

Name Key

Period \_\_\_\_\_

**Categorical vs. Quantitative Variables**  
**Categorical Graphs**

1. Data from a medical study contain values of many variables for each of the people who were the subjects of the study. Which of the following variables are categorical and which are quantitative? If you believe a variable to be quantitative, further decide if it is discrete (can be counted) or continuous (must be measured).

(a) Gender (female or male) *Categorical*

(b) Age (years) *Quantitative Discrete*

(c) Race *Categorical*

(d) Smoker (yes or no) *Categorical*

(e) Systolic blood pressure (millimeters of mercury) *Quantitative Continuous*

(f) Level of calcium in the blood (micrograms per milliliter) *Quantitative Continuous*

2. A table represents data on the states. The first column identifies the states. Each of the remaining seven columns contains values of a variable. Which of these variables are categorical and which are quantitative? If quantitative, state whether it is discrete or continuous.

(a) Region of the country *Categorical*

(b) Population (in thousands of people) *Quantitative Discrete*

(c) SAT verbal state average *Quantitative Continuous*

(d) SAT math state average *Quantitative Continuous*

(e) Percent of students in state taking SAT *Quantitative Discrete*

(f) Dollars spent on public education per pupil *Quantitative Continuous*

(g) Average teacher's pay (in thousands of dollars) *Quantitative Continuous*

3. **Graphs:** Email spam is the curse of the internet. Here is a compilation of the most common types of spam:

Type of Spam	Percent
Adult	19
Financial	20
Health	7
Internet	7
Leisure	6
Products	25
Scams	9
Other	??

- (a) What percent of spam would fall in the "other" category? *7%*
- (b) Display this data in a bar graph. Use graph paper and a formal neat presentation with all the required elements.
4. **Graphs:** Births are not evenly distributed across the days of the week. Here are the average number of babies born on each day of the week in the United States in a recent year:

Day	Births
Sunday	7,374
Monday	11,704
Tuesday	13,169
Wednesday	13,038
Thursday	13,013
Friday	12,664
Saturday	8,459

- (a) Present these data in a well-labeled bar graph.
- (b) Suggest some possible reasons why there are fewer births in the weekends.  
*Stress of the work week brings on labor.  
 Less babies induced on the weekends.*
5. In July 1991 and again in April 2001, the Gallup poll asked random samples of 1015 adults about their opinions on working parents. The table summarizes responses to this question:

*"Considering the needs of both parents and children, which of the following do you see as the ideal family in today's society?"*

Based on these results, do you think there was a change in people's attitudes during the 10 years between these polls? Support your conclusions using a segmented or side-by-side bar graph.  
*There seems to be little change based on the bar graph.*

Response	1991	2001
Both Work Full Time	142 <i>.14</i>	131 <i>.13</i>
One works full time, the other part time	274 <i>.27</i>	244 <i>.24</i>
One works, the other works at home	152 <i>.15</i>	173 <i>.17</i>
One works, the other stays at home with the kids	396 <i>.39</i>	416 <i>.41</i>
No opinion	51 <i>.05</i>	51 <i>.05</i>

*1015*

*1015*

6. **Graphs:** In the year 2000, the Centers for Disease Control (CDC) estimated that 19.8% of Americans over 15 years old were obese. The CDC conducts a survey on obesity and various behaviors. Here is a table on self-reported exercise classified by body mass index (BMI):

Physical Activity	Normal BMI (%)	Overweight BMI (%)	Obese BMI (%)
Inactive	23.8	26.0	35.6
Irregularly Active	27.8	28.7	28.1
Regular, not intense	31.6	31.1	27.2
Regular, intense	16.8	14.2	9.1

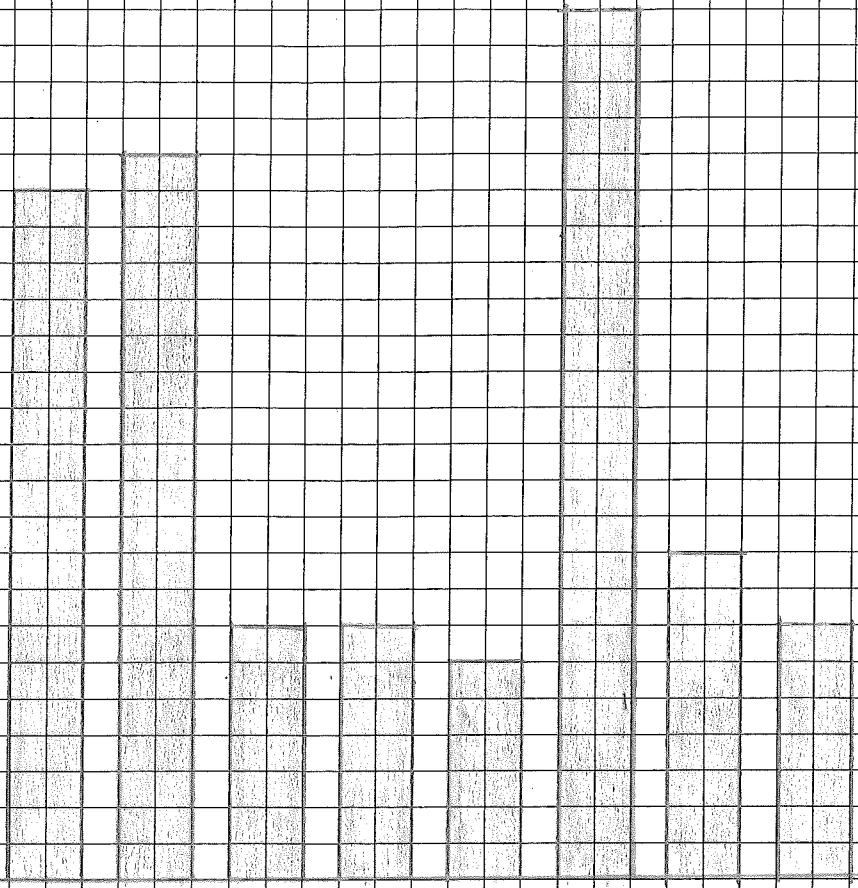
- (a) Construct a segmented bar graph to show the different percentages of physical activity for the three BMI Groups.
- (b) Do these data prove that lack of exercise causes obesity? Explain.

The data fails to "prove" anything. There may be other factors behind obesity besides exercising.

# Type of Spam Email Received

Relative Frequency of Occurrence

0.01  
0.02  
0.03  
0.04  
0.05  
0.06  
0.07  
0.08  
0.09  
0.10  
0.11  
0.12  
0.13  
0.14  
0.15  
0.16  
0.17  
0.18  
0.19  
0.20  
0.21  
0.22  
0.23  
0.24  
0.25  
0.26  
0.27  
0.28  
0.29  
0.30  
0.31  
0.32  
0.33  
0.34  
0.35  
0.36  
0.37  
0.38  
0.39  
0.40  
0.41  
0.42  
0.43  
0.44  
0.45  
0.46  
0.47  
0.48  
0.49  
0.50  
0.51  
0.52  
0.53  
0.54  
0.55  
0.56  
0.57  
0.58  
0.59  
0.60  
0.61  
0.62  
0.63  
0.64  
0.65  
0.66  
0.67  
0.68  
0.69  
0.70  
0.71  
0.72  
0.73  
0.74  
0.75  
0.76  
0.77  
0.78  
0.79  
0.80  
0.81  
0.82  
0.83  
0.84  
0.85  
0.86  
0.87  
0.88  
0.89  
0.90  
0.91  
0.92  
0.93  
0.94  
0.95  
0.96  
0.97  
0.98  
0.99  
1.00



Type of Spam

Adult

Financial

Health

Internet

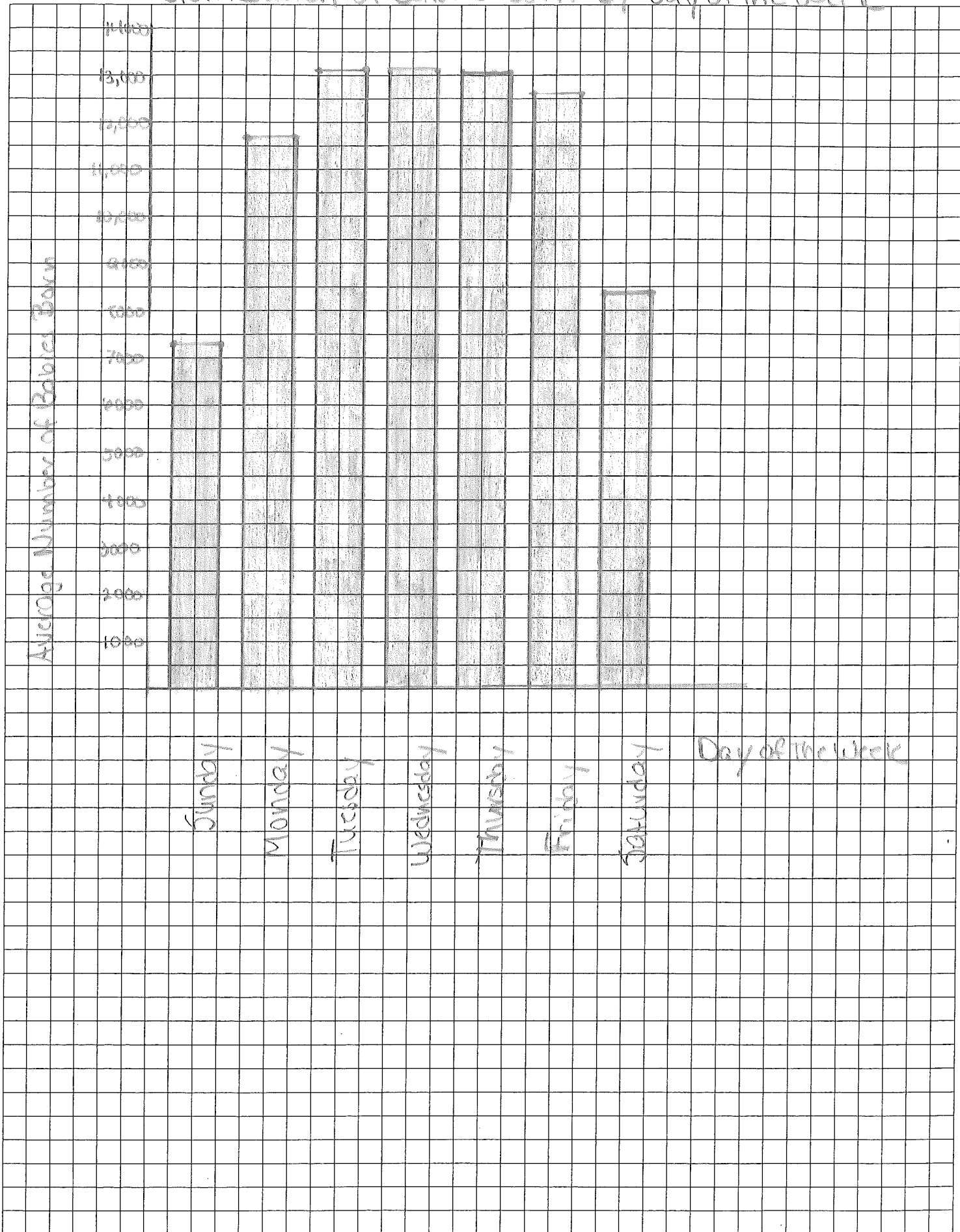
Leisure

Products

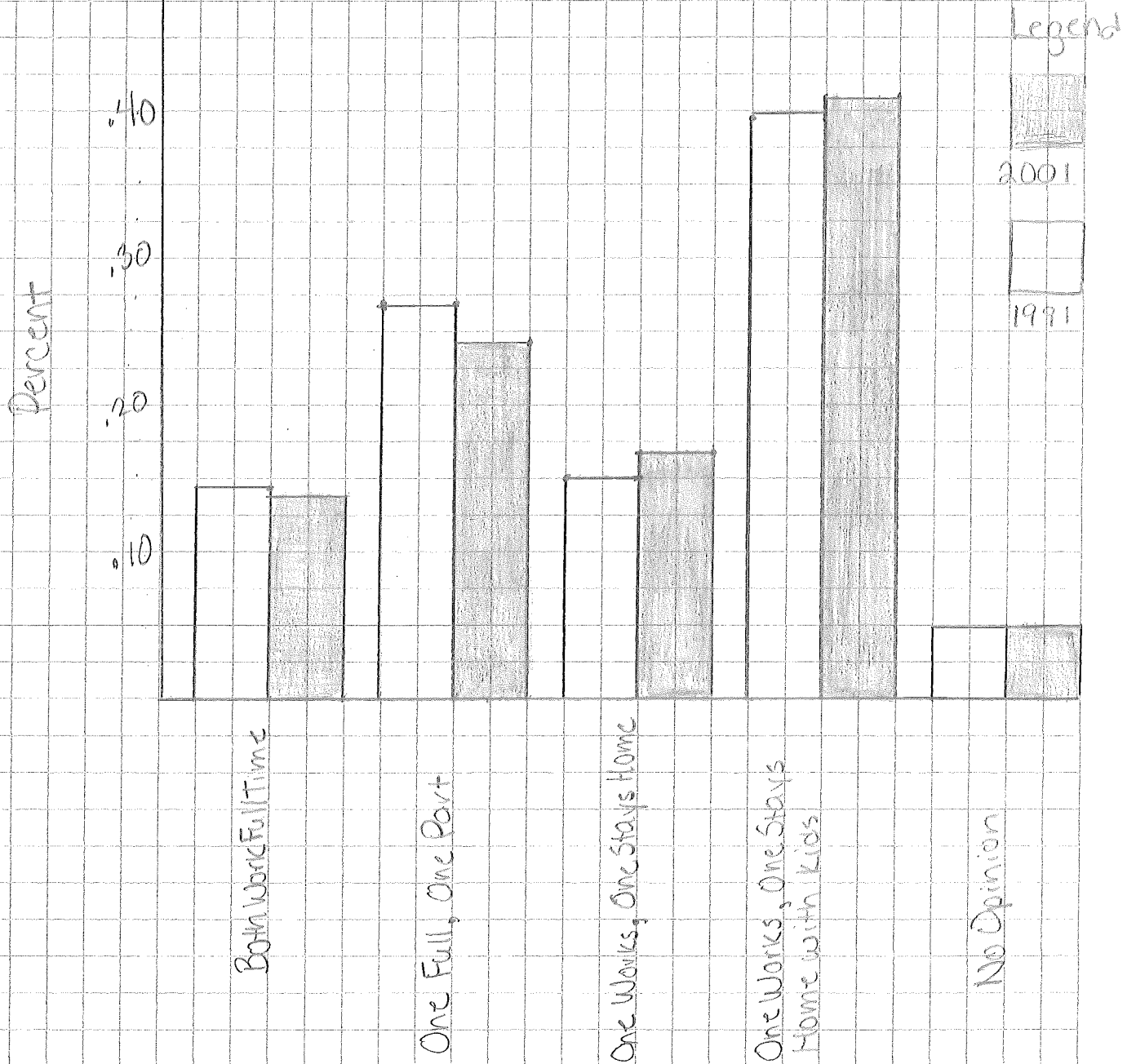
Scams

Other

Distribution of Babies Born By Day of the Week



# Opinions About Working Parents - 1991 vs 2001



# Obesity Vs Exercise Behavior

