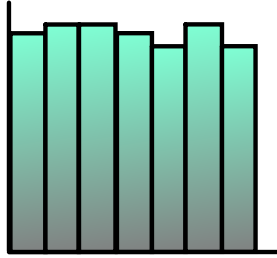


17.4 lesson

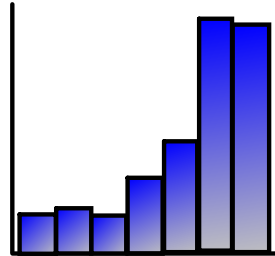
Section 17.4 *Normal Distribution*

Types of Distribution

1) Uniform

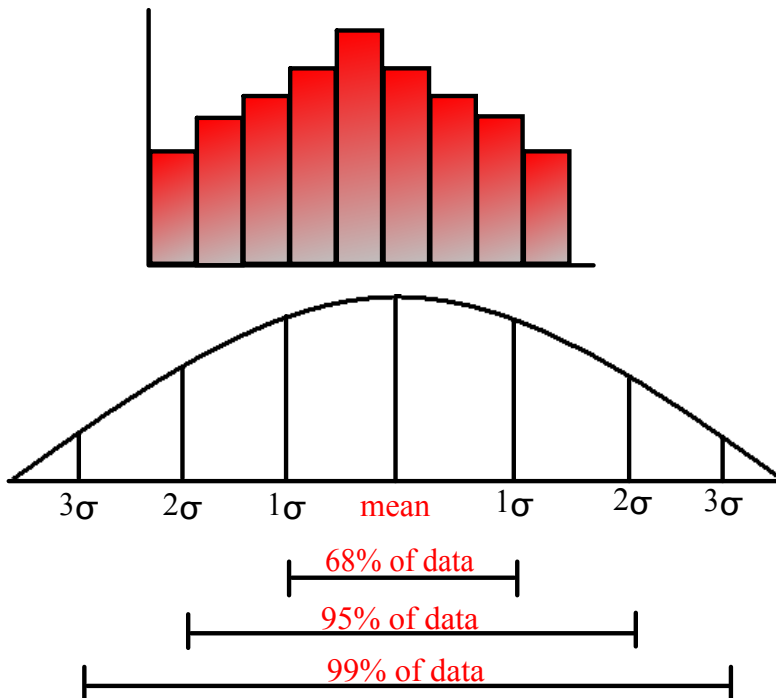


2) Skewed



This particular set of data is
Skewed Left
(less data on left side)

3) Normal Distribution (Normal Curve or Bell-Shape Curve)

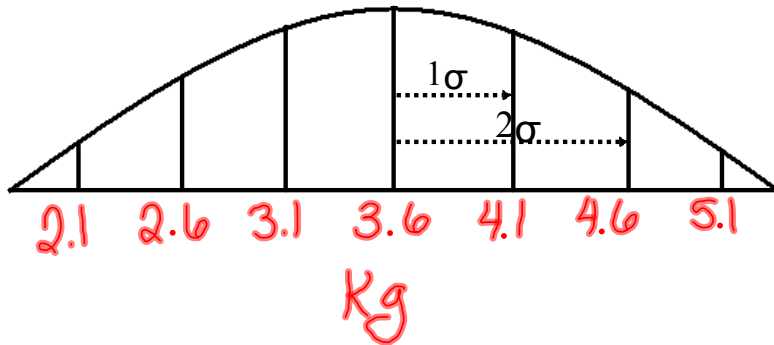


17.4 lesson

Example 1

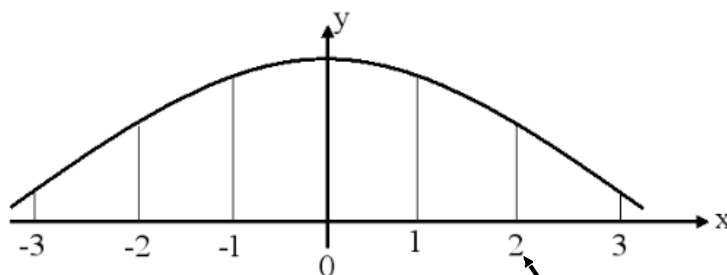
Average weight of a newborn baby is 3.6 kg and $\sigma = 0.5$ kg.

Sketch a normal curve showing weights at 1, 2, and 3 σ from the mean.



STANDARD NORMAL DISTRIBUTION

- ↳ Is a normal distribution with a mean = 0 and $\sigma = 1$
- ↳ Any normal distribution can be related to it using standard values (z-scores)
- ↳ Total area under curve = 1.0 (100%)
- ↳ Area under curve to the left of a z-score = proportion(%) of the data having standard values less than z



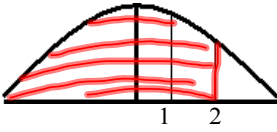
$$z = \frac{x - \bar{x}}{\sigma}$$

17.4 lesson

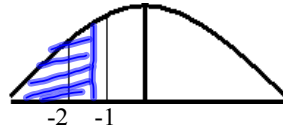
Example 2

a) $P(2.0) = .9772$ b) $P(-1.3) = .0968$

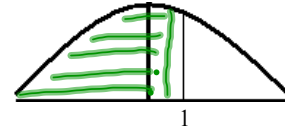
c) $P(0.7) = .7580$



Means area to the left of 2 is 97.72%



Means the area to the left of -1.3 is 9.7%

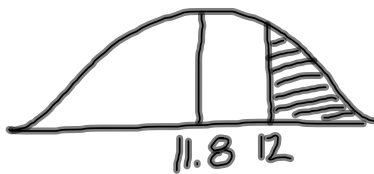


Means area to the left of 0.7 is 75.8%

Example 3

At a track meet, the race times for 100m are normally distributed with mean of 11.8 s and $\sigma = 0.5$ s.

- a) What percent of entrants finished with a time greater than 12 s?



$$z = \frac{\text{time} - \bar{x}}{\sigma}$$

$$z = \frac{12 - 11.8}{.5} = .4$$

Look @ table for 0.4
.6554

$$1 - .6554 = .3446$$

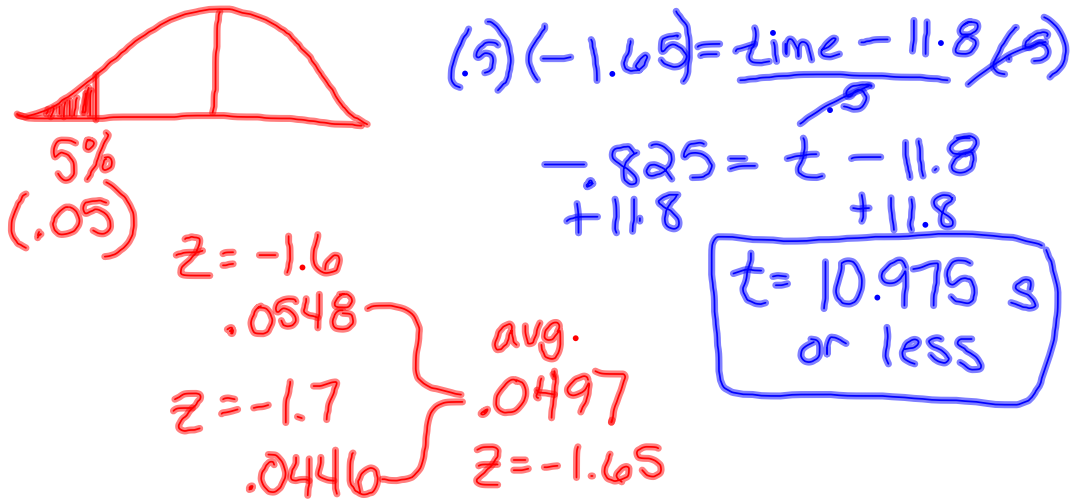
34.46%
had a time
greater than 12 s

17.4 lesson

Example 3 (continued)

At a track meet, the race times for 100m are normally distributed with mean of 11.8 s and $\sigma = 0.5$ s.

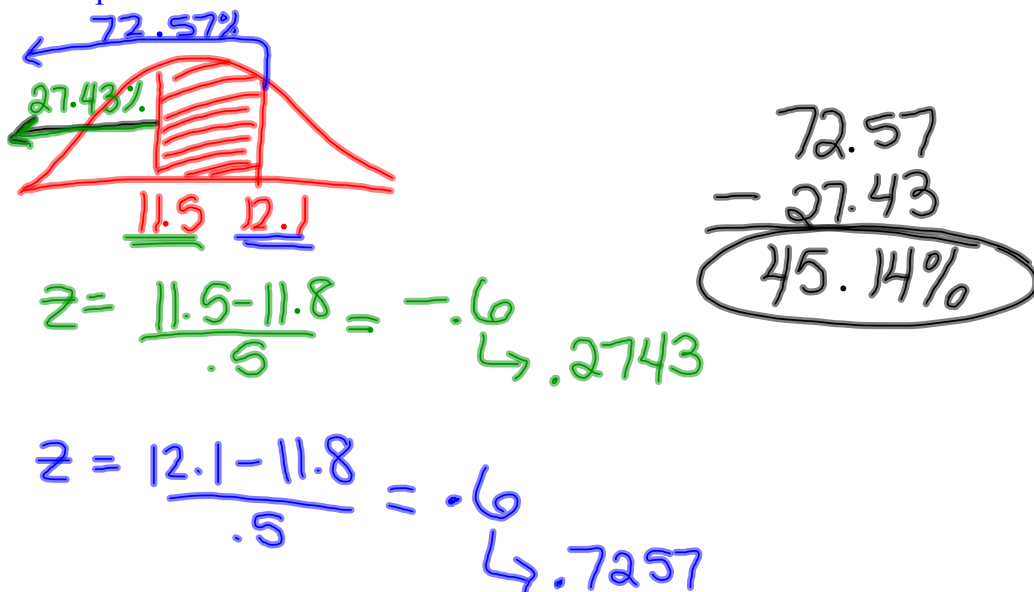
- b) If the top 5% received awards, what race time did an entrant need to get an award?



Example 3 (continued)

At a track meet, the race times for 100m are normally distributed with mean of 11.8 s and $\sigma = 0.5$ s.

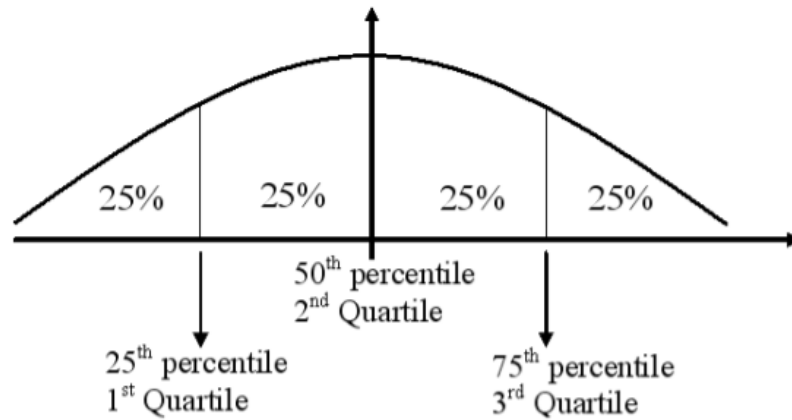
- c) What percent of entrants had times between 11.5 s and 12.1 s?



17.4 lesson

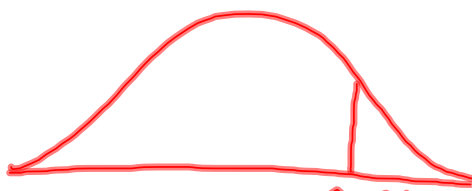
PERCENTILES

- ↳ Used for standardized tests
- ↳ 75% percentile means 75% of people taking test had a score less than or equal to your score



Example 4

The scores on a test are normally distributed with mean = 70 and $\sigma = 10$. Find the 90th percentile.



90%
(.90)

Look for .90

@ $z = 1.3$
.9032

$$z = \frac{\text{score} - \bar{x}}{\sigma}$$

$$10 \cdot 1.3 = \frac{s - 70}{10} \cdot 10$$

$$13 = s - 70$$
$$+70 \quad +70$$

$$\text{Score} = 83$$

Homework p.667

CE #2-7

WE #1-11 odd,
14, 15, 16