Histograms

Objectives

1. Create and interpret histograms

Histograms of Quantitative Data

A histogram is like a bar graph but without any gaps between consecutive bars.

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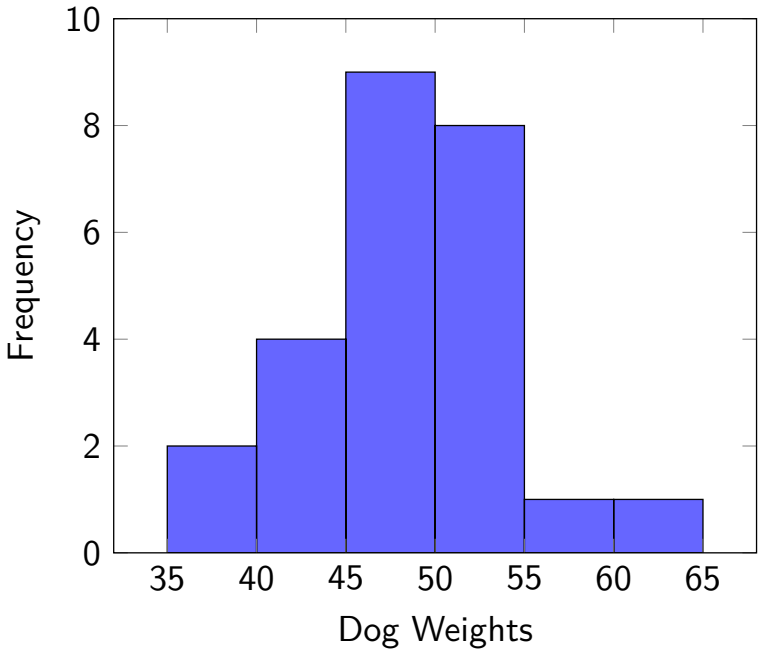
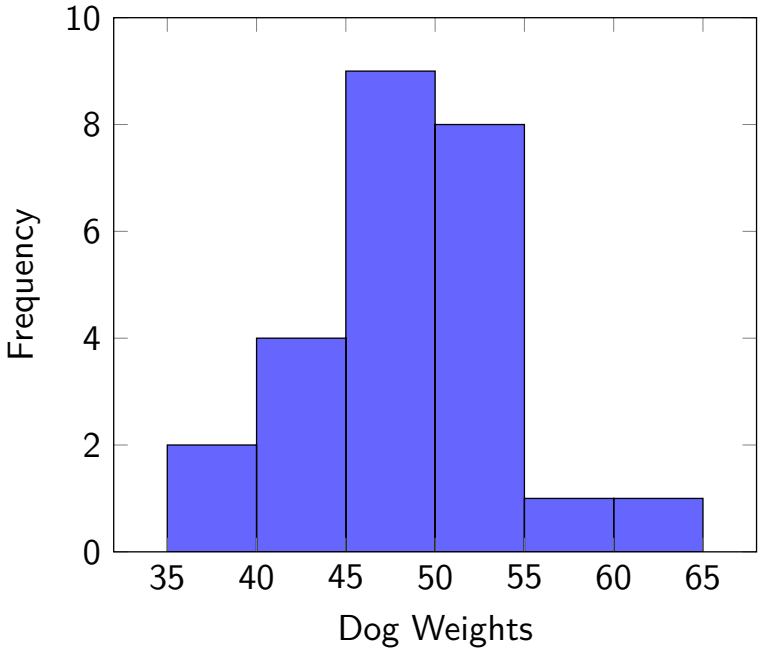


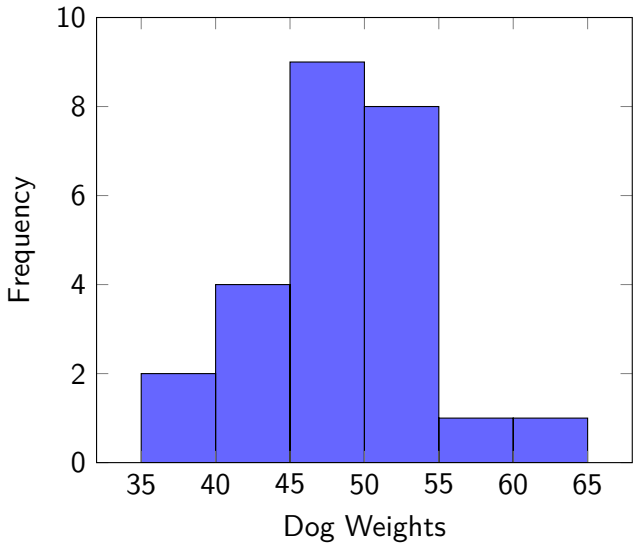
Histograms of Quantitative Data

A histogram is like a bar graph but without any gaps between consecutive bars.



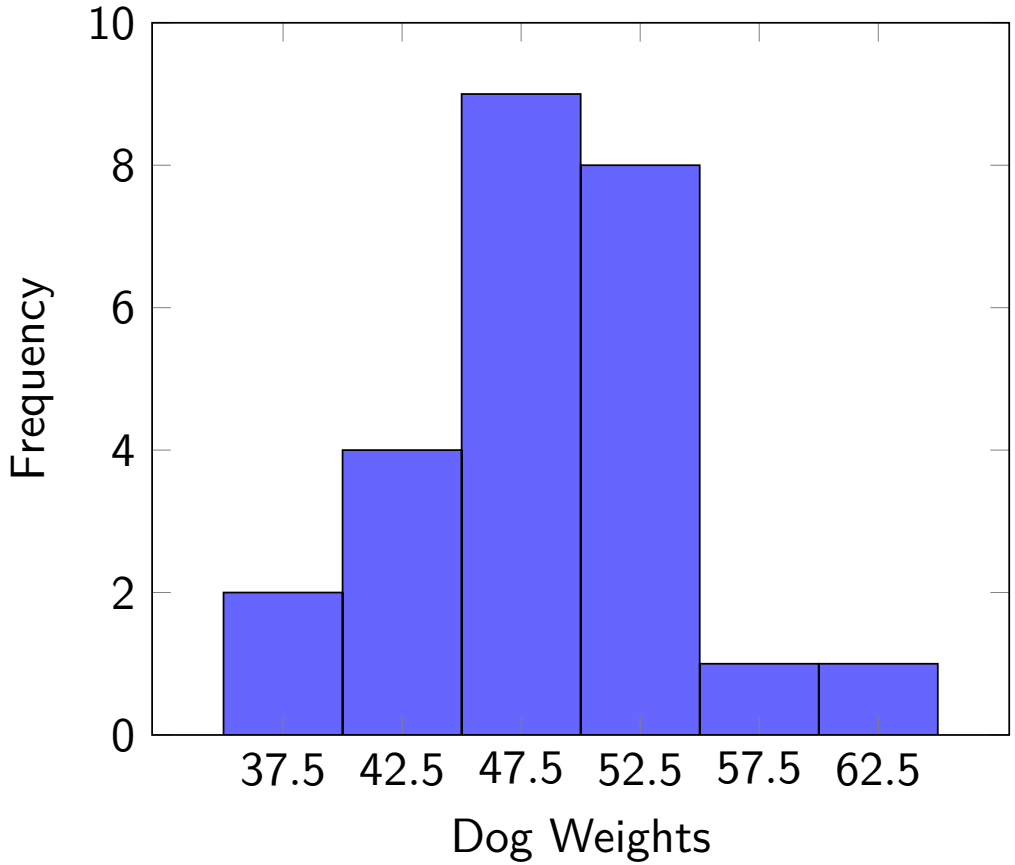
Each bar is called a **class**, and in the histogram above, the class width is 5.

Histograms of Quantitative Data



Class	Frequency	Class Midpoint
$35 \leq x < 40$	2	37.5
$40 \leq x < 45$	4	42.5
$45 \leq x < 50$	9	47.5
$50 \leq x < 55$	8	52.5
$55 \leq x < 60$	1	57.5
$60 \leq x < 65$	1	62.5

Histogram with Class Midpoints



Relative Frequency Histogram

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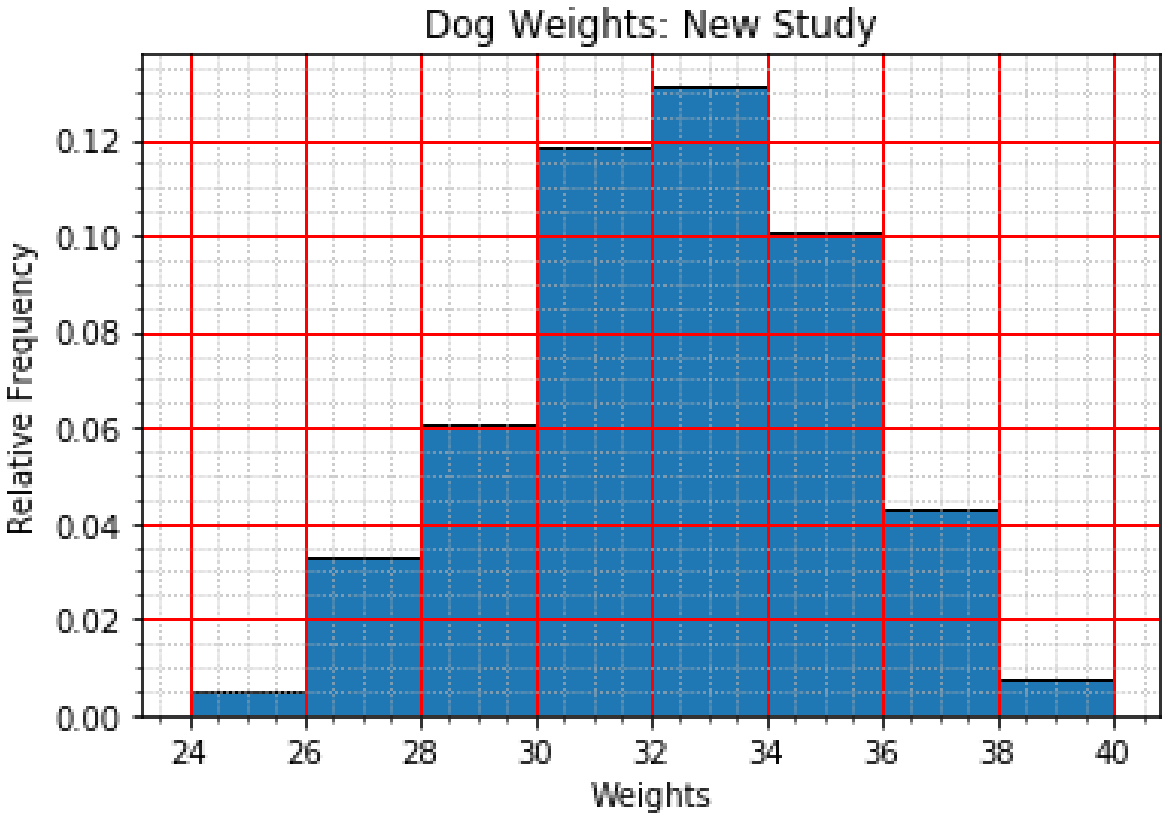
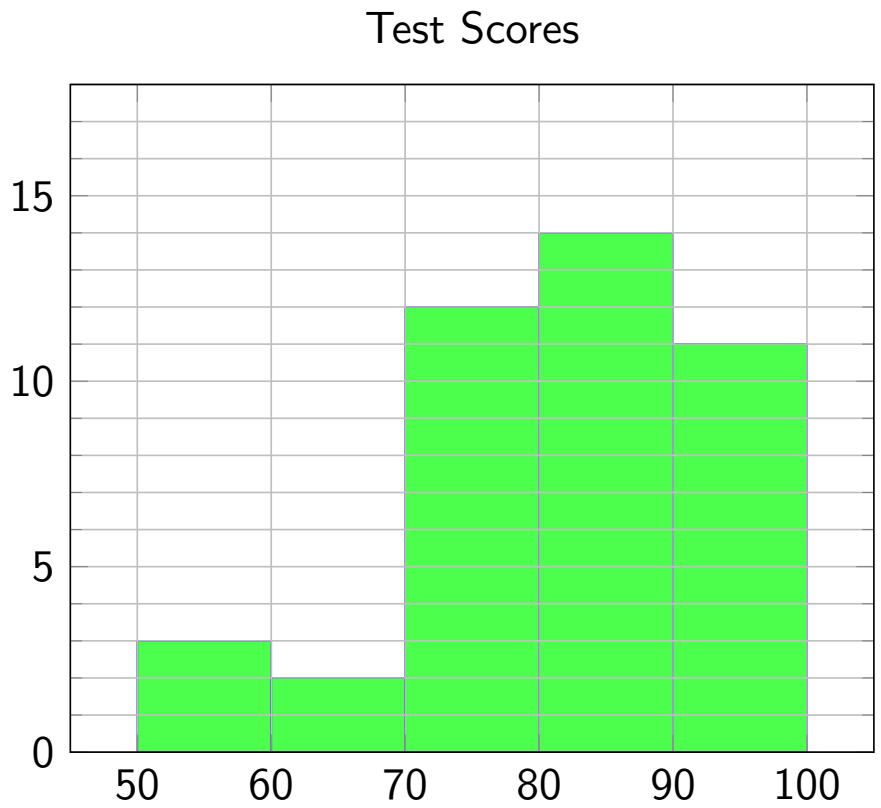


Example 1

Answer each given the histogram below.



(a) What is the class width?

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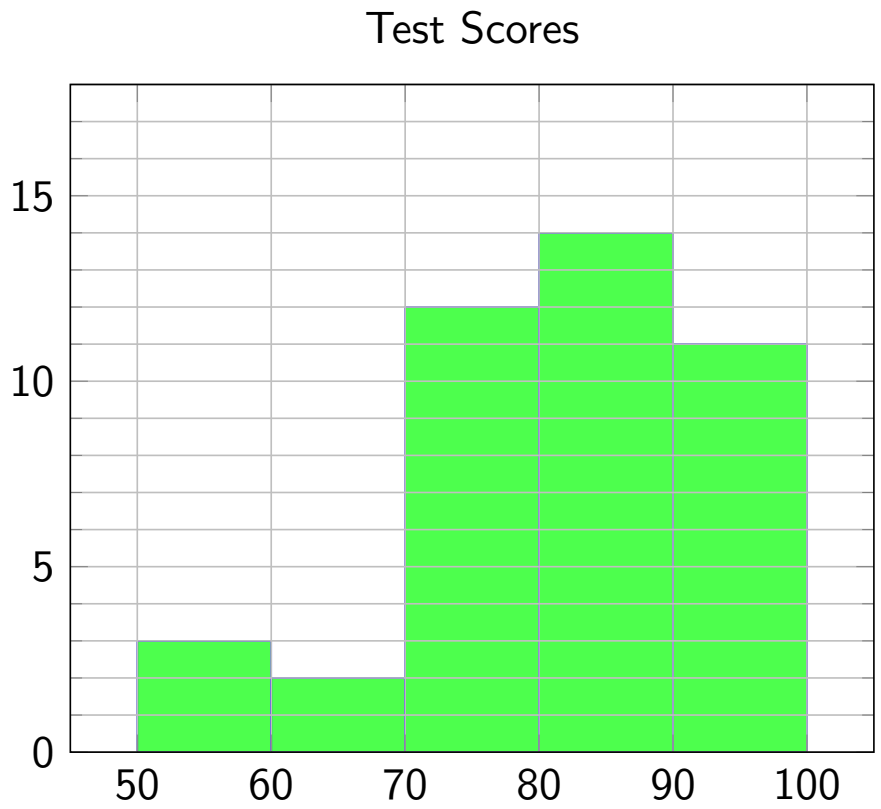
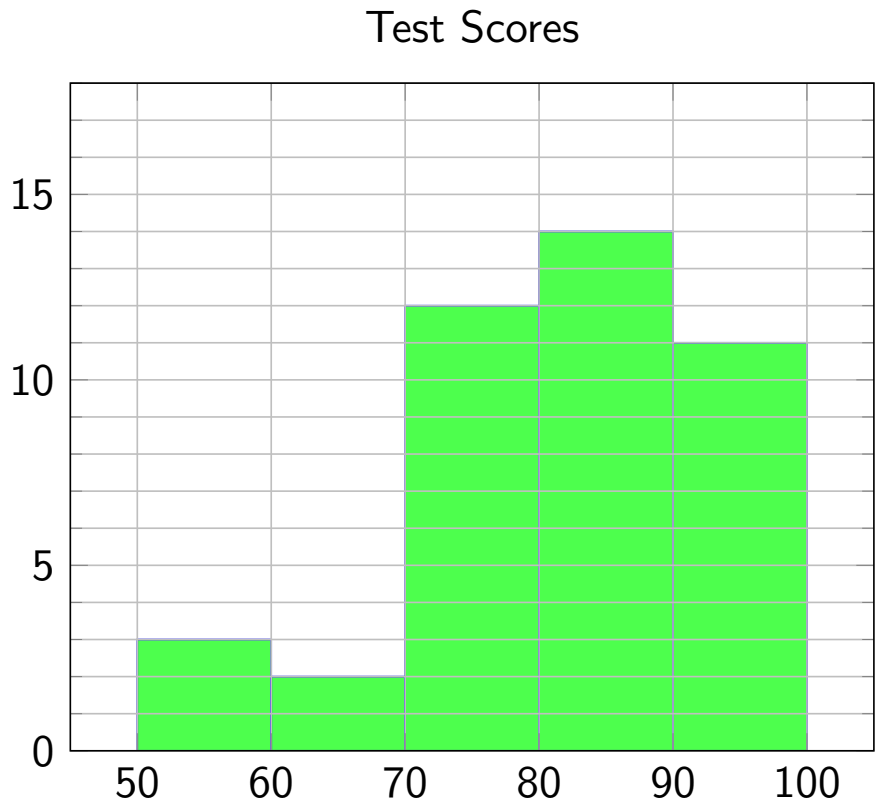


(a) What is the class width? 10

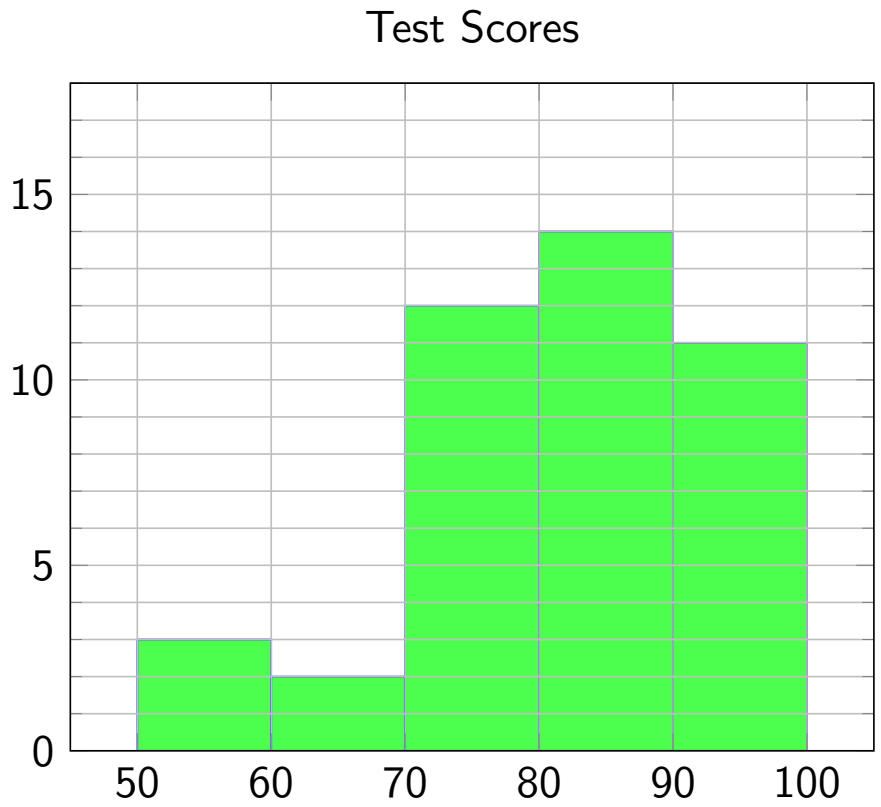
Example 1

(b) What is the class midpoint of the 4th class?



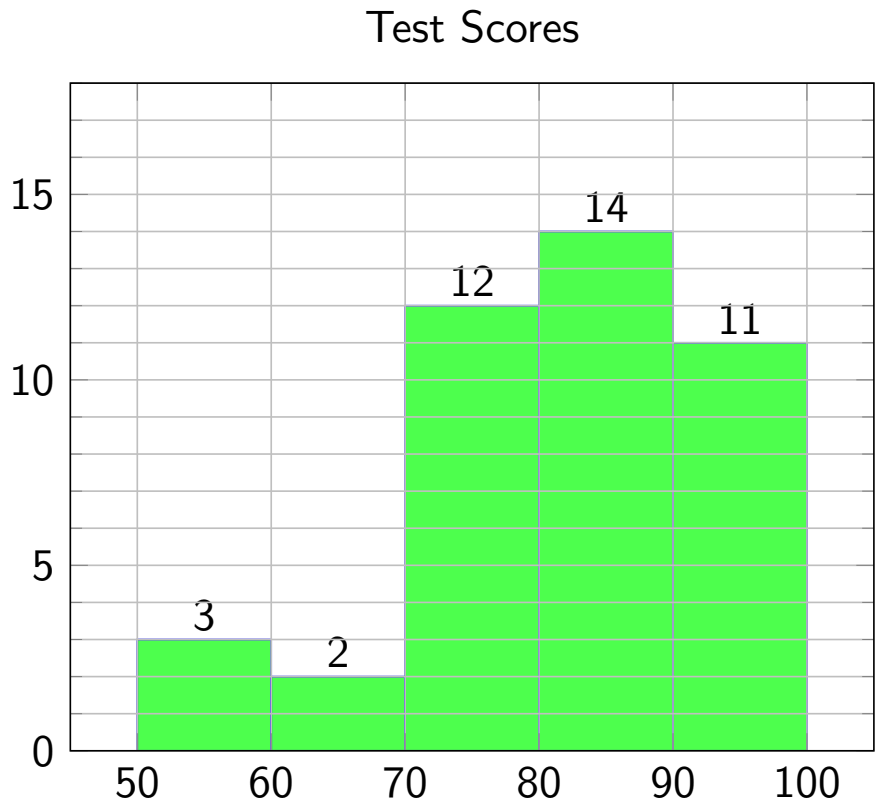
Example 1

(b) What is the class midpoint of the 4th class? 85



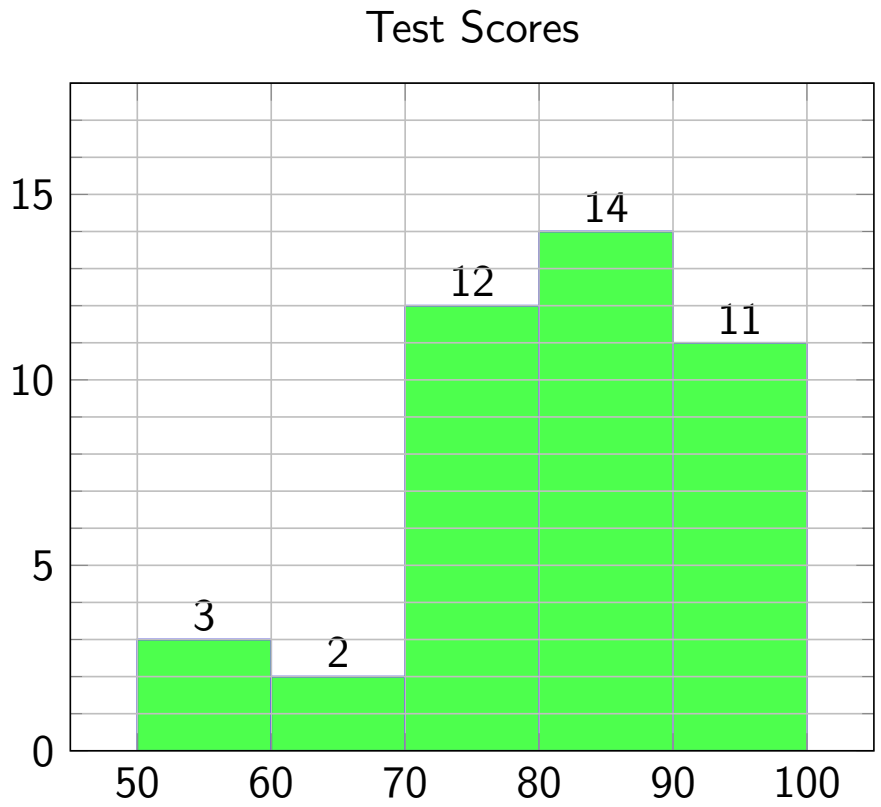
Example 1

(c) What is the relative frequency of the 5th class?



Example 1

(c) What is the relative frequency of the 5th class? 11/42



Example 2

Create a histogram from the measurements below. Use the minimum value as the lower class limit of the first class and use a class width of 2.

9	2	10	1	4
5	1	6	7	4
6	5	4	8	10
3	1	2	3	9
8	6	1	1	10

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9	2	10	1	4
5	1	6	7	4
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3	1	2	3	9
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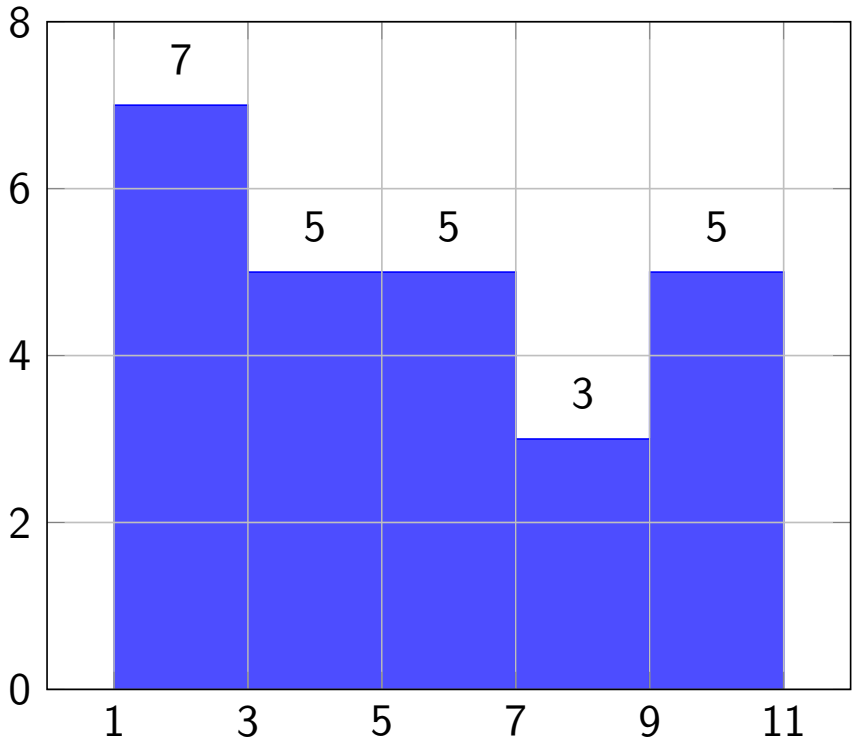
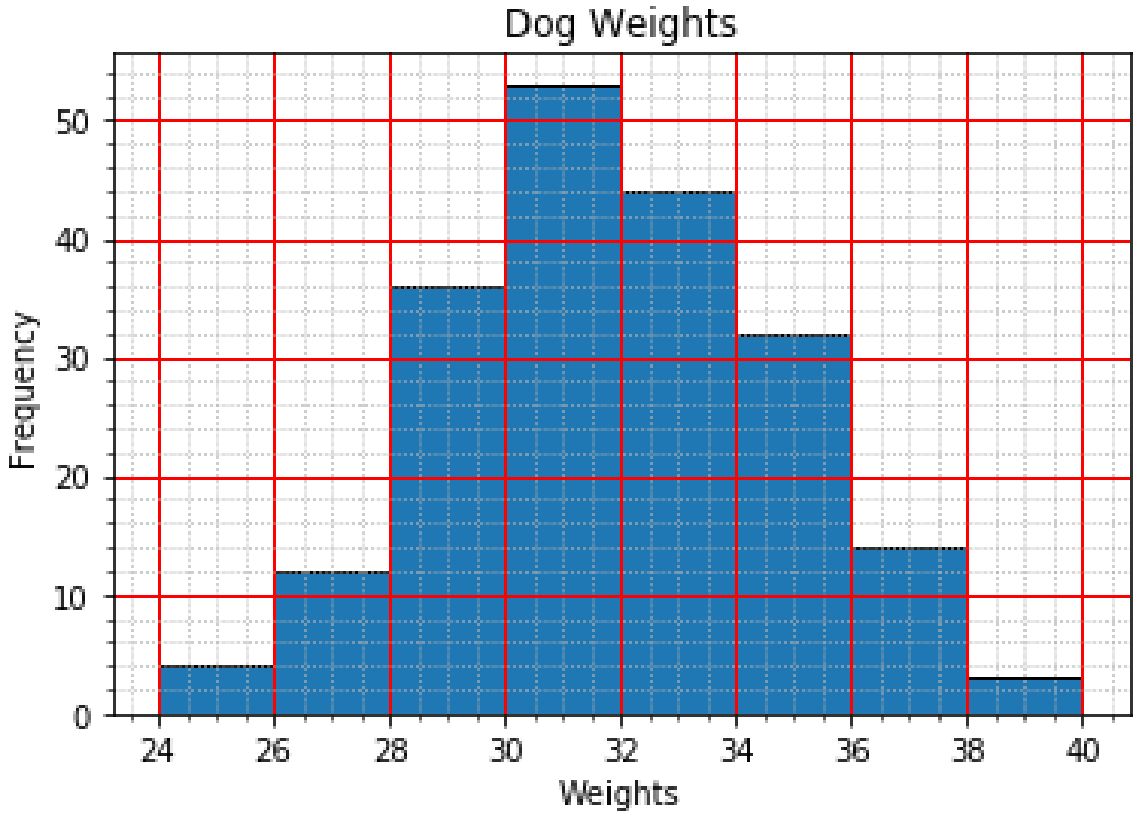
Use 1,3,5,7,9, and 11 as the lower class limits.

Example 2



Example 3

(a) Given the histogram below of the weights of 200 dogs, find the total number of dogs whose weight is at least 34 pounds.



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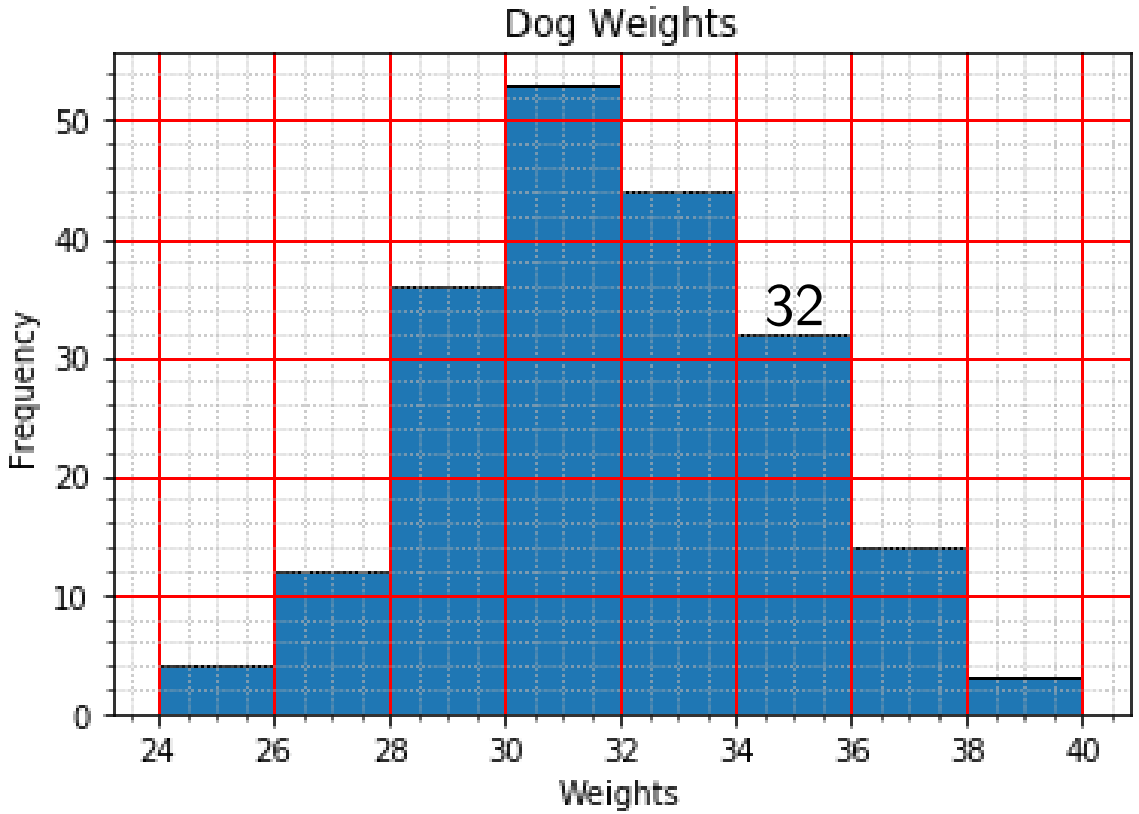

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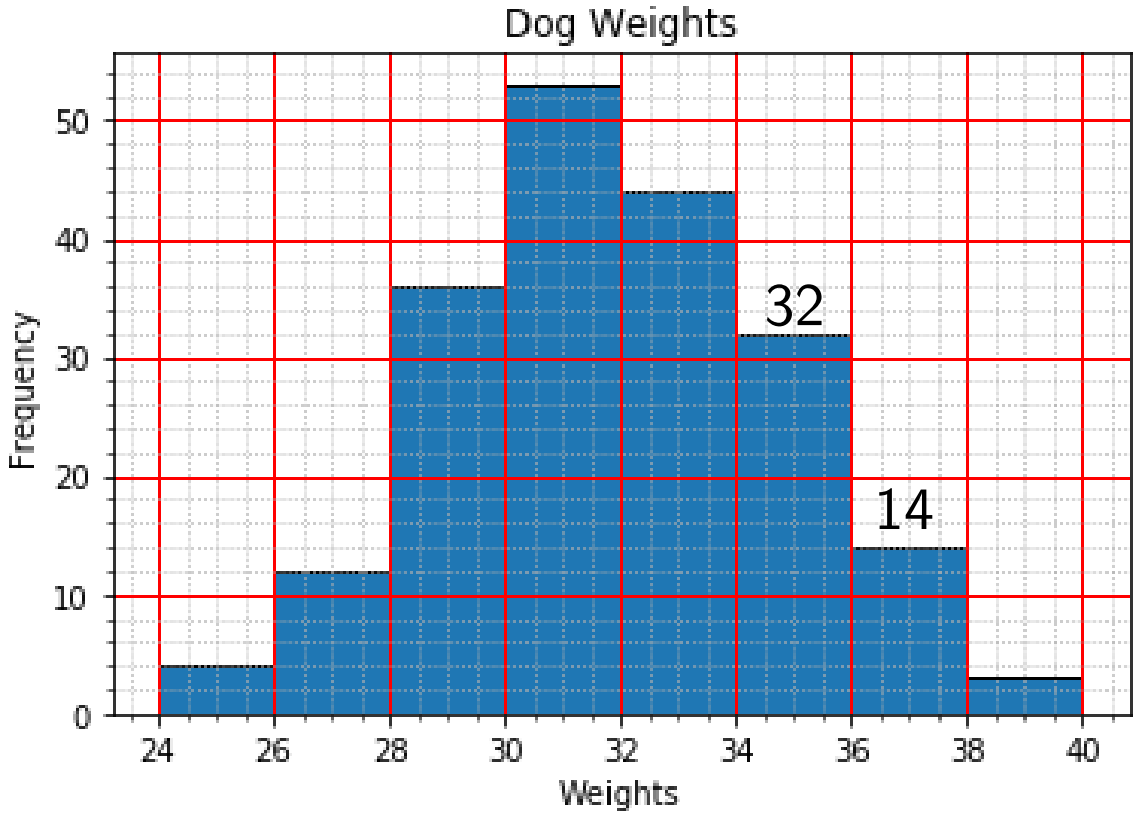

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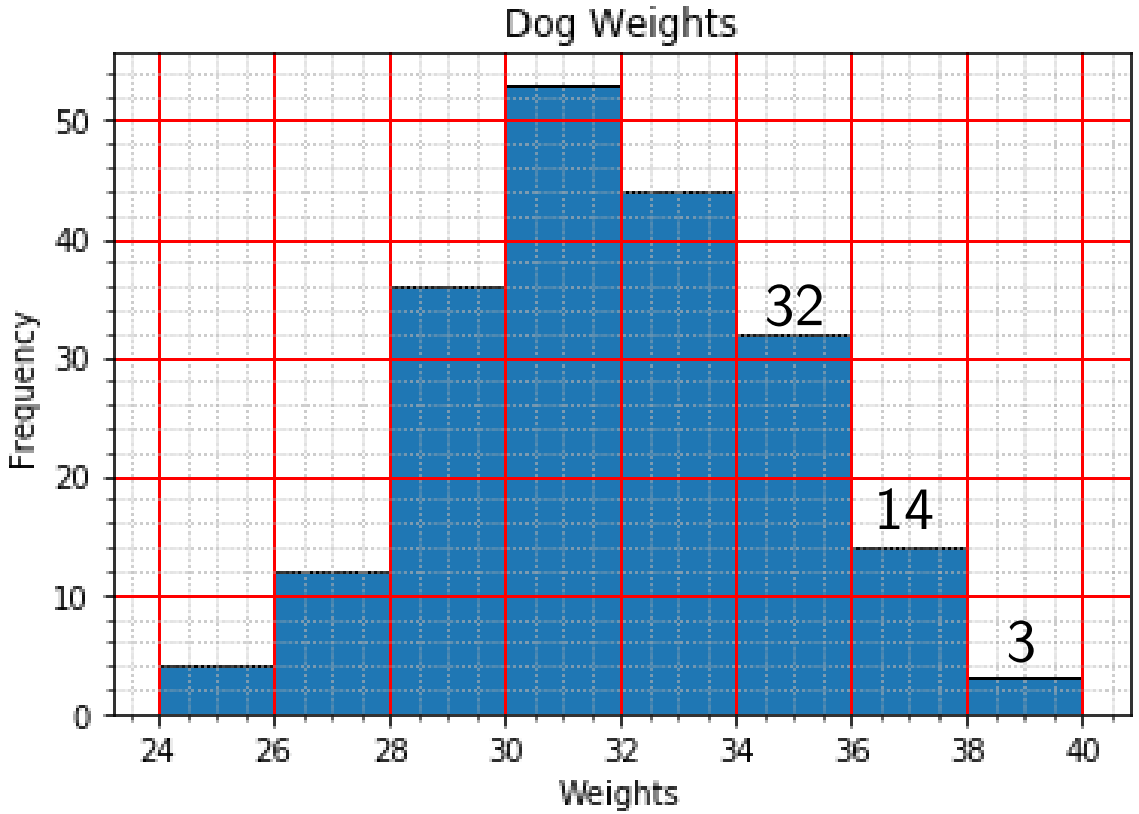

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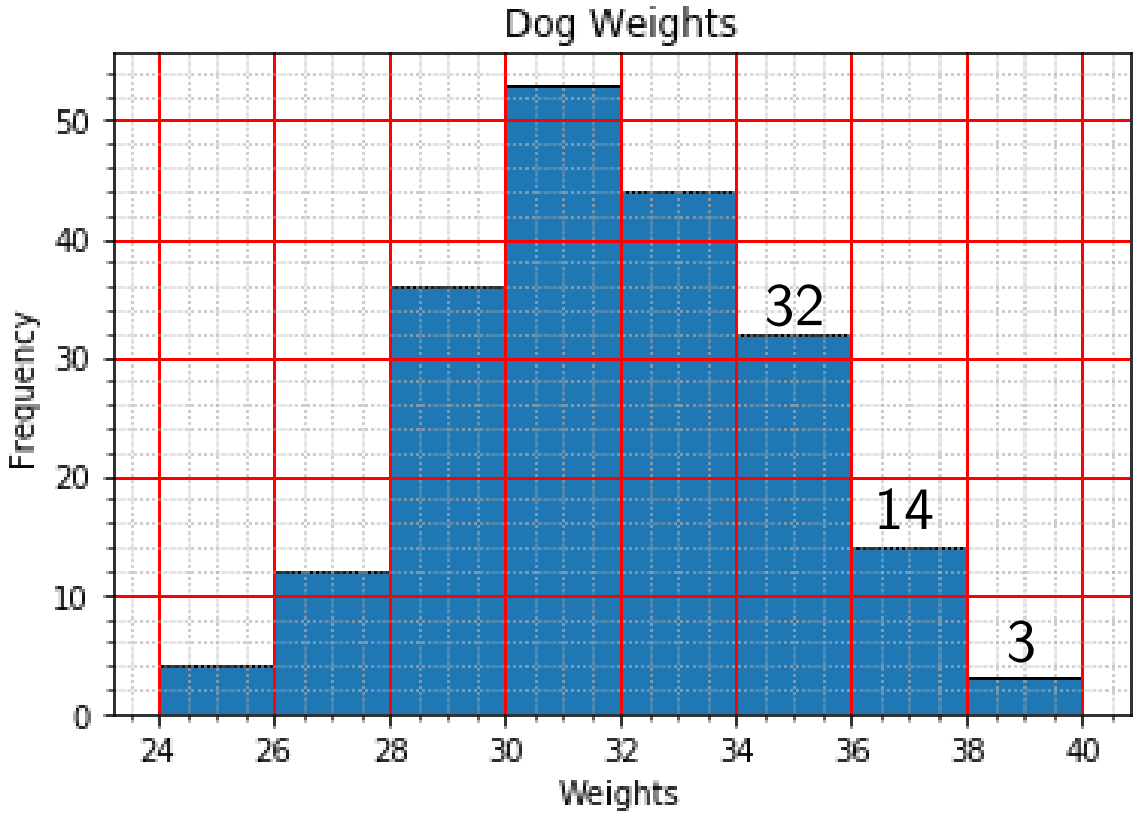
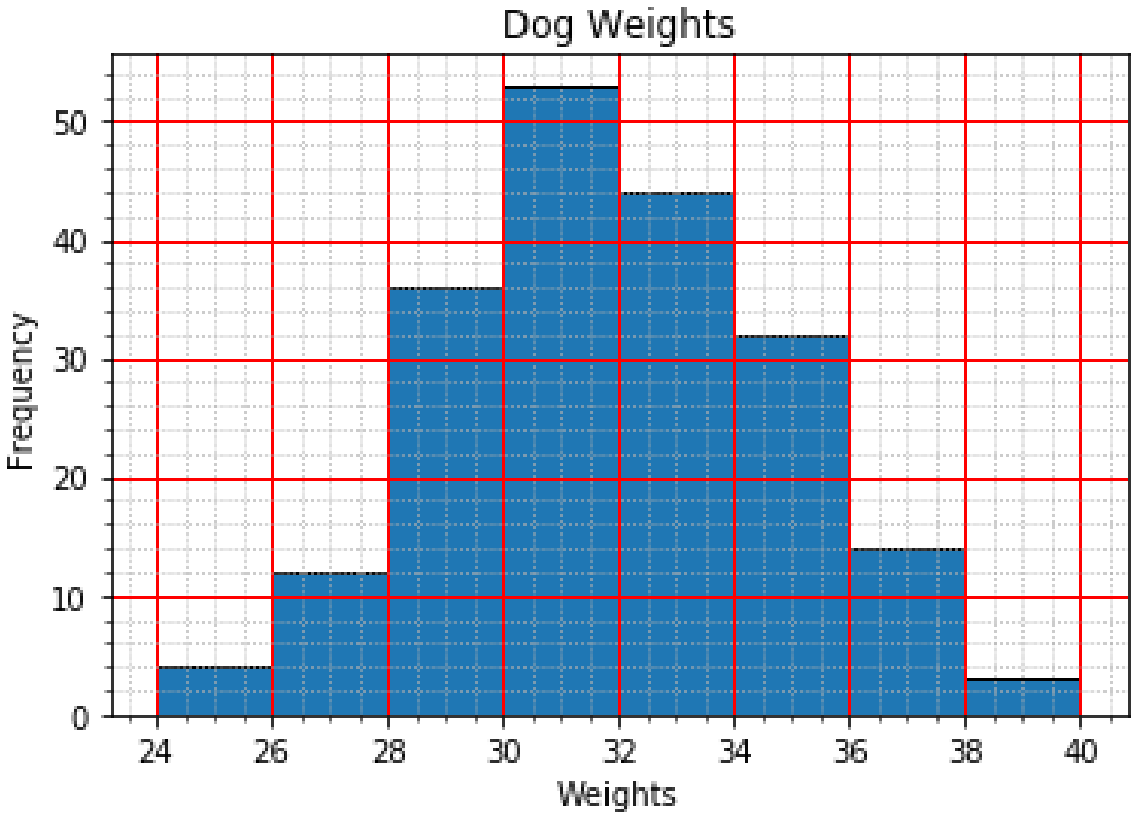


Total: 49

Example 3

(b) What percentage of the dogs have weights between 26 and 28 pounds?



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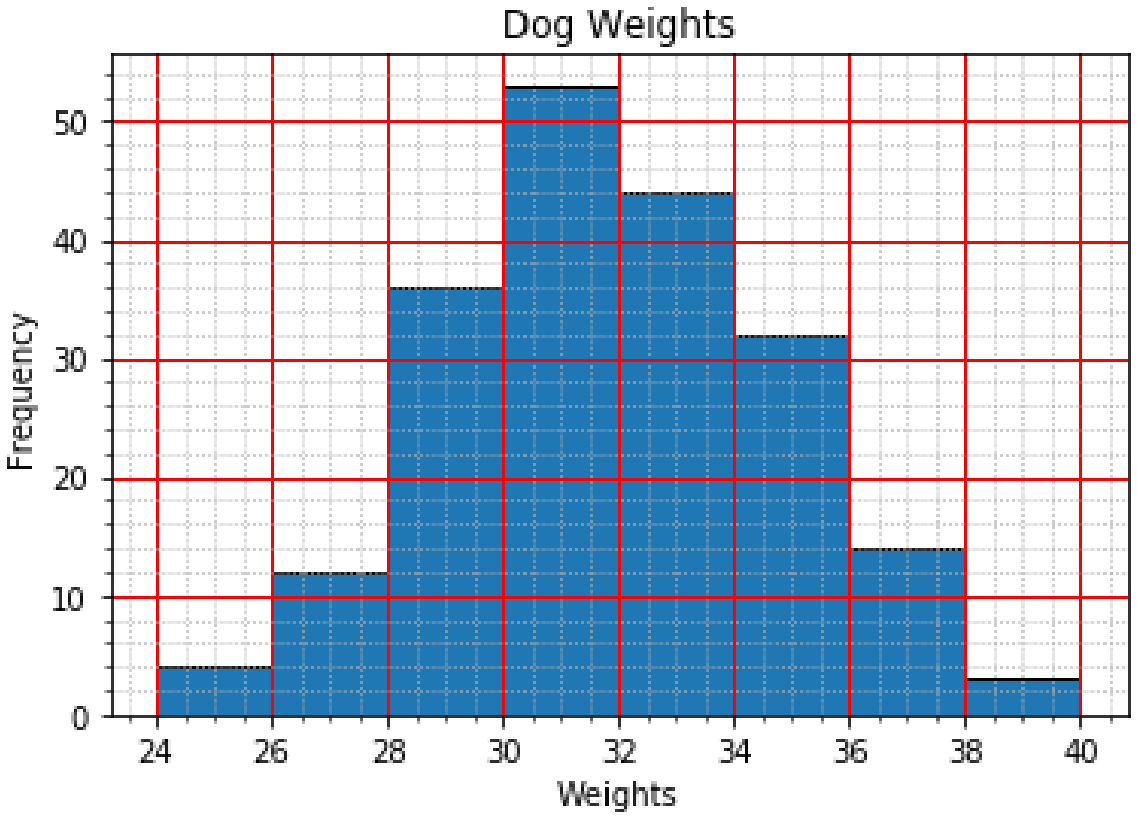

12/200

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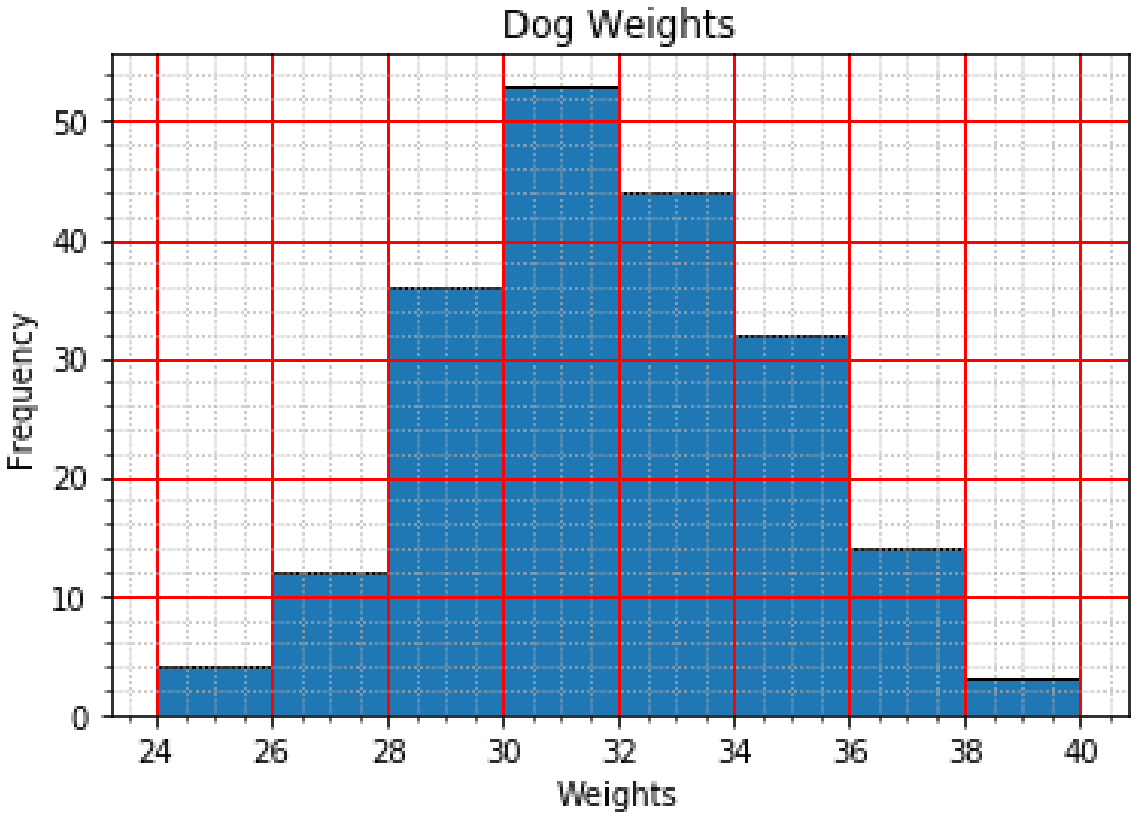
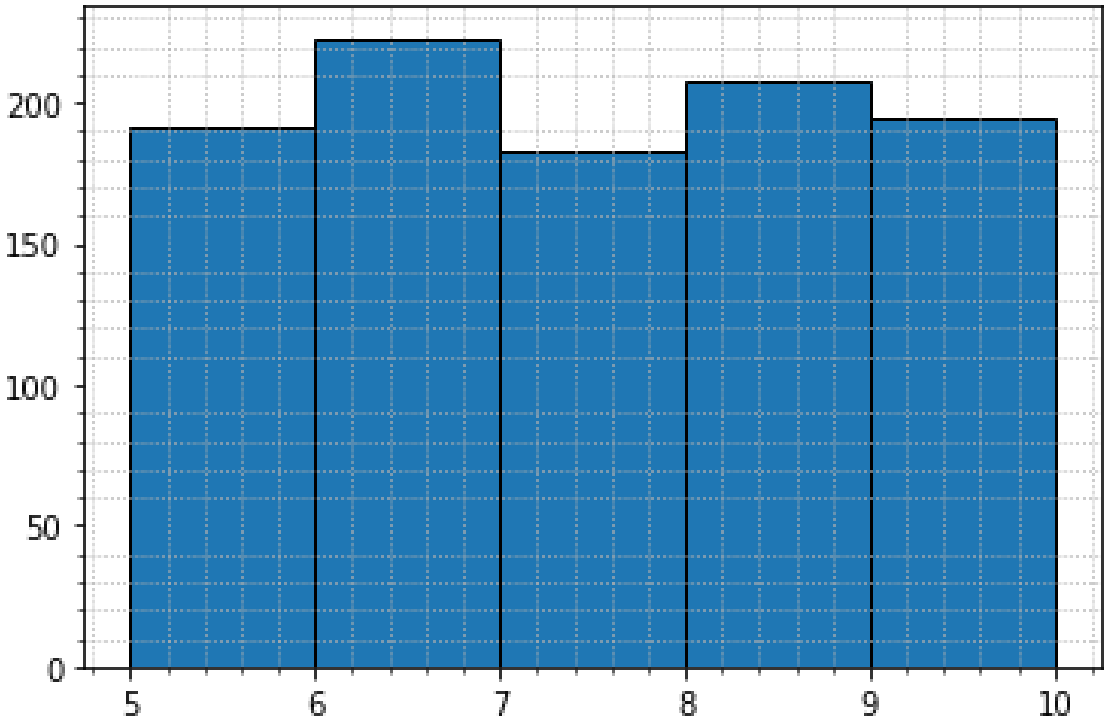


12/200

6%

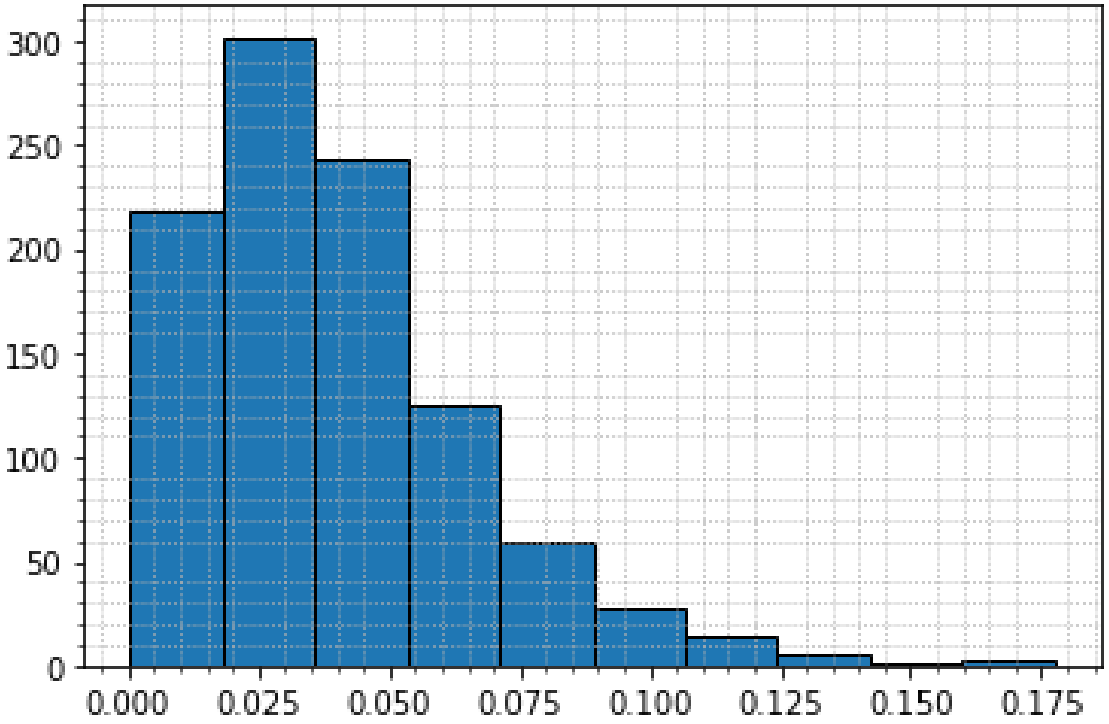
Some Common Histogram Shapes

Uniform distribution:



Some Common Histogram Shapes

Right (a.k.a. positively) skewed



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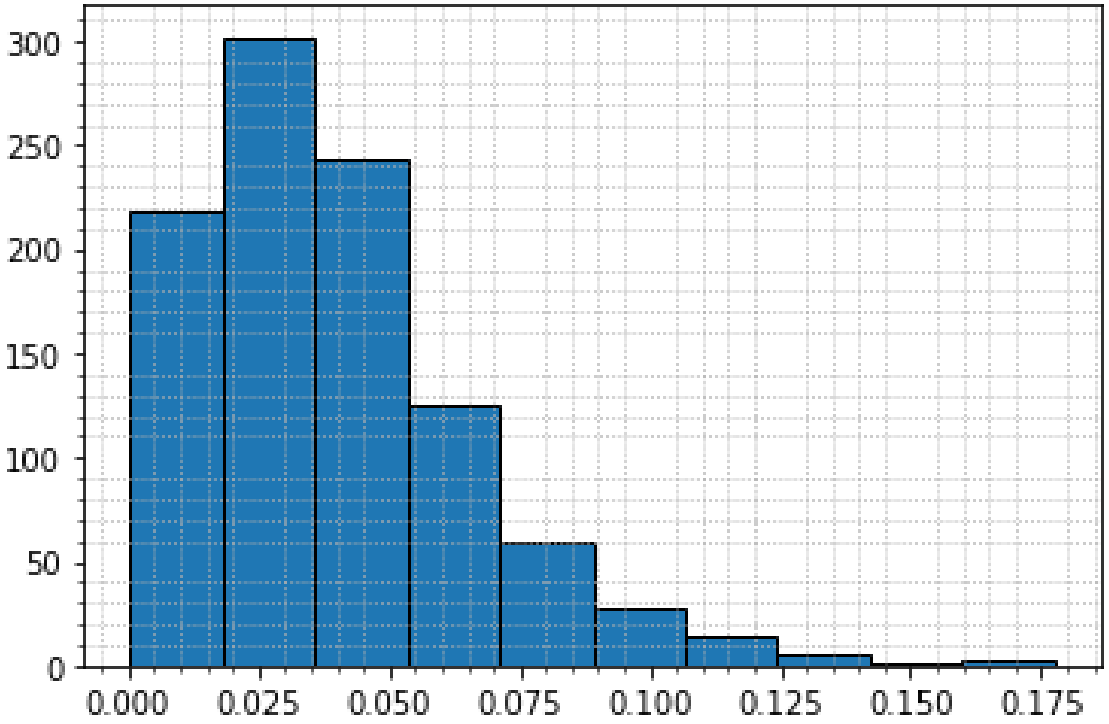
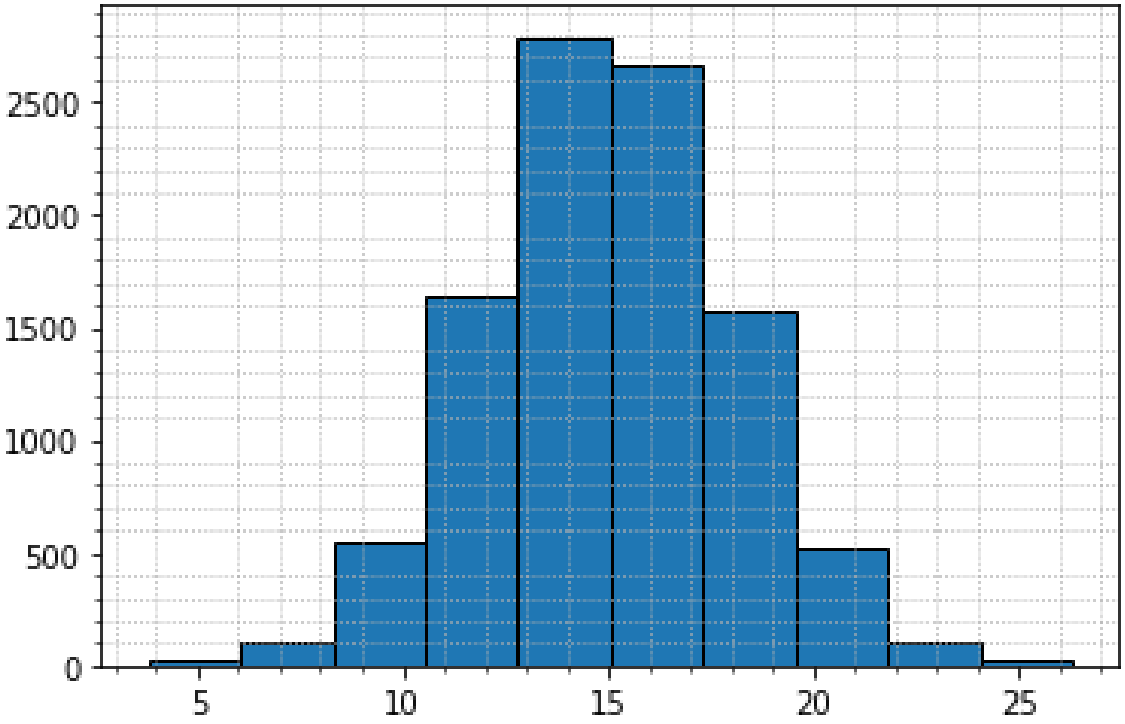


Note: Skewness refers to the tail

Some Common Histogram Shapes

Normal (a.k.a. bell-shaped)



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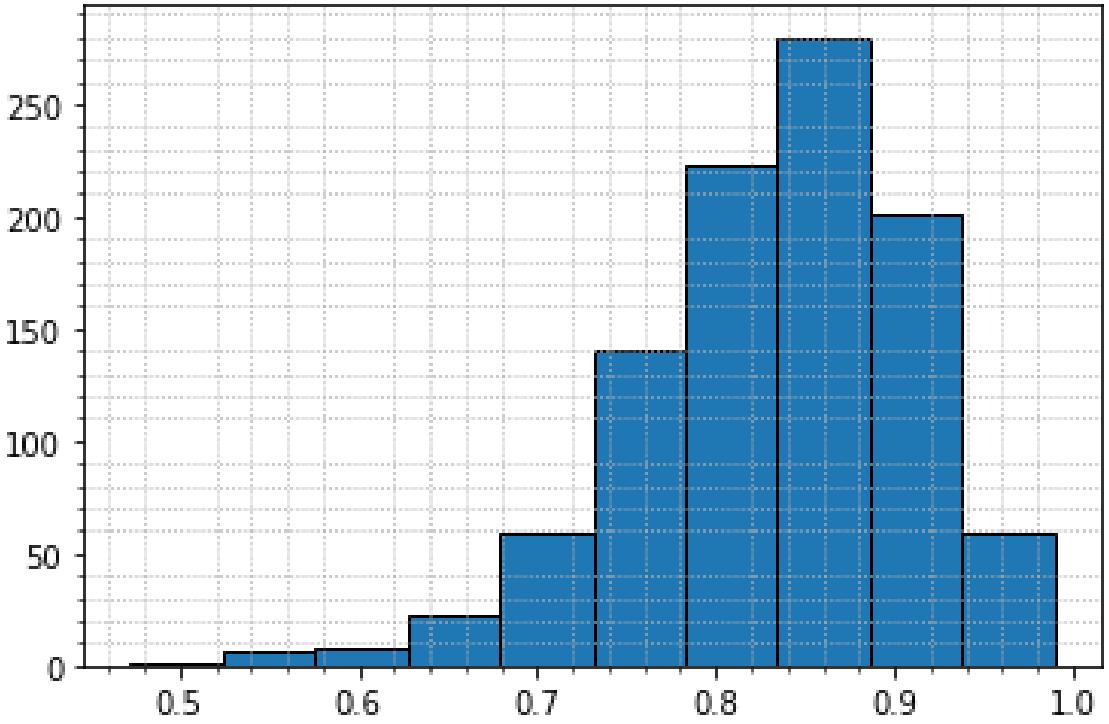

Cumulative Histograms

The cumulative relative frequency histogram below shows a running total of relative frequencies of scores for a mathemathics test.