

## Welcome MYP 9 Mathematics!

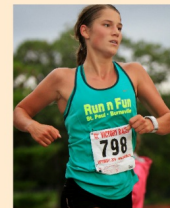
	Assignment Effort Grade (Circle One)	Comments (What was interesting or challenging?)
<b>Monday</b> Date: <u>4-16</u> Topic: <u>No school</u>	0 1 2	
<b>Tuesday</b> Date: <u>4-17</u> Topic: <u>10FG Spread (Range, IQR) &amp; Box Whisker Plot</u>	0 1 2	
<b>Wednesday</b> Date: <u>4-18</u> Topic: <u>Standard deviation, outliers</u>	0 1 2	
<b>Thursday</b> Date: _____ Topic: _____	0 1 2	
<b>Friday</b> Date: _____ Topic: _____	0 1 2	

Warm-up: Ms. Berg wants to average at least ~6 miles each day.

How many miles should she run on Sat?

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
6.8	7.1	5.0	6.5	6.8	3.0	?

What would you estimate the standard deviation to be? What does this mean?



Warm-up: Ms. Berg wants to average at least ~6 miles each day.

How many miles should she run on Sat?

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6.8	7.1	5.0	6.5	6.8	3.0	?

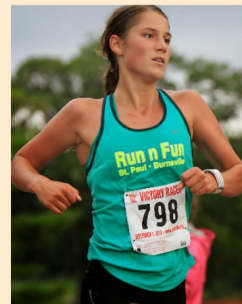
$$7\left(\frac{35.2 + X}{7}\right) = (6)7$$

$$35.2 + X = 42$$
$$-35.2 \quad -35.2$$

$$X = 6.8 \text{ miles}$$

$$\sigma \approx 1.383$$

Each day is about 1.383 miles from an average of 6 miles.



## Class Plan

### 1. Warm-up

Statistics Review Day!

### 2. Graphical Displays, Measures of Center, Measures of Spread

Textbook: Chapter 10

## Unit 7: Statistics

### Do: Review for Quiz 7.1

10B Discrete Data Displays

10C Continuous Data Displays

10D Measures of Center

10E Cumulative Data

10F Measures of Spread

10G Box-and-Whiskers Plot

## 10B Discrete Data Displays

**5** A microbiologist measured the diameter (in cm) of a number of bacteria colonies 12 hours after seeding. The results were as follows:

0.4, 2.1, 3.4, 3.9, 1.7, 3.7, 0.8, 3.6, 4.1, 0.9, 2.5, 3.1, 1.5, 2.6, 1.3, 3.5

**a** Construct an ordered stem-and-leaf plot for this data.

**b** What percentage of the bacteria colonies were greater than 2 cm in diameter?

**c** Are any colonies outliers? Explain and show all work.

## 10B Discrete Data Displays

10B

#5

DIAMETER OF BACTERIA COLONIES

a)

<u>stem</u>	<u>leaf</u>
0	4 8 9
1	3 5 7
2	1 5 6
3	1 4 5 6 9
4	1

key

0|4 means 0.4 cm

## 10B Discrete Data Displays

a)  $\underline{\text{MIN}}: 1.4$   
 $\underline{Q_1}: 1.4$   
 $\underline{\text{MED}}: 2.55$   
 $\underline{Q_3}: 3.55$   
 $\underline{\text{MAX}}: 4.1$   
 $\text{IQR} = 3.55 - 1.4 = 2.15$

OUTLIERS  
 $Q_1 - 1.5\text{IQR} = 1.4 - 1.5(2.15) = 1.4 - 3.225 = -1.825$   
 $Q_3 + 1.5\text{IQR} = 3.55 + 3.225 = 6.775$

OUTSIDE OF  $-1.825 \leq X \leq 6.775$   
NOPE! NO BACTERIA COLONIES ARE OUTSIDE THESE PARAMETERS

b)  $\frac{10}{16} = 62.5\%$  of colonies are more than 2cm.



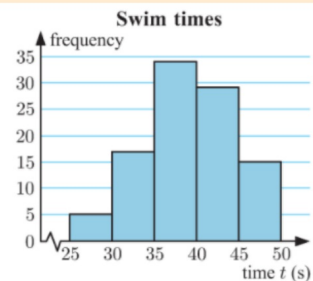
## 10C Continuous Data Displays

**2** The table below summarises the best times of 100 swimmers who swim 50 m.

- a** Draw a frequency histogram of the data.
- b** What is the modal class?
- c** Estimate the mean best time of the swimmers.
- d** What percentage of swimmers have a best time less than 35 seconds?

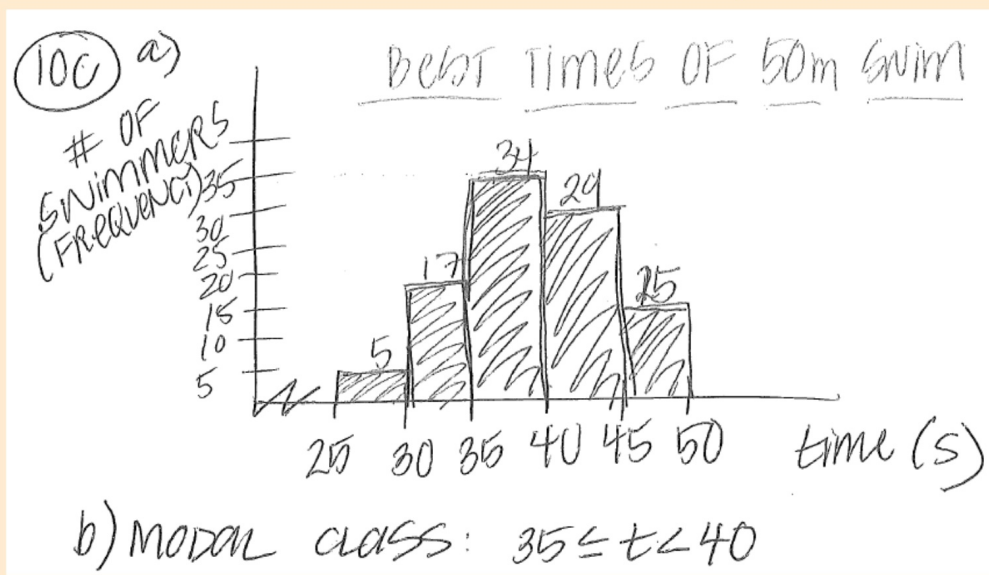
Time $t$ (s)	Frequency
$25 \leq t < 30$	5
$30 \leq t < 35$	17
$35 \leq t < 40$	34
$40 \leq t < 45$	29
$45 \leq t < 50$	15

**2 a**



**b**  $35 \leq t < 40$  sec      **c** 39.1 seconds

## 10C Continuous Data Displays



## 10C Continuous Data Displays

c)

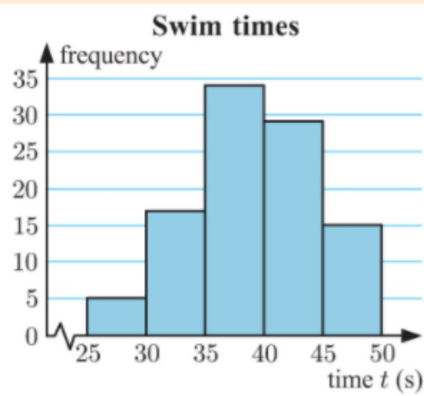
<u>MIDPOINT OF INTERVAL</u>	<u>FREQUENCY</u>	<u>PRODUCT</u>
27.5	5	137.5
32.5	17	552.5
37.5	34	1275
42.5	29	1232.5
47.5	15	712.5
<u>Total Freq: 100</u>	<u>Sum</u>	<u>3910</u>

Estimated mean:  $\frac{3910}{100} = 39.1$   
 $\bar{x} \approx 39.1$  seconds

d) 22 Swimmers less than 35 seconds.  
 $\frac{22}{100} = 22\%$  of swimmers.

## 10C Continuous Data Displays

2 a



b  $35 \leq t < 40$  sec      c 39.1 seconds

## 10D Measures of Center

- 3** Eight scores have an average of six. When scores of 15 and  $x$  are added to the set, the average is increased to 7. Find  $x$ .

## 10D Measures of Center

- 3 Eight scores have an average of six. When scores of 15 and  $x$  are added to the set, the average is increased to 7. Find  $x$ .

(10D) 8 scores average to 6. Sum = 48

[3] 
$$\frac{15 + x + 48}{10} = 7$$

$$x + 63 = 70$$

$x = 7$

## 10D Measures of Center

- 6 12 of 29 measurements are below 20 cm, and 13 measurements are above 21 cm. Find the median if the other 4 measurements are 20.1 cm, 20.4 cm, 20.7 cm, and 20.9 cm.

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6 12 are below 20 cm  
13 are above 21 cm



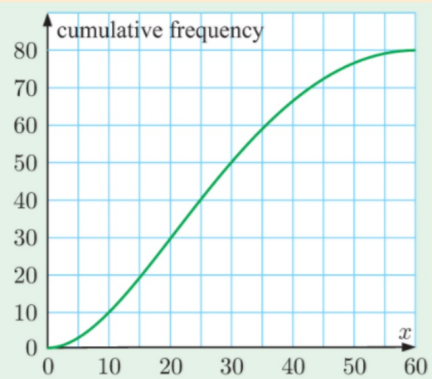
6 20.7 cm



## 10E Cumulative Data

**10** Consider the data displayed in the cumulative frequency graph alongside.

- a** How many of the data values are:
  - i** less than 15
  - ii** more than 40?
- b** Estimate the median of the data.



## 10E Cumulative Data

10E  
a) ~~16~~ ~~17~~ ~~18~~ ~~19~~ data values are less than 15.  
b)  $\approx 25$  ii) 13 above 40.

**10**   **a**   **i**  $\approx 19$  values   **ii**  $\approx 13$  values   **b**  $\approx 25$

## 10E Cumulative Data

**10** The times taken for trampers to climb Ben Nevis were recorded and the results tabled below:

<i>Time <math>t</math> (min)</i>	$175 \leq t < 190$	$190 \leq t < 205$	$205 \leq t < 220$	$220 \leq t < 235$	$235 \leq t < 250$
<i>Frequency</i>	11	35	74	32	8

- a** Construct a cumulative frequency table for the data.
- b** Draw a cumulative frequency graph for the data.
- c** Estimate the median time for the walk.
- d** Guides on the walk say that anyone who completes the walk in 3 hours 15 min or less is extremely fit. Estimate the number of extremely fit trampers in this group.

# 10E Cumulative Data

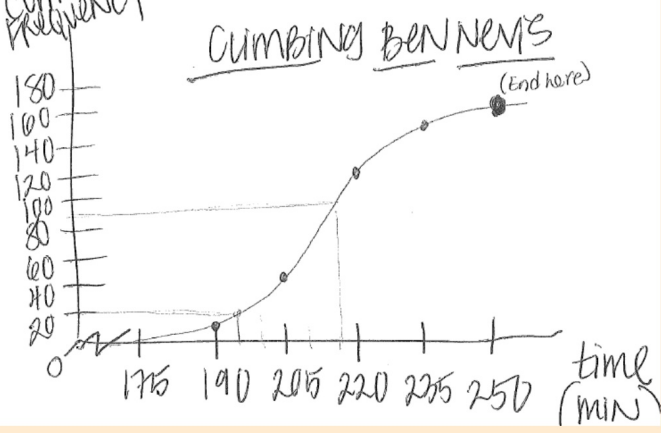
(10E)

time	175-190	190, 205 (early!)	205, 220 (out of space...)	220, 235	235, 250
freq	11	35	74	32	8
cum. Freq	11	46	120	152	160

1135

a)

b) Cumulative Frequency



## 10E Cumulative Data

c) ~215 MINUTES

d) 3 hrs & 15 min

$$3 \times 60 = 180 \quad \# \quad 180 + 15 = 195$$

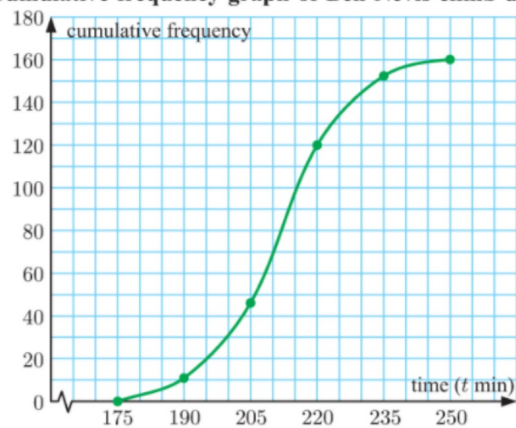
~20 trampers are less than  
195 min...

## 10E Cumulative Data

10 a

Time $t$ (min)	Frequency	Cumulative frequency
$175 \leq t < 190$	11	11
$190 \leq t < 205$	35	46
$205 \leq t < 220$	74	120
$220 \leq t < 235$	32	152
$235 \leq t < 250$	8	160

b Cumulative frequency graph of Ben Nevis climb data



c  $\approx 212$  min

d  $\approx 20$  trampers

## 10F Measures of Spread

**4** Jenny's golf scores for her last 20 rounds were:

90	106	84	103	112	100	105	81	104	98
107	95	104	108	99	101	106	102	98	101

- a** Find the median, lower quartile, and upper quartile of the data set.
- b** Find the interquartile range of the data set and explain what it represents.

**c** Find and interpret the standard deviation

**ABOVE**

**d** If Jenny scores less than one standard deviation ~~below~~ the mean, then she will qualify for nationals. Will Jenny go to nationals? Explain.

## 10F Measures of Spread

④ a) med: 101.5  $Q_1$ : 98  $Q_3$ : 105.5

b) IQR = 7.5

The middle 60% of the data/  
GOLF SCORES ARE WITHIN 7.5 PTS/STROKES

c)  $\sigma \approx 7.6$

ON AVERAGE, JENNY'S SCORES ARE  
8 STROKES FROM THE MEAN OF 100.2<sub>STROKES</sub>

d)  $\bar{x} - \sigma$

$100.2 - 7.6 = 92.6$   $100.2 + 7.6 = 107.8$

SHE SCORED 108, THEREFORE,  
SHE WILL GO TO NATIONALS!



# 10G Box-and-Whiskers Plot

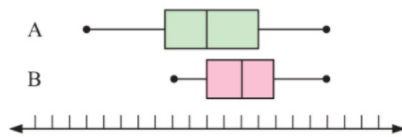
1 For each of the following parallel box-and-whisker plots, determine which data set:

i generally has larger values

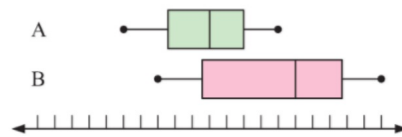
ii has a greater spread of values.

Give reasons for your answers.

a



b



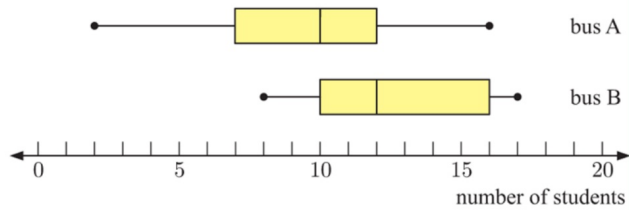
## 10G Box-and-Whiskers Plot

**2** This parallel box-and-whisker plot shows the numbers of students on school buses A and B over a one month period.

**a** On what percentage of trips were there 10 or more students on:

- i** bus A
- ii** bus B?

**b** Which bus generally has the higher number of students?



## 10G Box-and-Whiskers Plot

- ① a) i) B has larger  $Q_3$ , Med,  $Q_1$ ,  
and min (max is same)  
ii) A has a greater range  
and IQR.
- b) i) B has a larger Max,  $Q_3$ , Med,  
 $Q_1$ , and min  
ii) B has a larger range  
and IQR

- ② a) i) 50%  
ii) 75%  
b) Bus B.

**Bus A** {2, 7, 10, 12, 16}

**Bus B** {8, 10, 12, 16, 17}

Exercises...

Study for Quiz 7.1

:)