

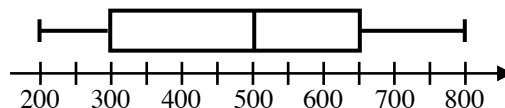
## Percentiles Algebra 1

A **percentile** is a number that tells us the **percent** of a data set that lies **at or below a given value**. For example, if Isabella said that her score on a certain test was in the eightieth percentile, this means that her score was better than or equal to eighty percent of all of the scores for this particular test.

**Exercise #1:** The following box-and-whiskers diagram gives the results on a recent SAT math test.

(a) What is the 25<sup>th</sup> percentile score?

300



(b) What is the 50<sup>th</sup> percentile score?

500

(c) What is the 75<sup>th</sup> percentile score?

650

(d) What is the 100<sup>th</sup> percentile score?

800

99<sup>th</sup>

Percentiles are mostly used when working with **large data sets** (data sets with over 100 values) in order to give particular values a **standardized ranking** compared to others. That is why they are particularly useful on large standardized tests where many thousands of scores are recorded.

**Exercise #2:** When the heights of 250 9<sup>th</sup> grade boys were measured, Jaden found that his height placed him at the 82<sup>nd</sup> percentile. Which of the following gives the number of boys that were at or below Jaden's height?

(1) 82

(2) 45

(3) 28

(4) 205

$$.82 \times 250$$

**Exercise #3:** Kadeesha recently ran in a marathon with 350 competitors (including herself). She finished 40<sup>th</sup> in the race. Which of the following is closest to her percentile rank?

(1) 89<sup>th</sup>

(2) 40<sup>th</sup>

(3) 58<sup>th</sup>

(4) 8<sup>th</sup>

$$\frac{320 + \frac{1}{2} \cdot 1}{350}$$

**Exercise #4:** Landon took a competitive spelling test with 600 other area students. When the results were announced, Landon found out he scored in the 93<sup>rd</sup> percentile. Which of the following gives the number of students who did *better* on the spelling test than Landon?

(1) 7

(3) 65

(2) 93

(4) 42

7% of 600

**Exercise #5:** Madaline and Naresh are trying to determine who did better on a standardized test. When Madaline took it in the fall, her score placed her better than 240 other participants out of 300. When Naresh took it in the spring, his score placed him better than 265 other participants out of 350. Based on their percentile rank, who did better, Madaline or Naresh? Show work to justify your answer.

$$\frac{M}{239 + \frac{1}{300} \cdot 1}$$

$$\frac{N}{264 + \frac{1}{350} \cdot 1}$$

**Exercise #6:** In Introductory Calculus at Magna University, a total of 300 students take the course and the professor curves the grades as follows:

85 <sup>th</sup> to 100 <sup>th</sup> percentile	65 <sup>th</sup> to 84 <sup>th</sup> percentile	35 <sup>th</sup> to 64 <sup>th</sup> percentile	20 <sup>th</sup> to 34 <sup>th</sup> percentile	below 20 <sup>th</sup> percentile
A	B	C	D	F

(a) How many students earn an A in Introductory Calculus?

$$.14 \times 300 = 4$$

(b) How many students fail Introductory Calculus?

$$.19 \times 300$$

(c) How many students get a C or better in Introductory Calculus?

$$.30 \times 300$$

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Percentiles Algebra 1 Homework

### Skills

1. The median of a data set represents which of the following percentiles?

(1) 25<sup>th</sup>

(3) 50<sup>th</sup>

(2) 75<sup>th</sup>

(4) 100<sup>th</sup>

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2. The 75<sup>th</sup> percentile is also known as the

(1) Upper quartile

(3) Maximum value

(2) Lower quartile

(4) Mean

\_\_\_\_\_

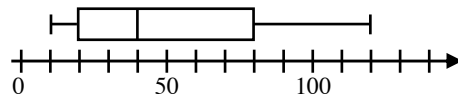
3. A box-and-whiskers diagram is shown for a data set below. What is the 25<sup>th</sup> percentile value for this data set?

(1) 10

(3) 40

(2) 120

(4) 20



\_\_\_\_\_

4. If a data set includes 500 values, how many of these data values lie above the 85<sup>th</sup> percentile?

(1) 15

(3) 75

(2) 125

(4) 425

$$.14 \times 500$$

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### Applications

5. On a recent competitive statewide math exam, Odessa scored as well as or better than 650 other students out of a total of 825 that took the test. Her percentile rank would be closest to

(1) 79<sup>th</sup>

(3) 65<sup>th</sup>

(2) 54<sup>th</sup>

(4) 83<sup>rd</sup>

$$\frac{650 + \frac{1}{2} \cdot 1}{825}$$

\_\_\_\_\_

6. In his company of 512 employees, Paresh's salary places him at the 85<sup>th</sup> percentile. About how many employees have a greater salary than Paresh?

(1) 124

(3) 59

(2) 92

(4) 77

$$\frac{.14 \times \frac{1}{2} \cdot 1}{512}$$

\_\_\_\_\_

7. Quentin's height is between the median and the third quartile for all heights in his school. His height's percentile rank could be which of the following?

(1) 45<sup>th</sup>

(3) 64<sup>th</sup>

(2) 79<sup>th</sup>

(4) 23<sup>rd</sup>

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8. Ruby scored a 730 on her math SAT this year. Out of 1250 students who took this test in Dutchess County, Ruby's score qualified as the 96<sup>th</sup> percentile. How many students did Ruby do as well as or better than?

(1) 1200

(3) 701

$$.04 \times 1250$$

(2) 50

(4) 538

\_\_\_\_\_

9. On a certain test, a score of 90 was the 25<sup>th</sup> percentile. If 20 students took the test, how many received scores of 90 or below?

$$.25 \times 20$$

10. Twelve students scored 60 or less in a mathematics test. If 60 is the 5<sup>th</sup> percentile, what is the number of students who took this test?

$$12 = .05 \times$$

11. On a mathematics test, Sal scored at the 90<sup>th</sup> percentile. Which one of the following statements is true?

(1) Ninety percent of the students who took the test had the same score as Sal had.

(2) Ninety percent of the students who took the test had a score equal to or less than Sal's score.

(3) Sal scored 90% on this test.

(4) Sal answer 90 questions correctly.

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