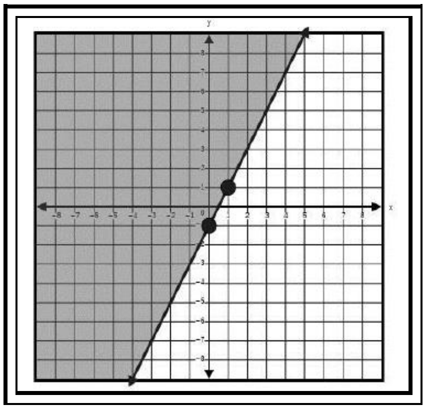
MCAS Mathematics Grade 10 Practice Test

Student Work

Session 1 - Question # 4

Score Point 4

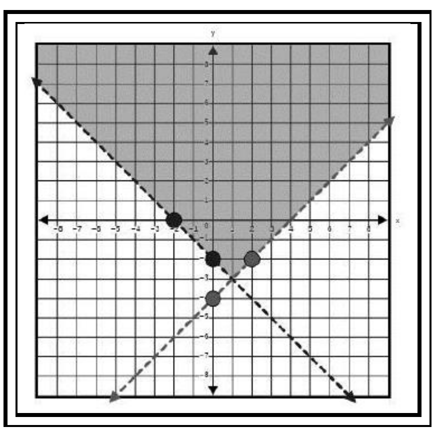
Part A



Part B

(0,0)
$y \geq 2x - 1$
$0 \geq 2(0) - 1$
$0 \geq 0 - 1$
$0 \geq -1$

Part C

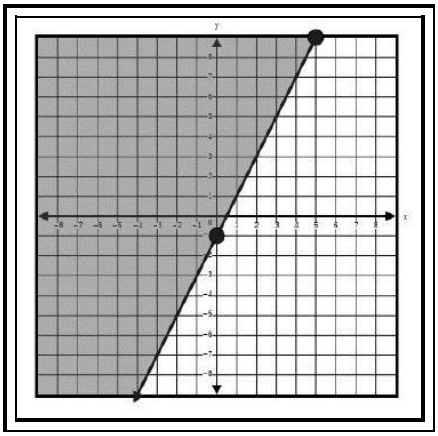


Part D

(0, 0)
I compared the shaded regions from both graphs. In both graphs, (0, 0) was shaded in, indicating it was an answer to the inequality. To check that I was right, I plugged (0, 0) into each of the inequalities given.
(0, 0) was a solution to all of them.

Score Point 4

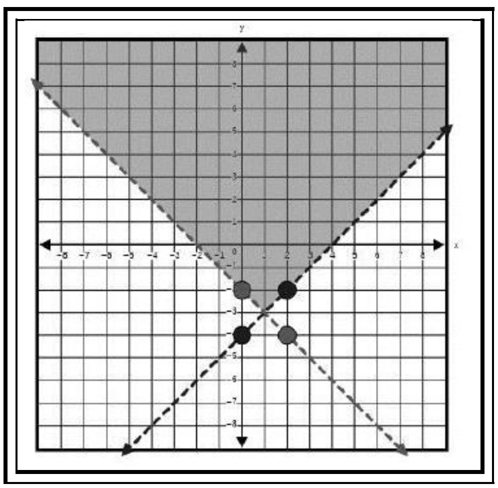
Part A



Part B

(-1, 1)
It’s in the shaded region.

Part C

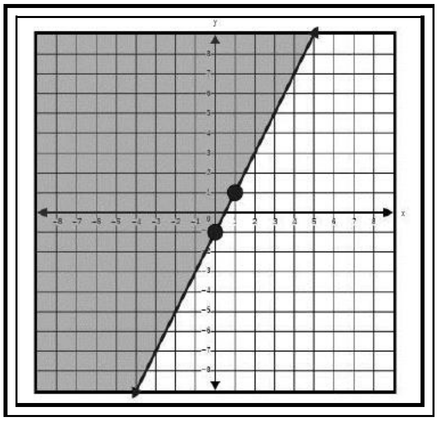


Part D

(1, 3) is a solution set because it is in the shaded region of both.

Score Point 3

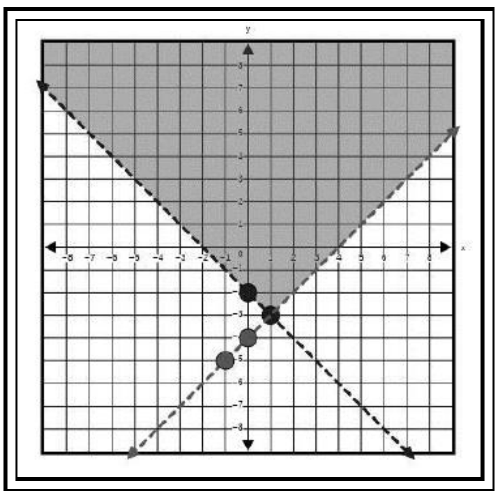
Part A



Part B

An ordered pair that is a solution to the graph is (-1, 0) because it is a point that is a part of the shaded region, therefore, it is a solution to the graph.

Part C

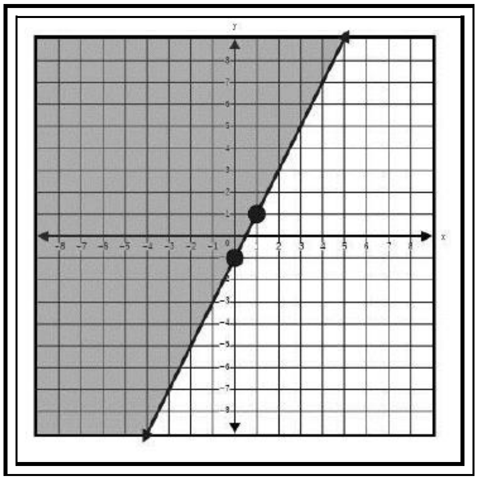


Part D

(1, -3) is the solution because its the point where the two graphs cross

Score Point 2

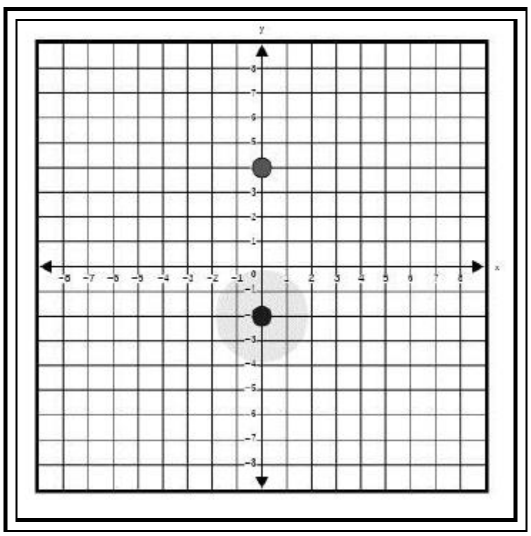
Part A



Part B

(0, -1) is a point on the line.

Part C

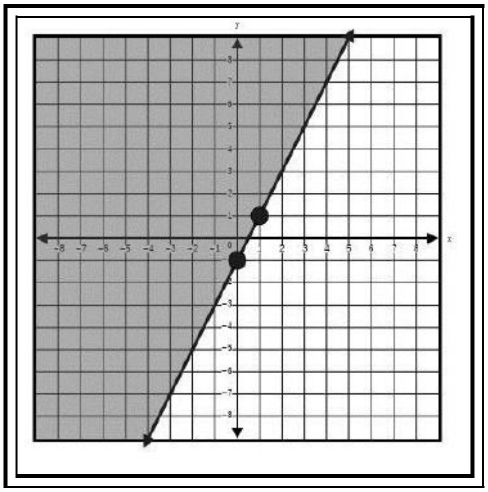


Part D

(0, -2)

Score Point 1

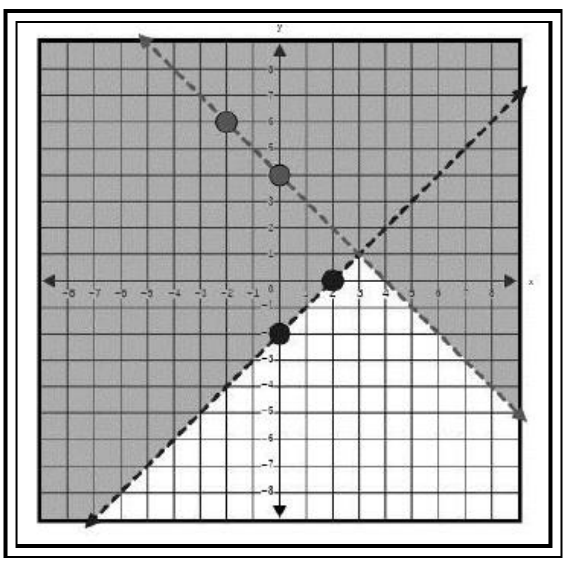
Part A



Part B

(0, -3)

Part C

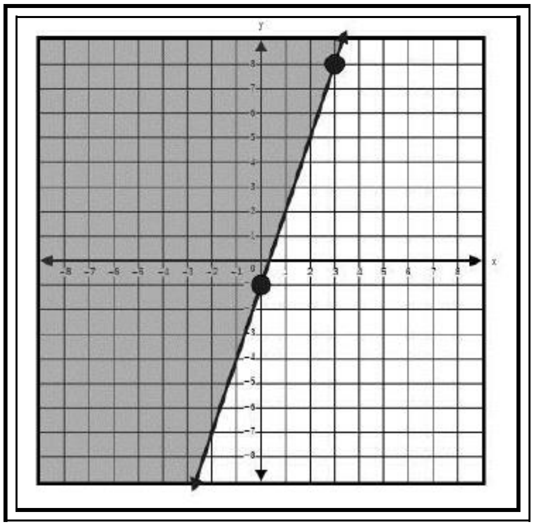


Part D

(3, 1)

Score Point 0

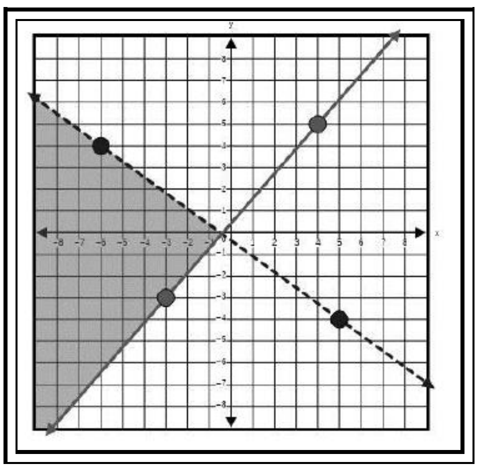
Part A



Part B

Y = 2*x*

Part C



Part D

X + 4 = Y + 3

MCAS Mathematics Grade 10 Practice Test

Student Work

Session 1 - Question # 11

Score Point 4

Part A

2

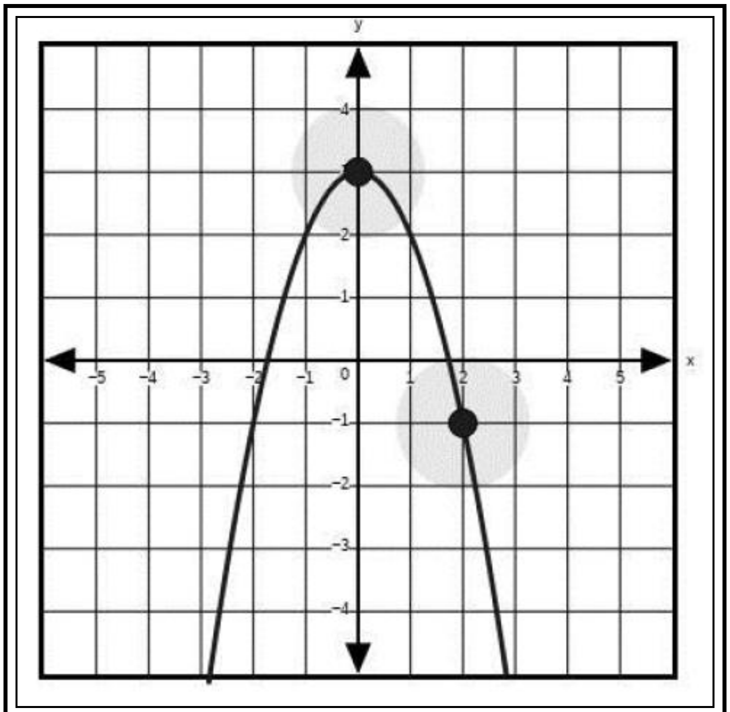
Part B

k = -7
$f(4)$ = 2, which means 2 + k = -5. To solve for k, subtract 2 from both sides, to get k = -5 – 2 which is also k = -7.

Part C

$f(x)$ + 3 shifts the graph up 3 units, while $f(x + 3)$ shifts the graph 3 units to the left.

Part D



Score Point 4

Part A

2

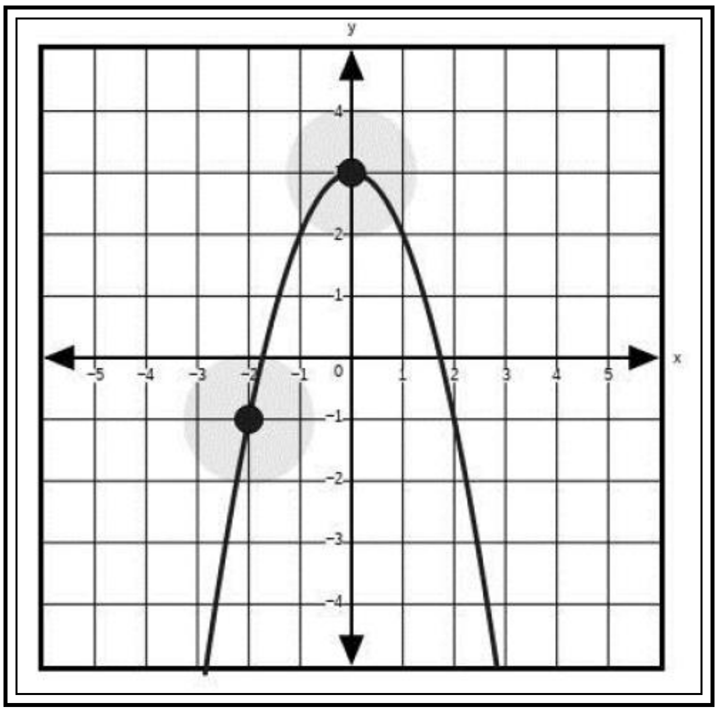
Part B

k = -7
Work:
$f(4) + k = -5$
$f(4) = 2$
$2 + k = -5$
$k = -5 - 2$
$k = -7$

Part C

In the graph of $f(x) + 3$, the 3 affects the y-values, versus in $f(x + 3)$, where the 3 affect the x values. $f(x) + 3$ is shifted three spaces up from the original graph, and $f(x + 3)$ is shifted three spots to the left

Part D



Score Point 3

Part A

$f(4) = 2$

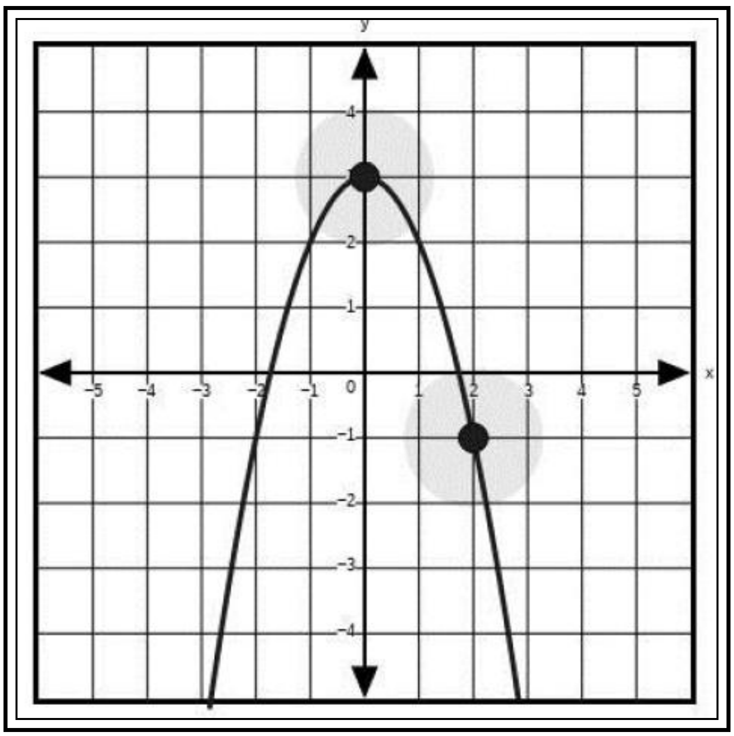
Part B

k = - 7 this is because if $f(4) = 2$ then the equation would be 2 + k = -5. after that you would subtract 2 on both sides to get k = -7

Part C

$f(x + 3)$ increases more rapidly so it would have a steeper slope that $f(x) + 3$

Part D



Score Point 2

Part A

2

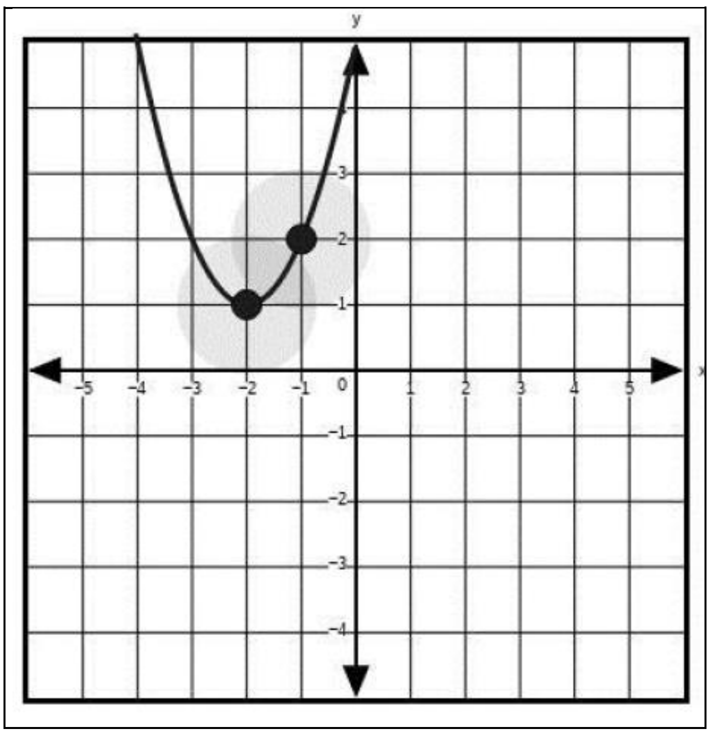
Part B

k = -7
Because if $f(4) = 2$, $2 + k = -5$, so k must be -7

Part C

$f(x) + 3$ would affect the y axis, while $f(x + 3)$ would affect the x axis

Part D



Score Point 1

Part A

$(x - 2)^2 - 2$

Part B

$f(4) + k = (4 - 2)^2 - 2$

$f(4) = (4 - 2)^2 - 2$

$f(4) = 2$

$f(4) + k = 2$
$- f(4) - f(4)$

$k = 2 - f(4)$

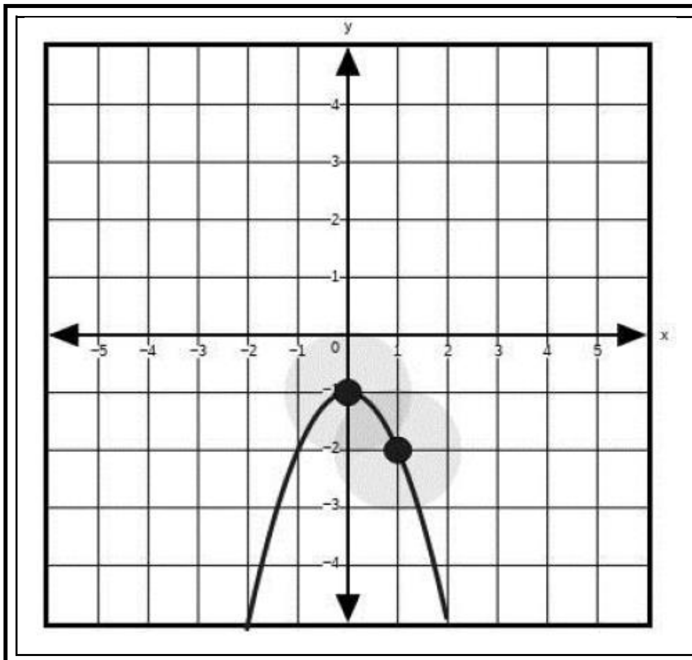
$k = 2 - 2$

$k = 0$

Part C

The graph of $f(x) + 3$ would be translated up 3 units while the graph of $f(x + 3)$ would be translated left 3 units.

Part D



Score Point 0

Part A

(8, 9)

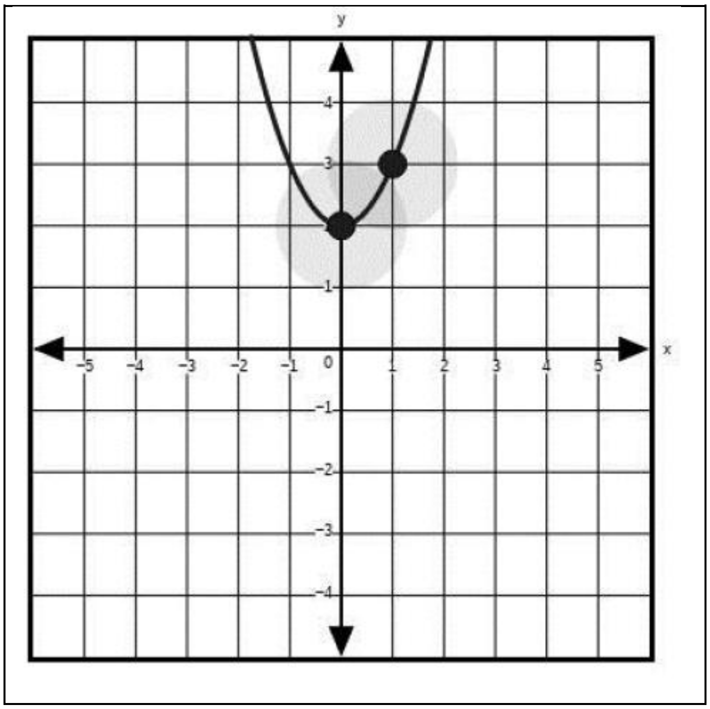
Part B

$k = 20$

Part C

$f(x) + 3$ has 3 as the y intercept, while $f(x + 3)$ has $y + 3$ as the slope of the graph.

Part D



MCAS Mathematics Grade 10 Practice Test

Student Work

Session 2 - Question # 4

Score Point 4

Part A

first quartile = $\boxed{2}$

median = $\boxed{2.5}$

third quartile = $\boxed{5}$

Part B

$IQR = Thirdquartile - firstquartile = 5 - 2 = 3$

Part C

The value of 10 skews the distribution to the right, a positive skew. The outlier pulls the mean up, while leaving the median unaffected.

Part D

The original mean was

$(1 + 1 + 2 + 2 + 2 + 3 + 3 + 5 + 5 + 10)\,\frac{1}{10} = 3.4$

If the 10 is removed and replaced by the mode (2), then the mean is

$(1 + 1 + 2 + 2 + 2 + 2 + 3 + 3 + 5 + 5)\,\frac{1}{10} = 2.6$

So the mean decreases by 0.8 if the value of 10 is changed to 2.

Score Point 4

Part A

first quartile = $\boxed{2}$

median = $\boxed{2.5}$

third quartile = $\boxed{5}$

Part B

> The interquartile range of the data is 3. I got this by lining up the data in consecutive order: 1, 1, 2, 2, 2, 3, 3, 5, 5, 10. Then, I found the median at the middle of that, being 2.5, then I found the first and third quartiles by finding the halfway points between the median and each end of the data set. I got 2 and 5 as the first and third quartiles respectively. The range between them is difference between them, and 5- 2 = 3 so the interquartile range is 3.

Part C

> The outlier of 10 makes both the median and the mean of the data higher. Having 10 be a part of the data set moves the median and the interquartile points higher in the data set. For example, the median of the current data set is 2.5 but the median of a data set without 10 would only be 2. The 10 makes the team seem like it had better games than it did by skewing the distribution of the data higher.

Part D

> If the value 10 is replaced by the mode, the mean would decrease by a value of 0.8. The mean of the original data set is $\frac{1+1+2+2+2+3+3+5+5+10}{10}$, or 3.4. The mode of this set is 2, the number repeated the most. The mean of the new set would be $\frac{1+1+2+2+2+2+3+3+5+5}{10}$, or 2.6. The difference between 3.4 and 2.6 is 0.8

Score Point 3

Part A

first quartile = $\boxed{2}$

median = $\boxed{2.5}$

third quartile = $\boxed{5}$

Part B

IQR = 3 quartile – 1 quartile
IQR = 5 – 2 = 3

Part C

It makes the distribution of the data on a curve skewed to the right because 10 is on the right side of the data

Part D

It would change by .2.
3.4 to 3.2

Score Point 2

Part A

first quartile = 2

median = 2.5

third quartile = 5

Part B

The interquartile range of the data is [1, 2.5] and [2.5, 10]. This is because the range of each quartile, the first and third, is between the lowest value, 1, and the median, 2.5, and between the median and the highest value in the data set, 10.

Part C

This outlier of 10 affects the distribution of the data because it is not close to or similar to the rest of the data, creating an imbalance. The remaining data points are close together and all within five points of one another while the value 10 is not close to the rest of the data points.

Part D

The mode is 2 because it is the value that appears most frequently in the data set, and 2 shows up three times. The mean of the data set with the value 10 is 3.4 because it is the average you get when you add all the values in the data set and divide by 10, the number of data points in the set. If the value 10 was replaced with the mode, 2, then the mean would be 2.6 because when you add all the values together, replacing the value of 10 with a value of 2, and divide by 10, the average you find is 2.6. The change in the mean when changing the value 10 to 2, the mode, is 0.8 because 3.4 – 2.6 = 0.8

Score Point 1

Part A

first quartile = 3

median = 2

third quartile = 5

Part B

the range of the data is 4.5, I got this answer because 10 is the greatest number and 1 is the smallest number. I subtracted 10 – 1 = 9 and the divided the answer by 2 to get my final answer.

Part C

The outlier effects the data because it is the largest data meaning its high score will effect the others.

Part D

The data would be effected drastically because the mode of the data is 2. The mean would change by 0.8. The original mean is 3.4, but with the data being changed the new mode the new mean is 2.6. I subtracted 3.4 – 2.6 = 0.8.

Score Point 0

Part A

first quartile = $\boxed{3}$

median = $\boxed{5}$

third quartile = $\boxed{10}$

Part B

The interquartile range of data is 5 because you need to find the number in the number in the middle by counting how many numbers there are and then multiply the two numbers in the middle and then dividing them by the total amount of numbers in thus case the two middle numbers were 5 and 1 and there were 10 numbers in total so 10 ÷ 5 = 2.

Part C

The value 10 being an outlier affects the distribution of data because it is an even number which makes it more difficult to find the median.

Part D

The mean changes by 5 so it is now 10.

MCAS Mathematics Grade 10 Practice Test

Student Work

Session 2 - Question # 11

Score Point 4

Part A

- ○ A. $\frac{EF}{EG}$
- ◉ B. $\frac{FG}{EG}$
- ○ C. $\frac{EG}{FG}$
- ○ D. $\frac{FG}{EF}$

Part B

sin θ and cos(∠G) are equivalent in terms of the sides of triangle EFG. The ratios of the sides according to the trigonometric functions for sine is opposite over the hypotenuse and for cosine is adjacent over hypotenuse. In relation to each of the angles the same sides are used as the numerator and denominator in the ratios.

Part C

60° because 30° must be the other acute angle of the triangle that is not θ. The opposite side from the 30° is the adjacent side of the θ. And they share a hypotenuse. The sum of the interior angles of a triangle is 180°. The right angle is 90° and the other acute angle is 30°. This leaves 60° to be the value of the θ.

Part D

cos(∠G) = cos (90 – θ)

Score Point 4

Part A

- A. $\frac{EF}{EG}$
- (selected) B. $\frac{FG}{EG}$
- C. $\frac{EG}{FG}$
- D. $\frac{FG}{EF}$

Part B

They are the same. sin θ is $\frac{FG}{EG}$ whereas cos∠G is $\frac{FG}{EG}$

Part C

60° They are complementary cofunctions. This means that when the angles are complementary then they have the same measurement.

Part D

cos(∠G) = cos (90 – θ)

Score Point 3

Part A

- A. $\frac{EF}{EG}$
- (selected) B. $\frac{FG}{EG}$
- C. $\frac{EG}{FG}$
- D. $\frac{FG}{EF}$

Part B

The relationship between the sin θ and cos∠G is that they are equivalent in value. The sin function is the ratio of the opposite side of the theta to the hypotenuse. The cosines function is a ratio of the adjacent side to the hypotenuse, and they are measuring the same ratio, therefore equivalent.

Part C

the value of cos$\frac{1}{2}$ is equal to 45°. You can find this by knowing that if the cosine is $\frac{1}{2}$, you can make a pythagorean triangle, and then figure that since both legs of the triangle are equal, the angle must be 45°

Part D

cos(∠G) = cos (90 – *theta*)

Score Point 2

Part A

- ○ A. $\frac{EF}{EG}$
- ◉ B. $\frac{FG}{EG}$
- ○ C. $\frac{EG}{FG}$
- ○ D. $\frac{FG}{EF}$

Part B

The relationship between sin (θ) and angle G is that sin is opposite over hypotenuse and angle G is adjacent and opposite. Sin comes out to FG over EG, and cos comes out to FG over EG. This relation is due to where the position of each angle is.

Part C

The value of theta is 30 degrees, and this because both equal to $\frac{1}{2}$, and so the angle measures would be the same. Since there is a relation between sin and cos because they are both equal to $\frac{1}{2}$.

Part D

cos(∠G) = cos $(\frac{EG}{FG})$

Score Point 1

Part A

- ○ A. $\frac{EF}{EG}$
- ◉ B. $\frac{FG}{EG}$
- ○ C. $\frac{EG}{FG}$
- ○ D. $\frac{FG}{EF}$

Part B

The angles are congruent because when you have a right triangle all of the angles add to 180°. m ∠ F = 90° and so you 180 – 90 = 90
90 ÷ 2 = 45.

Part C

15° Because it is half of a 30° ∠

Part D

cos(∠G) = cos (45)

Score Point 0

Part A

- A. $\frac{EF}{EG}$
- B. $\frac{FG}{EG}$
- C. $\frac{EG}{FG}$
- D. $\frac{FG}{EF}$

Part B

The relationship between the two angles is that they are both are a 45° angle. Due to the fact that triangle EFG is right triangle one of the angles is going to be 90° and the remaining angles will be 45° because all the angles in a triangle must add up to 180°.

Part C

The value of θ is 30° because the two angles must be the same.

Part D

cos(∠G) = cos (90 – 45)