# 5.2 Using Graphs of Functions

ALGEBRA

Write your questions here!

We need to use common vocabulary when describing graphs:

a. Domain _____ The part of the graph with the lowest y-value

b. Range _____ All of the y-values that are needed to graph the function

c. Rate of Change _____ Where the y-value increases when x increases.

d. Minimum _____ Where a graph crosses the x axis

e. Increasing _____ The part of the graph with the highest y value.

f. Decreasing _____ Where the y-value decreases when x increases.

g. Maximum _____ All of the x-values that are needed to graph the function

h. x-Intercept _____ Where the y-value doesn't change when x increases.

i. y-Intercept _____ The slope! How "steep" the line is. $\frac{\Delta y}{\Delta x}$
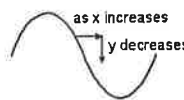
j. Constant _____ Where a graph crosses the y axis
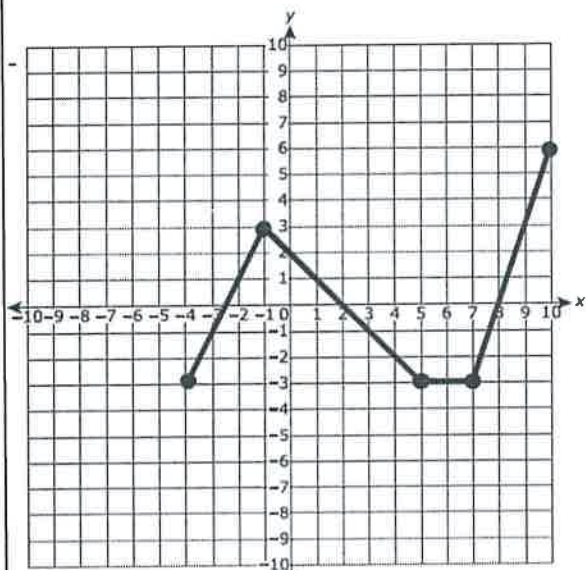
Let's find!!!

x-intercepts: maximum:

y-intercept: minimum:

domain: range:

Where is the graph of $F(x) =$....?

constant?   decreasing?   increasing?
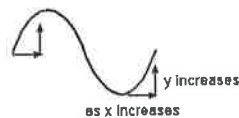
positive?   negative? $F(3) =$ _____ $F(-2) =$ _____

Where is $F(x) = 1$?   Where is $F(x) = 1$?   Where is $F(x) = 3$?   Where is $F(x) = -4$?

Estimate the rate of change when $x = 2$.   Estimate the rate of change when $x = 9$.

Ex2.

Find $F(3) =$ Find x if $F(x) = -5$.

Find x if $F(x) = 1$.   Find $F(-7)$
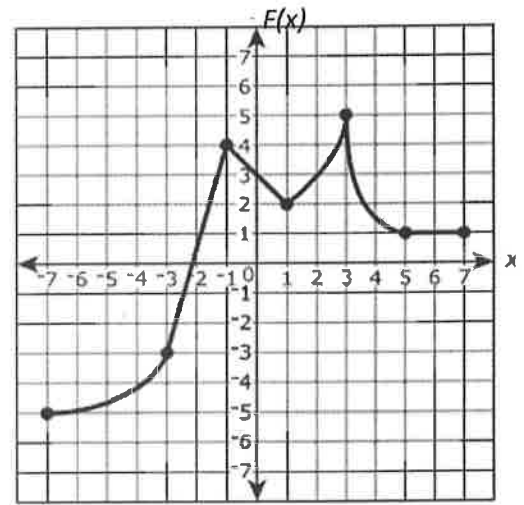
Find the minimum.   Find the maximum.

Find the domain.   Find the range.

Where is the function constant?   What is the rate of change when $x = -2$?

Where is the function decreasing?   Where is the function increasing?

Ex 3 . One day, Sully made a quick trip to the local library. On the way home, he stopped for some ice cream. The graph shows Sully's distance from home.

Where is the graph increasing? What is happening at this time?

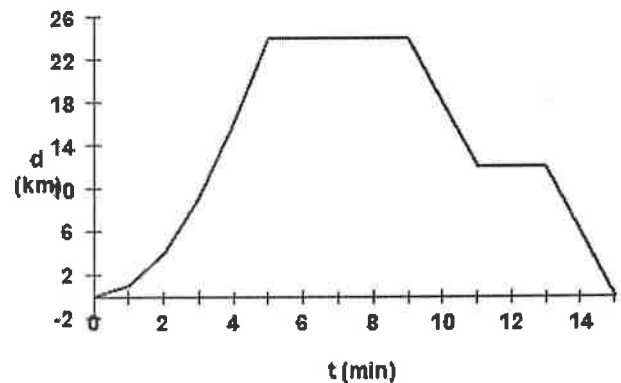Explain what the x-intercepts represent in this situation.

And the y-intercept?

Where is the distance constant?

Distance vs Time

Estimate the rate of change 10 minutes after Sully started.

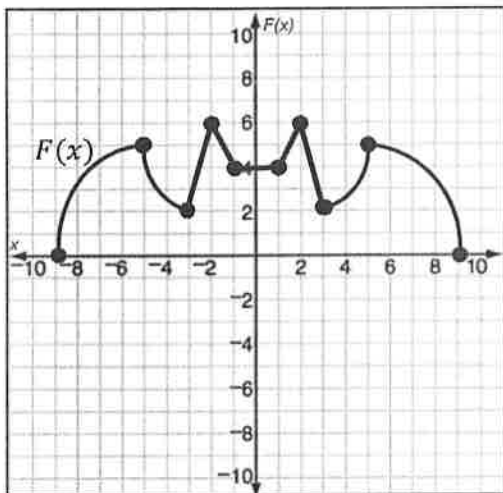What does $F(4)$ mean in the context of this problem?   What about $F(x) = 4$?

Graphs of Functions

Find the values using the graph.

1. $F(3) =$

2. $F(0) =$

3. y-intercept =

4. x-intercepts =

5. Where is $F(x)$ decreasing?

6. Where is $F(x)$ negative?

7. Where is $F(x)$ increasing?

8. Where is $F(x)$ constant?

9. $F(-4) =$

10. $F(8) =$

11. If $F(x) = 0$, find x.

12. If $F(x) = 4$, find x.

13. If $F(x) = -4$, find x.

14. $F(-2) =$

15. What is the domain of $F(x)$?

16. What is the range of $F(x)$?

17. What is the maximum of $F(x)$?

18. What is the range of $F(x)$?

19. $F(8) =$

20. If $F(x) = -4$, find x.

21. Where is $F(x)$ decreasing?

22. What is the maximum of $F(x)$?

23. x-intercepts =

24. y-intercept =

25. If $F(x) = 0$, find x.

26. $F(-4) =$

27. Where is $F(x)$ increasing?

28. $F(2) =$

29. What is the domain of $F(x)$?

30. Where does $F(x)$ have a constant rate of change?

31. Where is $F(x)$ positive?

32. If $F(x) = 8$, find x.

33. Where is $F(x)$ negative?

34. What is the minimum of $F(x)$?

35. $F(7) =$

36. What part(s) of the domain are nonlinear?

37. What part(s) of the domain are linear?

38. If $F(x) = -3$, find x.

39. What is the range of $F(x)$?   40. $F(9) =$ 41. If $F(x) = -4$, find x.

42. What is the domain of $F(x)$?   43. Where is $F(x)$ increasing?

44. x-intercepts =   45. y-intercept =   46. If $F(x) = 0$, find x.

47. $F(-1) =$ 48. Where is $F(x)$ positive?

---

49. Which statements are true? Select **ALL** that apply!

i.   The function is linear between $x = 2$ and $x = 4$.

ii.   The function is linear between $x = 6$ and $x = 8$.

iii.   The function is decreasing between $x = -9$ and $x = -6$.

iv.   The function is increasing and linear between $x = -4$ and $x = -1$.

v.   The function is decreasing and nonlinear between $x = -1$ and $x = 2$.
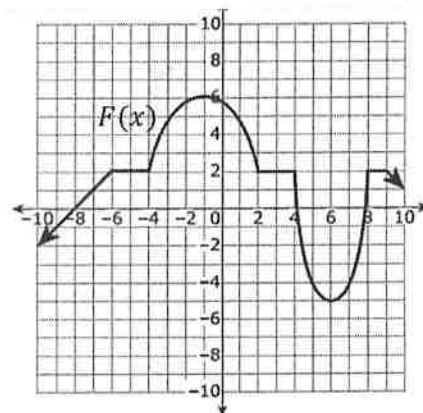
54.   The graph below shows Corey's trip to get his burger. Match up each sentence with a piece of the graph.
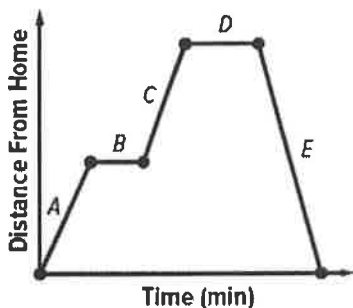
_____ Corey practically runs home to catch **Dancing with The Stars.**

_____ Corey walks from the ATM to the JR Rockers, his most favorite restaurant.

_____ Corey remembers he's broke and stops to gets some money out of the ATM.

_____ Corey leaves home. He is feeling "hangry."

_____ Corey sits down at JR Rockers and eats his burger.

The school is 100 meters from Bean's house. The following describes his most recent trip:

- ✓ He walked 50 meters toward school in 2 minutes. He realized he left a book at home.
- ✓ He turned around and walked home at the same speed.
- ✓ He spend 1 minute looking for his book.
- ✓ He walked all the way to school at twice his original speed.

Finish a graph that accurately represents Bean's trip.
(The x-axis displays time in minutes - counting up by 1 s.
The y-axis displays Bean's distance from home.)
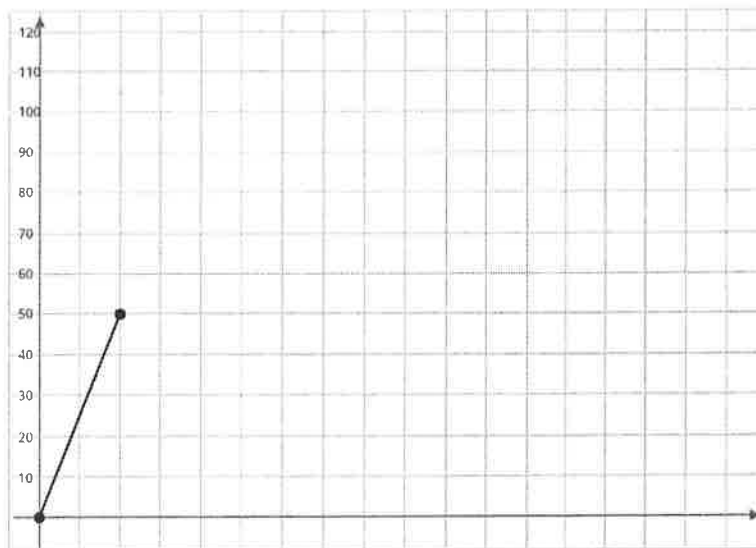
Graphs of Functions

1. Where is $F(x)$ negative?   2.   Where is $F(x)$ increasing?

3. $F(-4) =$ 4. If $F(x) = 0$, find x.   5. What is the domain of $F(x)$?

6. Where is $F(x)$ constant?   7. Estimate the rate of change at $x = -9$.
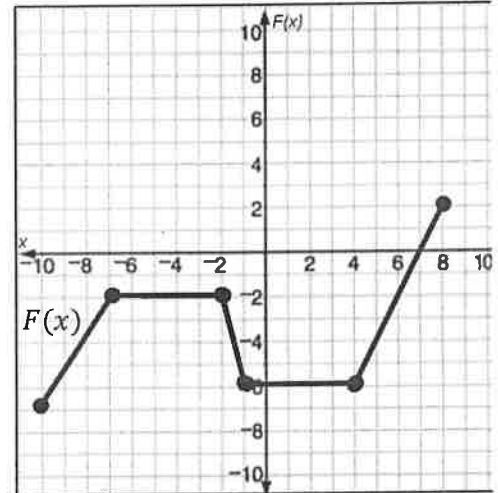
8.2 EXIT TICKET –

1. Sketch a graph that has the following characteristics:

a. $F(-4) = 8$
b. For $2 \le x \le 5$, the graph is increasing.
c. For $-9 \le x \le -4$, the graph is decreasing.
d. The y intercept is 2.
e. The x intercepts are 1 and 5.
f. For $-4 \le x \le 2$, the graph is nonlinear.
g. The rate of change for $5 \le x \le 7$ is -2.
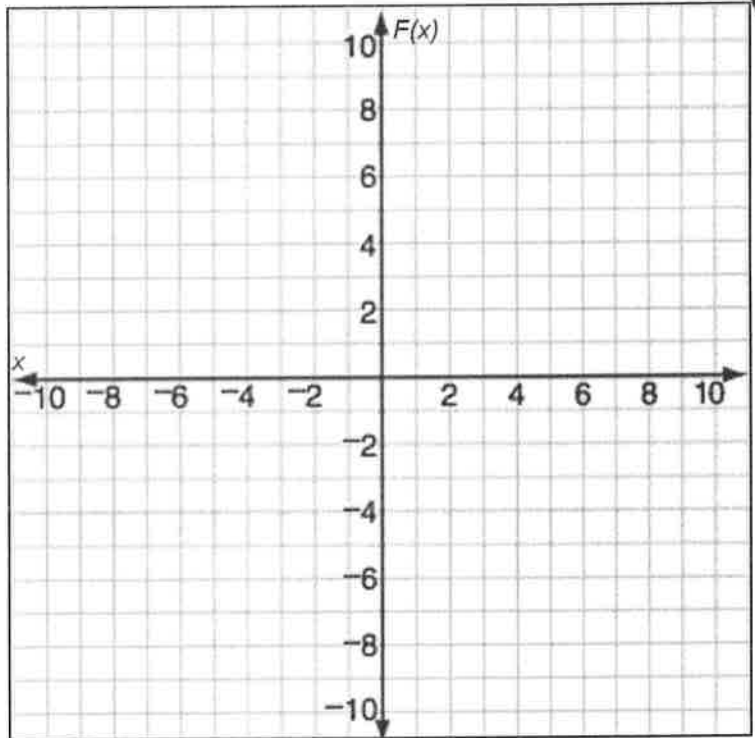
2. How would you explain to a student who was absent what the **rate of change** is? Be sure to use a complete sentence and tell the difference between *positive* and *negative* rate of change.