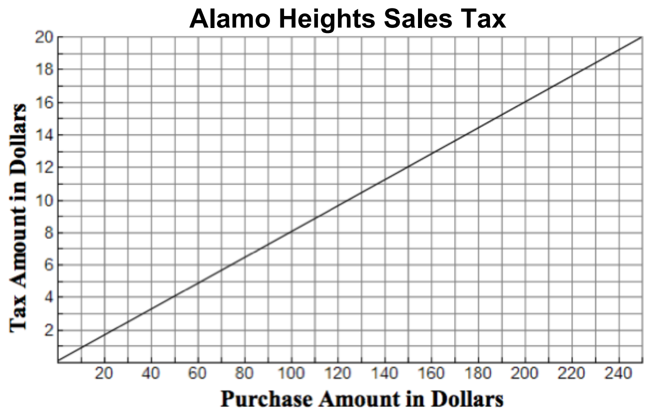
CATEGORY 2 - Readiness Standard 3.B

Calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems.

Calculate the rate of change for each situation.

1



Rate of Change:

$0.08 per dollar of purchases.

2 The level of gas in a truck's tank depends on how many miles have been driven. The table shows the gas level during a trip.

miles driven	0	50	125	175	250
gallons of gas in tank	20	16	10	6	0

Rate of Change:

-0.08 gallons per mile

3 The function *f(x)* = 15 + 40*x* describes the cost for a group of *x* people to park one vehicle and purchase tickets at a theme park.

Rate of Change:

$40 per person

4 The table shows a bank's monthly service fee as a function of the number of transactions.

# of transactions	0	10	15	20	30
monthly fee ($)	5.00	6.50	7.25	8.00	9.50

Rate of Change:

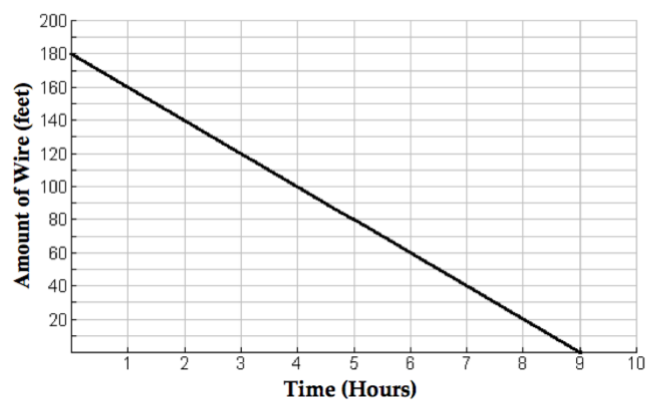
$0.15 per transaction

5 The function $f(x) = \frac{1}{4}x + 2$ represents the number of cups of frosting needed to decorate x cupcakes and a layer cake.

Rate of Change:

1/4 cup of frosting per cupcake

6 A machine takes soldering wire from a spool and uses it to make electronic components. The graph shows the amount of wire left on the spool during a work shift.



Rate of Change:

-20 feet per hour

CATEGORY 5 - Supporting Standard 9.B

Interpret the meaning of the values of a and b in exponential functions of the form $f(x) = ab^x$ in real-world problems.

For each situation, explain the significance of each number in the equation as in the example.

Example: *The function $f(x) = 340(1.07)^x$ describes the dollar value of an acre of land x years since Mrs. Brown acquired it.*

340: The land was acquired for $340.

1.07: Each year the value of the land is 100% + 7% = 107% of what it was the previous year.

1 Mr. Gilligan purchased a new tractor. The function $f(x) = 35{,}000(0.87)^x$ describes the value of the tractor x years from the date of purchase.

35,000: **The tractor cost $35,000.**

0.87: **Each year the tractor is worth 100% - 13% = 87% of what it was the previous year.**

2 The profit of a business for its first month in operation can be estimated using the function $f(x) = 4{,}034(1.1)^x$, where x is the number of months after the business was started.

4,034: **The first month's profit was $4034.**

1.1: **Each month the profit is expected to be 100% + 10% = 110% of what it was the previous month.**

3 The function $f(x) = 180(1.03)^x$ describes the balance in a savings account x years from the date the only deposit was made.

180: **$180 was deposited when the account was opened.**

1.03: **Each year the balance in the account is 100% + 3% = 103% of what it was the previous year.**

4 A radioactive isotope has a half-life of one day. The function $f(x) = 850(0.5)^x$ describes the mass, in grams, of a sample of the isotope x days after it was first measured.

850: **The sample had an initial mass of 850 g**

0.5: **Each day the mass is 100% - 50% = 50% of what is was the previous day.**

