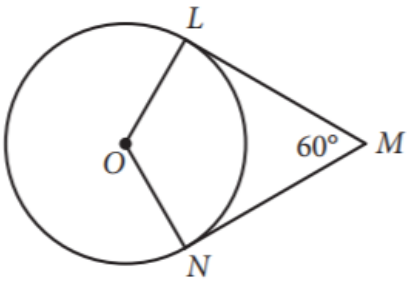


MENU 1 OPTN F4 F5 X,θ,T + 3 0 SHIFT • 4 5 0) EXE EXIT ÷ 6 0 EXE

Answer : h=7

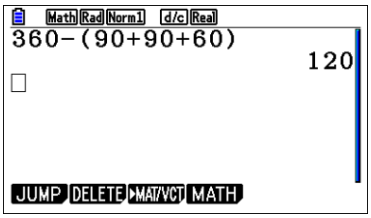
Q.24. In the figure above, point O is the center of the circle, line segments LM and MN are tangent to the circle at points L and N, respectively, and the segments intersect at point M as shown. If the circumference of the circle is 96, what is the length of minor arc LN?

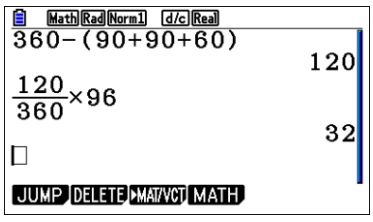
Since segments LM and MN are tangent to the circle at points L and N, respectively, angles OLM and ONM are right angles. Thus, in quadrilateral OLMN



the measure of angle O is
360° – (90° + 60° + 90°) = 120

Thus, in the circle, central angle O cuts off _120 360 = _1 3 of the circumference; that is, minor arc ⍰LN is _1 3 of the circumference





MENU 1 3 6 0 − (9 0 + 9 0 + 6 0) EXE

1 2 0 ▪ 3 6 0 ▶ × 9 6 EXE

Answer : length =32