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K-12 MCAS-Math

Massachusetts Comprehensive Assessment System



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Question: 1

$F(x) = 5x + 10$. If $x = 10$, then what is the value of $f(x)$?

- A. 25
- B. 60
- C. 12
- D. 5

Answer: B

Explanation:

The equation describes a functional relationship between x and $f(x)$. To solve the equation, substitute 10 as the value of x , such that $f(10) = 5(10) + 10 = 50 + 10 = 60$.

Question: 2

The table below lists values for x and $f(x)$.

x	$f(x)$
1	2
2	5
3	10
4	17
5	26

Which of the following equations describes the relationship between x and $f(x)$?

- a. $f(x) = x + 1$
- b. $f(x) = x^2$
- c. $f(x) = (-x)^2$
- d. $f(x) = x^2 + 1$

Answer: D

Explanation:

For each value of x , $f(x) = x + 1$

$$f(1) = (1)^2 + 1 = (1)(1) + 1 = 1 + 1 = 2$$

$$f(2) = (2)^2 + 1 = (2)(2) + 1 = 4 + 1 = 5$$

$$f(3) = (3)^2 + 1 = (3)(3) + 1 = 9 + 1 = 10$$

$$f(4) = (4)^2 + 1 = (4)(4) + 1 = 16 + 1 = 17$$

$$f(5) = (5)^2 + 1 = (5)(5) + 1 = 25 + 1 = 26$$

Question: 3

Mrs. Rose has 16 students in her class. Her class has three times as many girls as boys. How many girls and boys are in Mrs. Rose's class?

- A. 12 girls, 4 boys
- B. 4 girls, 12 boys
- C. 3 girls, 1 boy
- D. 9 girls, 7 boys

Answer: A

Explanation:

Let x represent the number of boys in Mrs. Rose's class. Since Mrs. Rose has three times as many girls in her class as boys, $3x$ represents the number of girls in Mrs. Rose's class. The total number of students in the class is 16. Written as an equation and solved for x we get:

$$x + 3x = 16$$

$$4x = 16$$

$$x = 4$$

Hence $x = 4$ and $3x = 12$. Therefore, 4 is the number of boys and 12 is the number of girls. Also, $4 + 12 = 16$, the total number of students in the class.

Question: 4

What was Liz's initial weight?

- A. 150 pounds
- B. 170 pounds
- C. 180 pounds
- D. 195 pounds

Answer: C

Explanation:

According to the graph, in month 1, Liz weighed 180 pounds.

Question: 5

How much weight did Liz lose by month 2?

- A. 30 pounds
- B. 20 pounds
- C. 10 pounds
- D. 0 pounds

Answer: A

Explanation:

In month 1, Liz weighed 180 pounds. By month 2, Liz weighed 150 pounds. Since $180 - 150 = 30$, Liz lost 30 pounds by month 2.

Question: 6

Did Liz lose or gain weight from month 2 to month 4? How much weight did Liz lose or gain?

- A. Liz lost 40 pounds
- B. Liz gained 40 pounds
- C. Liz lost 20 pounds
- D. Liz gained 20 pounds

Answer: B

Explanation:

In month 2, Liz weighed 150 pounds but she weighed 190 pounds in month 4. Since $190 - 150 = 40$, Liz gained 40 pounds from month 2 to month 4.

Question: 7

Which of the following statements is not supported by the weight loss data in Figure 1?

- A. Liz lost 30 pounds by the second month of her diet.
- B. Liz weighed more after the fourth month of her diet than she weighed at the beginning of her diet.
- C. Liz experienced slow but consistent weight loss after month 4 of her diet.

D. Liz's rapid weight loss was sustainable for all 12 months of her diet.

Answer: D

Explanation:

Liz experienced a rapid weight loss of 30 pounds by month 2; however she gained 40 pounds over the next 2 months, and her resulting weight was greater than her weight at the beginning of her diet. Therefore, her rapid weight loss was NOT sustainable for all 12 months of her diet.

Question: 8

Which of the following statements is most supported by the weight loss data in Figure 1?

- A. The most Liz weighed was 180 pounds over the entire course of her diet
- B. Liz lost weight every month during the entire 12 months of her diet
- C. Liz did not meet her weight loss goal
- D. Liz met her weight loss goal in month 12 through slow, consistent weight loss over time

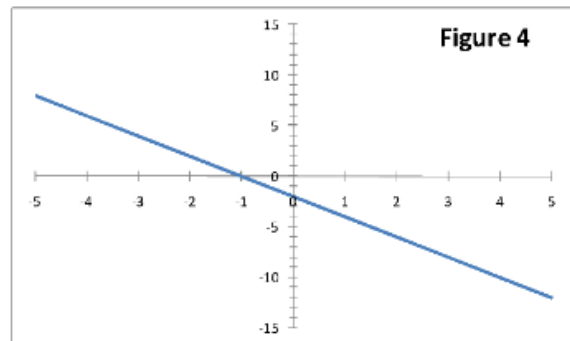
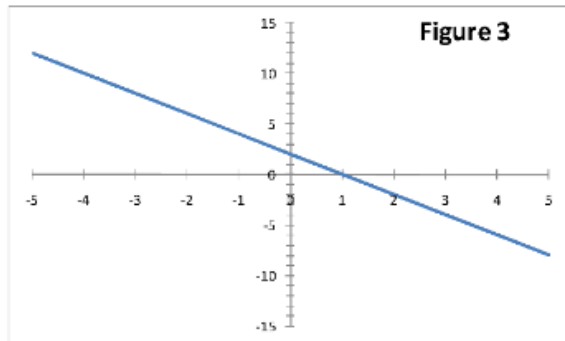
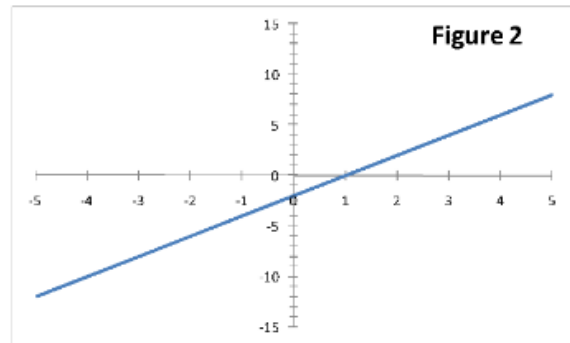
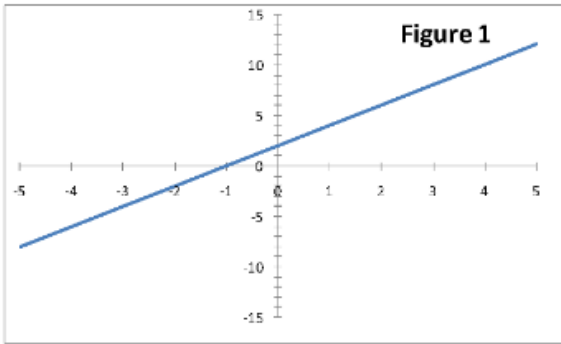
Answer: D

Explanation:

Liz weighed 150 pounds by month 12, which was 30 pounds less than her initial 180 pounds. Thus Liz met her weight loss goal. Furthermore, from month 4 to month 12, Liz lost 5 pounds per month, which means she met her goal through slow, consistent weight loss over time. Answer A is incorrect because Liz weighed 190 pounds during month 4. Answer B is incorrect because Liz gained weight between month 2 and month 4. Answer C is incorrect because Liz did meet her 30 pound weight loss goal.

Question: 9

Which of the following figures contains a graph of the function $y = 2x + 2$?



- A. Figure 1
- B. Figure 2
- C. Figure 3
- D. Figure 4

Answer: A

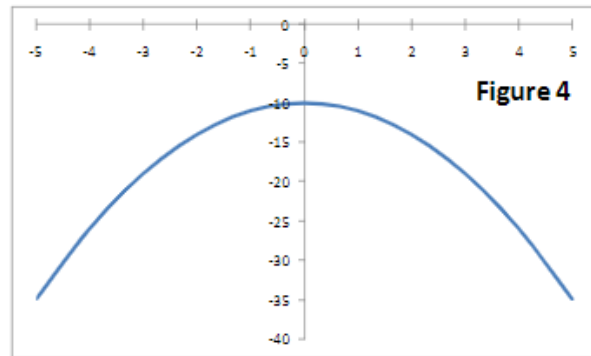
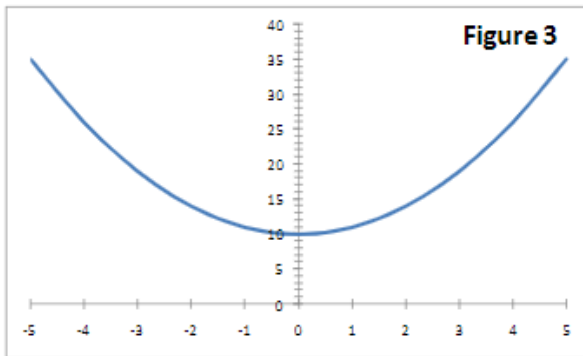
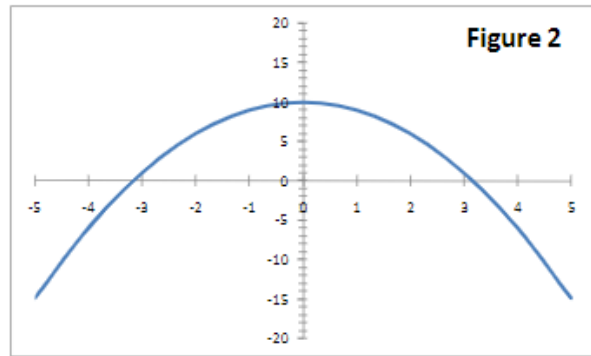
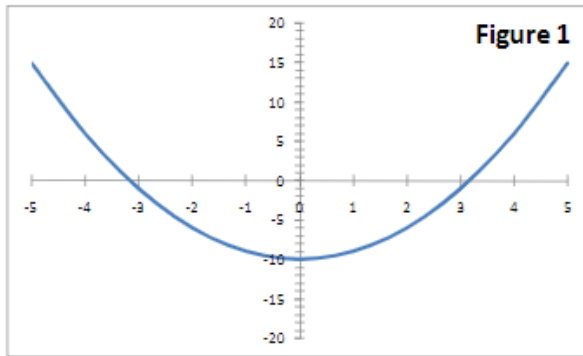
Explanation:

The equation is written in the form of the point slope formula: $y = mx + b$ where m is the slope of the line and b is the y-axis intercept. For the given equation $y = 2x + 2$, the slope of the line is positive 2 and the line intercepts the y-axis at positive 2. The graph in Figure 1 fits these criteria.

The graph in Figure 2 intercepts the y-axis at negative 2. The graphs in Figure 3 and Figure 4 have slopes of negative 2.

Question: 10

Which of the following figures contains a graph of the function $y = x^2 + 10$?



- A. Figure 1
- B. Figure 2
- C. Figure 3
- D. Figure 4

Answer: C

Explanation:

The equation is written in the form $y = Ax^2 + B$ where A tells the concavity of the graph and B is the y-intercept. In this case, A equals positive 1. So the graph is concave up. B equals positive 10. So the graph intercepts the y-axis at positive 10. The graph in Figure 3 fits these criteria. The graph in Figure 1 intercepts the y-axis at negative 10. The graphs in Figure 2 and Figure 4 are concave down.

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