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- waiting to get onto counter
  rate = 0

/ moving onto counter
  rate = $\frac{5}{4}$ ft/sec

- stopped
  rate = 0

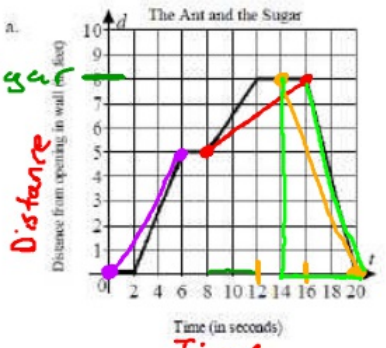
/ walking at a rate
  $\frac{3}{4}$ ft/sec

- collects sugar for 4 seconds

\ back to the hole
  rate = $\frac{-8}{4}$ = -2 ft/sec

A scout ant discovers that sugar has been spilled on Karen's kitchen countertop. The ant marks a straight line trail from the sugar back to the hole in the wall where ants can crawl directly onto the countertop. The sugar is 8 feet from the hole in the wall. The graph and table below describe the movement of the Ant along a path that is a straight line.

a.



t	d(t)
0	0
2	0
6	5
8	5
12	8
16	8
18	4
20	0

2. Find the average rate of change of the Ant during the interval(s) it is heading back toward the wall.
   slope = -2 ft/sec

3. At what intervals is the slope negative. What is the slope on those intervals.
   time $t=16$ to $t=20$ (16, 20) slope = -2 ft/sec

4. At what intervals is the slope positive. What is the slope on those intervals.
   (2, 6) → slope = $\frac{5}{4}$
   (8, 12) → slope = $\frac{3}{4}$

5. At what intervals is the slope constant. What is the slope on those intervals.
   Horizontal lines (0, 2) (6, 8) (12, 16) m = 0

6. What is the average speed of the ant on the interval $0 \le t \le 6$
   slope = $\frac{5}{6}$ ft/sec

7. What is the average speed of the ant on the interval $8 \le t \le 16$
   $\frac{3}{8}$ ft/sec

8. What is the average speed of the ant on the interval $14 \le t \le 20$
   $\frac{-8}{6} = \frac{-4}{3}$ ft/sec

A scout ant discovers that sugar has been spilled on Karen's kitchen countertop. The ant marks a straight line trail from the sugar back to the hole in the wall where ants can crawl directly onto the countertop. The sugar is 8 feet from the hole in the wall. The graph and table below describe the movement of the Ant along a path that is a straight line.

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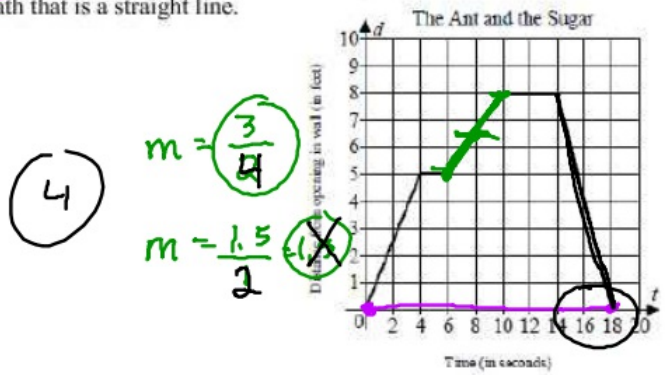


t	d(t)
0	0
4	5
6	5
10	8
14	8
16	4
18	0

1. What is the Ant's average speed for the time interval $0 \le t \le 18$. Include units.

0 ft/sec

2. What is the Ant's average speed for the time interval $0 \le t \le 5$. Include units.

3. What is the Ant's average speed for the time interval $0 \le t \le 10$. Include units.

4. What is the Ant's average speed for the time interval $6 \le t \le 8$. Include units.

5. What is the Ant's average speed for the time interval $6 \le t \le 14$. Include units.

6. What is the Ant's average speed for the time interval $14 \le t \le 18$. Include units.

7. According to the graph when was the Ant moving the fastest?

8. According to the graph when was the Ant moving the slowest?

Using the table, find the average rate of change over the following intervals

Slope

x	$f(x)$
0	5
1	1
2	−3
3	−7
4	−11

$\Delta x = 1$ $\Delta y = -4$

a) from $x = 0$ to $x = 2$

$AROC = -\frac{4}{1}$

b) from $x = 1$ to $x = 4$

$AROC = -\frac{4}{1}$

c) from $x = 3$ to $x = 4$

$AROC = -\frac{4}{1}$

Use the equations below to find the average rate of change on the given intervals

1. $y = 4x + 3$ $y = 4x + 3$ $m = 4$

a) $x = 0$ to $x = 2$ $m = \frac{4}{1}$

b) $x = 1$ to $x = 4$ $m = \frac{4}{1}$

c) $x = -5$ to $x = -1$ $m = \frac{4}{1}$

2. $y = \frac{-2}{3}x + 1$ $m = -\frac{2}{3}$

a) $x = 0$ to $x = 2$ $AROC = -\frac{2}{3}$

b) $x = 1$ to $x = 4$ $AROC = -\frac{2}{3}$

c) $x = -5$ to $x = -1$ $AROC = -\frac{2}{3}$

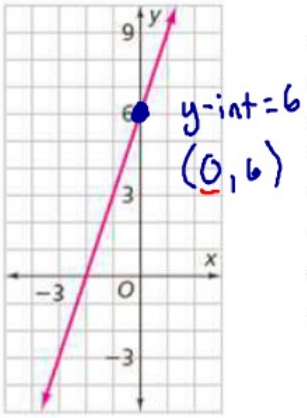
$y = mx + b$

Finding the *y*-intercept of a line

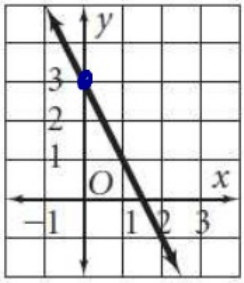
The y-intercept is the *y* - coordinate of the point where a line crosses the *y*-axis, it's also the initial value when $x = 0$.

y-axis

y-int = 4
b = 4
(0, 4)



y-int = 6
(0, 6)



y-int (0, 3)
b = 3

Determining the *y*-intercept of a table Find where $x = 0$

a.

x	−6	−4	−2	0	2	4
y	−10	−7	−4	−1	2	5

y-int (0, −1)
b = −1

b.

x	1	2	3	4	5	6
y	4.5	4.0	3.5	3.0	2.5	2.0

0
5

y-int (0, 5)
b = 5

c.

x	y
-4	-4
-2	0
0	4
2	8

y-int →

Squeaky Clean Car Wash Charges

Time (min)	5	10	15	20	25
Charge	$8	$13	$18	$23	$28

0
$3

y-int = 3

x	y
0	60
5	50
10	40
15	30
20	20

y-int = 60