

Σ ← upper case "sigma"
means sum
(add all terms together)

To describe data numerically, we often use two numbers:

1. **Mean:** the average

Let $x_1, x_2, x_3, \dots, x_n$ represent any set of values.

$$\text{Mean: } \bar{x} = \mu = \frac{\sum x_i}{n} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

sum (above the summation symbol)
mu (below the mean symbol)

2. **Standard Deviation:** a measure of the extent to which data cluster around the mean.

Let $x_1, x_2, x_3, \dots, x_n$ represent any set of values.

$$\text{Standard Deviation: } \sigma = \sqrt{\frac{\sum (x_i - \mu)^2}{n}} = \sqrt{\frac{(x_1 - \mu)^2 + (x_2 - \mu)^2 + \dots + (x_n - \mu)^2}{n}}$$

lower case "sigma" (below the sigma symbol)

* The smaller the standard deviation, the more consistent the results and the closer the data to the mean.

Example 1: Calculate the standard deviation from the following sets of values:

a. 7, 8, 9, 10, 11 $\text{mean} = \mu = (7+8+9+10+11) \div 5 = 9$

Standard Deviation

$$\begin{aligned} \sigma &= \sqrt{\frac{(7-9)^2 + (8-9)^2 + (9-9)^2 + (10-9)^2 + (11-9)^2}{5}} \\ &= \sqrt{\frac{(-2)^2 + (-1)^2 + (0)^2 + (1)^2 + (2)^2}{5}} \\ &= \sqrt{\frac{4 + 1 + 0 + 1 + 4}{5}} = \sqrt{\frac{10}{5}} = \sqrt{2} = 1.41 \end{aligned}$$

b. 7, 9, 11, 13, 15 $\mu = \frac{7+9+11+13+15}{5} = 11$

$$\sigma = \sqrt{\frac{(7-11)^2 + (9-11)^2 + (11-11)^2 + (13-11)^2 + (15-11)^2}{5}}$$

$$= \sqrt{\frac{(-4)^2 + (-2)^2 + (0)^2 + (2)^2 + (4)^2}{5}} = \sqrt{\frac{16+4+0+4+16}{5}} = \sqrt{\frac{40}{5}} = \sqrt{8} = 2.83$$

Example 2: Calculate the standard deviation for the following sets of data: HW P. 233 #2, 5

a.

Midpoint	Daily Commute Time (min)	Number of Employees
5	0- 10 9	4
15	10- 20 19	9
25	20- 30 29	6
35	30- 40 39	4
45	40- 50 49	2

Total = 25

mean

$$\mu = \frac{5(4) + 15(9) + 25(6) + 35(4) + 45(2)}{25}$$

$$= 21.4$$

$$\sigma = \sqrt{\frac{4(5-21.4)^2 + 9(15-21.4)^2 + 6(25-21.4)^2 + 4(35-21.4)^2 + 2(45-21.4)^2}{25}}$$

=

$$= 11.62$$

P. 233 # 3

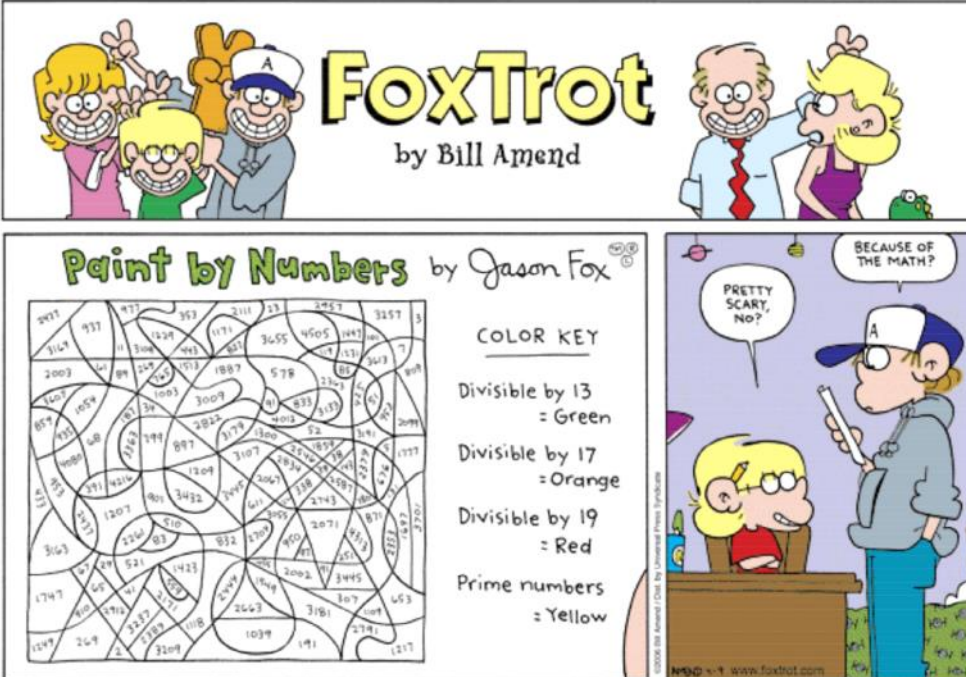
*HW 5.3 p.233 # 2, 3, 5

b.

# of Orders	# of Days
10-12	4
13-15	12
16-18	20
19-21	14

omit

Assignment: Pg. 233 #1-3, 5, 6, 8, 11, 14



FoxTrot
by Bill Amend

Paint by Numbers by Jason Fox

COLOR KEY

- Divisible by 13 = Green
- Divisible by 17 = Orange
- Divisible by 19 = Red
- Prime numbers = Yellow

BECAUSE OF THE MATH?

PRETTY SCARY, NO?

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