## 1.14 Function Model Construction

AP Precalculus – Calculator Allowed Name: _____ **CA #1**

**Use regression to answer the following.**

1.

| $x$ | $f(x)$ |
|---|---|
| 14 | 48 |
| 18 | 50 |
| 28 | 53 |
| 33 | 64 |
| 35 | 70 |
| 38 | 75 |
| 41 | 84 |
| 48 | 105 |
| 53 | 138 |

a. The data can be modeled by the function $f$ given by $f(x) = ax^2 + bx + c$, where $f(x)$ is the rating based on the month *t.* Find the value of $a, b$ and $c$.

b. Use your equation to find the average rate of change from 20 to 40.

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2. College students were asked how many classes they missed semester one and their grade in class.

| Missed Classes | Grade % |
|---|---|
| 1 | 88 |
| 1 | 91 |
| 3 | 82 |
| 4 | 79 |
| 6 | 73 |
| 6 | 71 |
| 8 | 65 |

a. The grade earned can be modeled by the function $G$ given by $G(n) = an + b$, where $G(n)$ is the rating based on the number of missed classes *n.* Find the value of $a$ and $b$.

b. Use your equation to predict the grade of college student that misses 5 classes.

**Construct an inversely proportional model to answer the following.**

3. The value of $y$ is inversely proportional to product of 4 and $x$ squared. If $y = 12$ when $x = 2$, then find the value of $y$ when $x = 6$

4. The time it takes to mow a lawn is inversely proportional to the number of workers. If it takes 3 workers 45 minutes to mow a lawn, how long will it take for 4 workers to mow the lawn?

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**Use the piecewise function to answer the following.**

5.

$$f(x) = \begin{cases} \sqrt{x+1}, & 0 \le x \le 3 \\ 2x - 4, & 3 < x < 10 \\ 16, & 10 \le x \le 12 \end{cases}$$

a. Find $f(3)$.

b. Find $f(6)$.

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6. A fast food company pays \$12 per hour for regular pay. Overtime pay is time and half.

$$P(h) = \begin{cases} 12h\,, & 0 \le h \le 40 \\ 18(h-40) + 480\,, & h > 40 \end{cases}$$

a. Find $P(48)$.

b. Find $P(40)$.

## Answers to 1.14 CA #1

| | |
|---|---|
| 1.<br>a. $a = 0.073$<br>$b = -2.754$<br>$a = 73.845$<br>b. 1.626 | 2.<br>a. $a = -3.487$<br>$b = 92.873$<br>b. 75.438% |
| 3. 1.333 | 4. 33.75 minutes |
| 5.<br>a. $f(3) = 2$<br>b. $f(6) = 8$ | 6.<br>a. $P(48) = 624$<br>b. $P(40) = 480$ |

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