Pre-Assessment: Rate of Change

1. Two runners are racing. Who is moving faster? How fast is that runner?

Runner A

time (sec)	*distance traveled (m)*
0	0
5	30
10	60
15	90
20	120

Runner B

time (sec)	*distance traveled (m)*
0	0
5	25
10	50
15	75
20	100

2. Two submarines are diving. Which one is diving faster? How fast is that submarine diving?

Submarine 1

time (min)	*depth (m)*
0	-100
1	-120
2	-140
3	-160
4	-180

Submarine 2

time (min)	*depth (m)*
0	-100
1	-80
2	-60
3	-40
4	-20

3. Two trains are on parallel tracks. Which one is moving faster? How fast is that train?

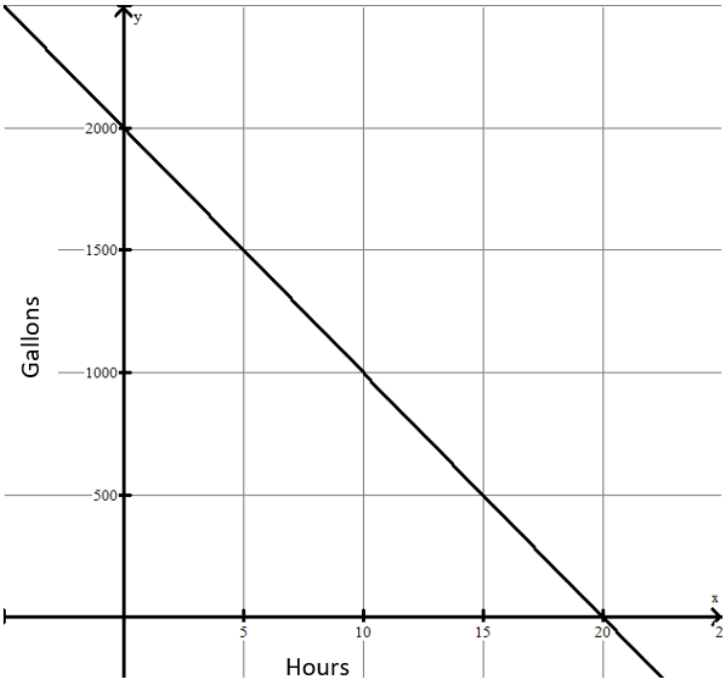
Train Alpha

time (hr)	*distance traveled (mi)*
0	0
2	50
4	100
6	150
8	200

Train Beta

time (hr)	*distance traveled (mi)*
0	0
3	50
6	100
9	150
12	200

4. How fast is the water flowing out of the tank?



Pre-Assessment: Rate of Change Answer Key

1. Two runners are racing. Who is moving faster? How fast is that runner?

Runner A

time (sec)	*distance traveled (m)*
0	0
5	30
10	60
15	90
20	120

Runner B

time (sec)	*distance traveled (m)*
0	0
5	25
10	50
15	75
20	100

Answer: Runner A is moving faster. Runner A is moving at 6 meters per second (m/s) whereas Runner B is moving at 5 meters per second (m/s).

2. Two submarines are diving. Which one is diving faster? How fast is that submarine diving?

Submarine 1

time (min)	*depth (m)*
0	-100
1	-120
2	-140
3	-160
4	-180

Submarine 2

time (min)	*depth (m)*
0	-100
1	-80
2	-60
3	-40
4	-20

Answer: Both submarines are moving at 20 meters per minute (m/min). Submarine 1 is moving down deeper in the water. Submarine 2 is moving towards the surface.

3. Two trains are on parallel tracks. Which one is moving faster? How fast is that train?

Train Alpha

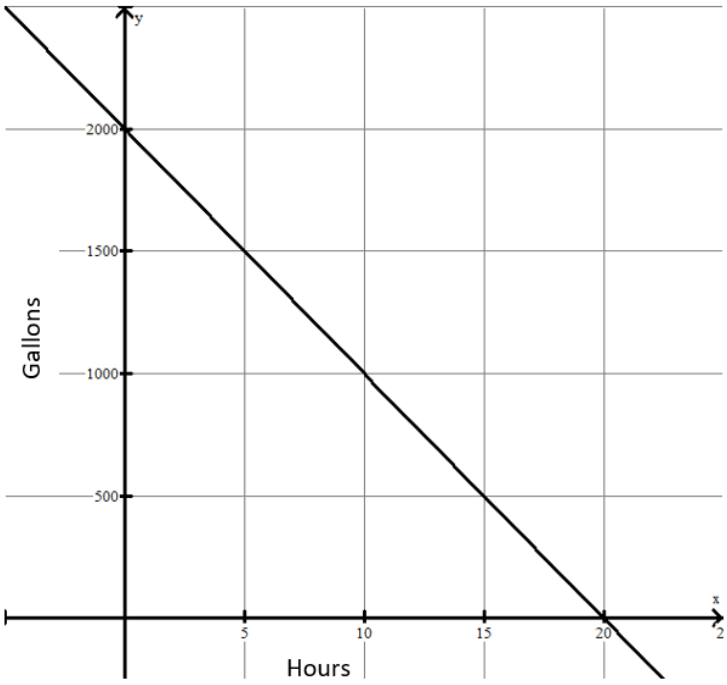
time (hr)	*distance traveled (mi)*
0	0
2	50
4	100
6	150
8	200

Train Beta

time (hr)	*distance traveled (mi)*
0	0
3	50
6	100
9	150
12	200

Answer: Train Alpha is moving faster. Train Alpha is moving 25 miles per hour (mi/hr). Train Beta is moving $\frac{50}{3}$ miles per hour (mi/hr) or $16.\overline{6}$ miles per hour (mi/hr).

4. How fast is the water flowing out of the tank?



Answer: The water is flowing out of the tank at 100 gallons per hour (gal/hr).