Chapter 13. Statistics

Ex. 13.5

Answer 1AA.

Consider the frequency table:

Math SAT Scores	Number of Students
200-300	2
300-400	19
400-500	44
500-600	55
600-700	32
700-800	8

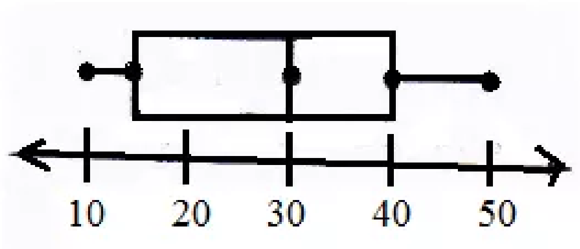
The table 2 that is cumulative frequency table of the data:

Math SAT Scores	Number of Students	Cumulative numbers of students
200-300	2	2
300-400	19	21
400-500	44	65
500-600	55	120
600-700	32	152
700-800	8	160

The column 3 of the table 2 is determined by adding the frequency of that range with the sum of previous frequencies of the other intervals.

Answer 1CU.

Consider the box-and-whisker plot:



From the box and whisker plot it can be observed that lowest value is $\boxed{10}$ and the highest value is $\boxed{50}$.

The median of the data is: $M = \boxed{30}$.

The 1st quartile is: $Q_1 = \boxed{10}$.

The 3rd quartile is: $Q_3 = \boxed{40}$.

The inter quartile range is:

$$\begin{aligned} Q_3 - Q_1 &= 40 - 10 \\ &= 30 \end{aligned}$$

Now

$10 - 1.5(30) = -35$ and $10 + 1.5(30) = 55$

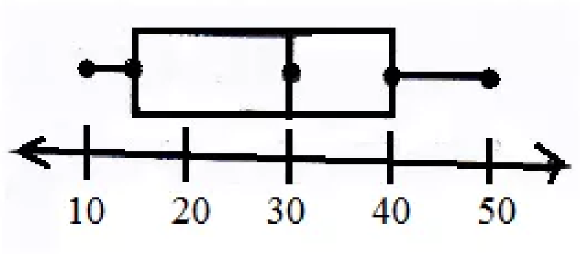
Since $-35 < 10$ and $55 > 50$, therefore there is no outliers.

Answer 2CU.

The two histograms are the frequency and cumulative frequencies respectively. The first histogram says the numbers of students within that category and while the second histogram says the total numbers of students present up to that category.

Answer 2CU.

In a box-and-whisker plot to determine the scale of the number line first observed the lowest and greatest value. Then divide the numbers into several classes and determine class width. For example if the lowest value is 5 and the highest value is 25 then scale the numbers with 5, 10, 15, 20, 25. An example of box-and-whisker plot is shown below:

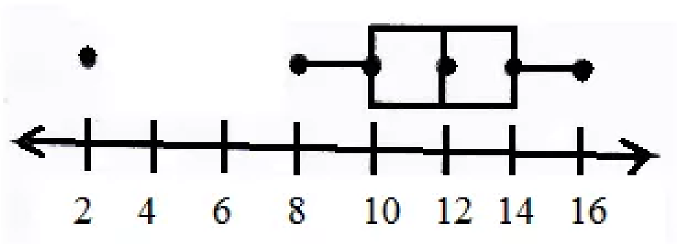


Answer 3AA.

The two histograms are the frequency and cumulative frequencies respectively. The first histogram says the numbers of students within that category and while the second histogram says the total numbers of students present up to that category. For displaying the data the comparing to the first histogram the second is preferable as it displays the numbers of students in that category as well as the total numbers of students present in that sample of data.

Answer 3CU.

Consider the box-and-whisker plot:



Here the lowest value is 2 and the highest value is 16. The outlier is 2.

The median of the data is 12 and upper and lower quartiles are 10 and 14 respectively.

Therefore a possible set of data for this plot will be:

2, 8, 10, 10, 11, 12, 12, 13, 14, 15, 16

Answer 4AA.

It is given that 100% is denoted by 160 and 0% is denoted by 0.

Therefore the 50% of the data will denoted by:

$$50\% \text{ of } 160 = \boxed{80}$$

Similarly the student corresponds to 25% and 75% will be:

$$25\% \text{ of } 160 = \boxed{40}$$

$$75\% \text{ of } 160 = \boxed{120}$$

Answer 4CU.

Consider the data:

30, 28, 24, 24, 22, 22, 21, 17, 16, 15

Arrange the data in ascending order as follows:

15, 16, 17, 21, 22, 22, 24, 24, 28, 30

Here the lowest value is 15 and the highest value is 30.

The median of the data is:

$$M = \frac{22+22}{2}$$
$$= 22$$

The 1st quartile is:

$$Q_1 = 17$$

The 3rd quartile is:

$$Q_3 = 24$$

The inter quartile range is:

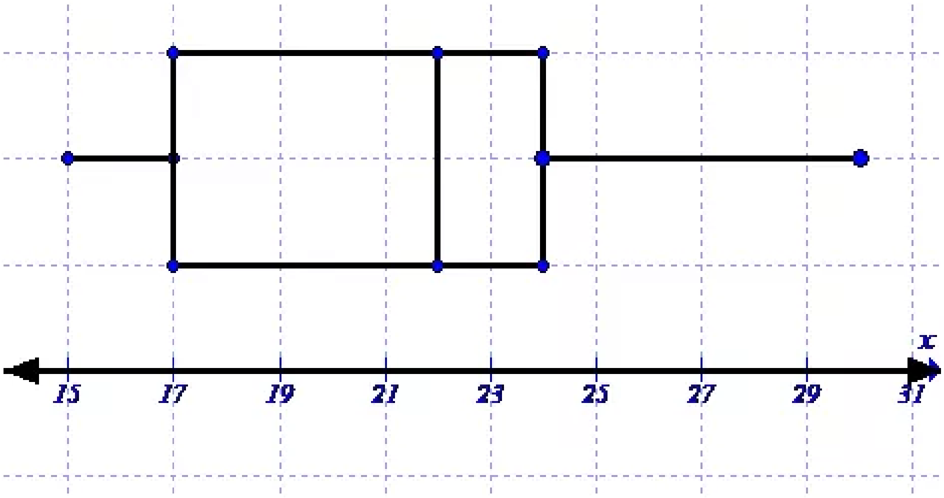
$$24 - 17 = 7$$

Now

$17 - 1.5(7) = 6.5$ and $24 + 1.5(7) = 35.5$

Since $6.5 < 15$ and $35.5 > 30$, therefore there is no outliers.

Therefore the box-and-whisker plot:



Answer 5CU.

Consider the data:

64, 69, 65, 71, 66, 66, 74, 67, 68, 67

Arrange the data in ascending order as follows:

64, 65, 66, 66, 67, 67, 68, 69, 71, 74

Here the lowest value is 64 and the highest value is 74.

The median of the data is:

$$M = \frac{67+67}{2}$$
$$= 67$$

The 1st quartile is:

$$Q_1 = 66$$

The 3rd quartile is:

$$Q_3 = 69$$

The inter quartile range is:

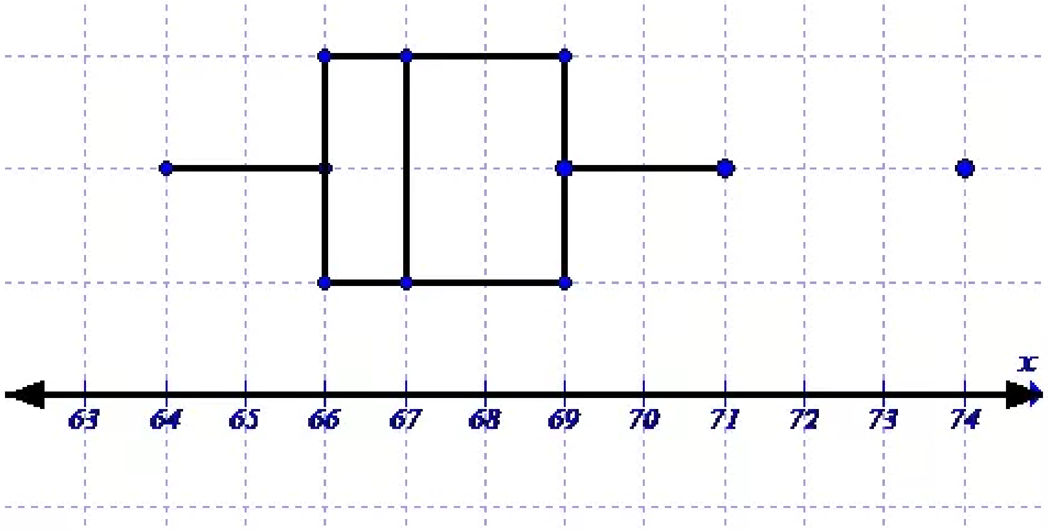
$$69 - 66 = 3$$

Now

$66 - 1.5(3) = 61.5$ and $69 + 1.5(3) = 73.5$

Since $61.5 < 64$ and $74 > 73.5$, therefore the outlier is 74.

The the box-and-whisker plot:



Answer 6CU.

Consider the data:

A: 22, 18, 22, 17, 32 24, 31, 26, 28

B: 28, 30, 45, 23, 24, 32, 30, 27, 27

Arrange the data in ascending order as follows:

A: 17, 18, 22, 22, 24, 26, 28, 31, 32

B: 23, 24, 27, 27, 28, 30, 30, 32, 45

The median of the data is:

$$M_1 = 24,\ M_2 = 28$$

The 1st quartile is:

$$Q_{11} = 20, Q_{12} = 25.5$$

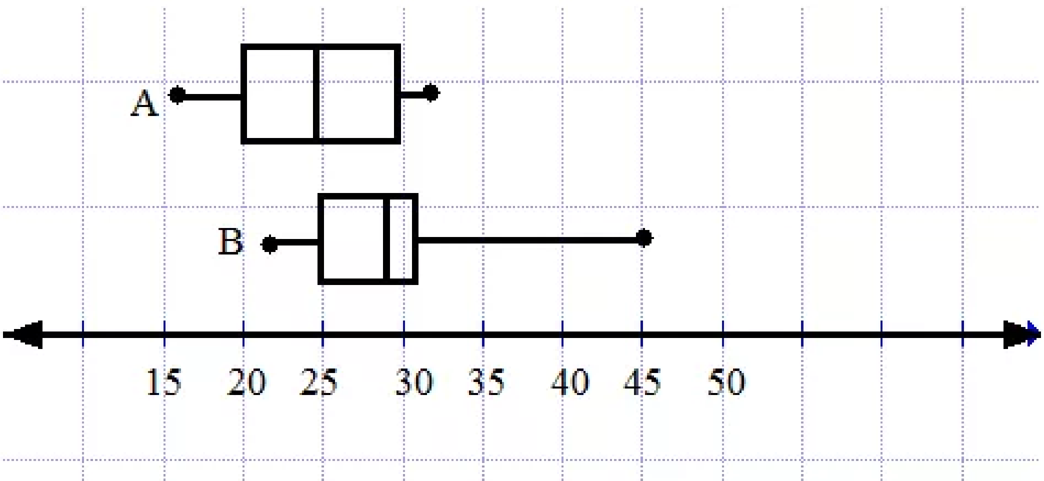
The 3rd quartile is:

$$Q_{21} = 29.5,\ Q_{22} = 31$$

The inter quartile range is:

$r_1 = 29.5 - 20 = 9.5$ and $r_1 = 31 - 25.5 = 5.5$

The box-and-whisker plot:



Answer 7CU.

Consider the data:

A: 8, 15.5, 14, 14, 24, 19, 16.7, 15, 11.4, 16

B: 18, 14, 15.8, 9, 12, 16, 20, 16, 13, 15

Arrange the data in ascending order as follows:

A: 8, 11.4, 14, 14, 15, 15.5, 16, 16.7, 19, 24

B: 9, 12, 13, 14, 15, 15.8, 16, 16, 18, 20

The median of the data is:

$$M_1 = 15.25,\ M_2 = 15.4$$

The 1st quartile is:

$Q_{11} = 14, Q_{12} = 13$

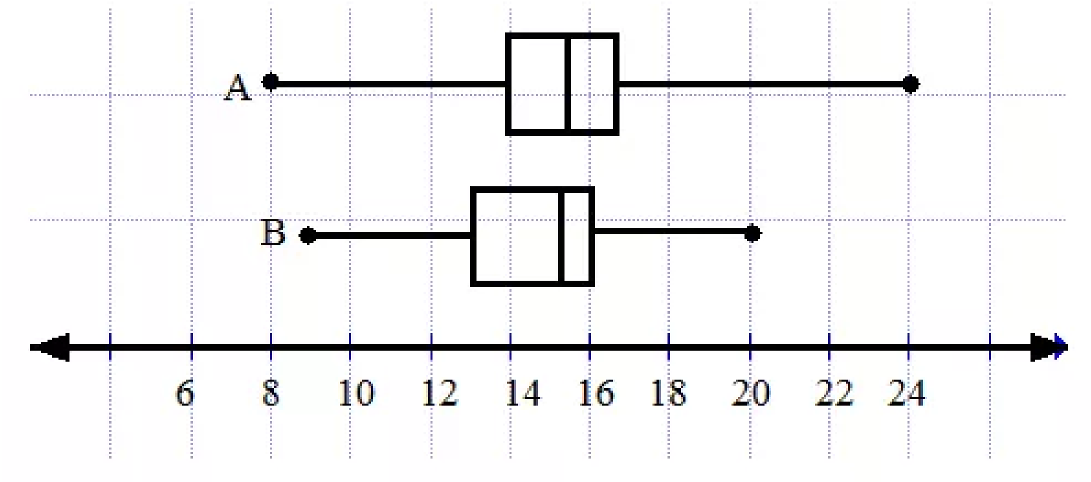
The 3rd quartile is:

$Q_{21} = 16.7,\ Q_{22} = 16$

The inter quartile range is:

$r_1 = 16.7 - 14 = 2.7$ and $r_1 = 16 - 13 = 3$

The box-and-whisker plot:



Answer 8AA.

There are 45 data in the data set.

Taking interval width 2 prepares a cumulative distribution table as follows:

Class interval (lb)	Frequency	Cumulative frequency
2-4	1	1
4-6	5	6
6-8	23	29
8-10	14	43
10-12	2	45

Answer 8CU.

Consider the data:

\$1397, \$693, \$678, \$620, \$573, \$559, \$524, \$472, \$467, \$452

The median of the data is:

$$M = \frac{\$573 + \$559}{2}$$
$$= \$566$$

The 1st quartile is:

$$Q_1 = \$472$$

The 3rd quartile is:

$$Q_3 = \$678$$

The inter quartile range is:

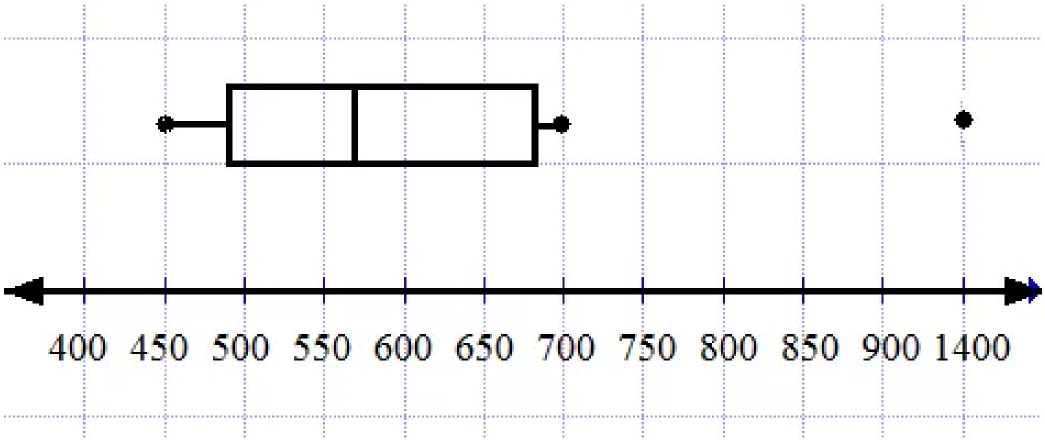
$$r = \$678 - \$472$$
$$= \$206$$

Now

$\$472 - \$1.5(206) = \$163$ and $\$678 + \$1.5(206) = \$987$.

Therefore \$1397 is outlier.

The box-and-whisker plot:



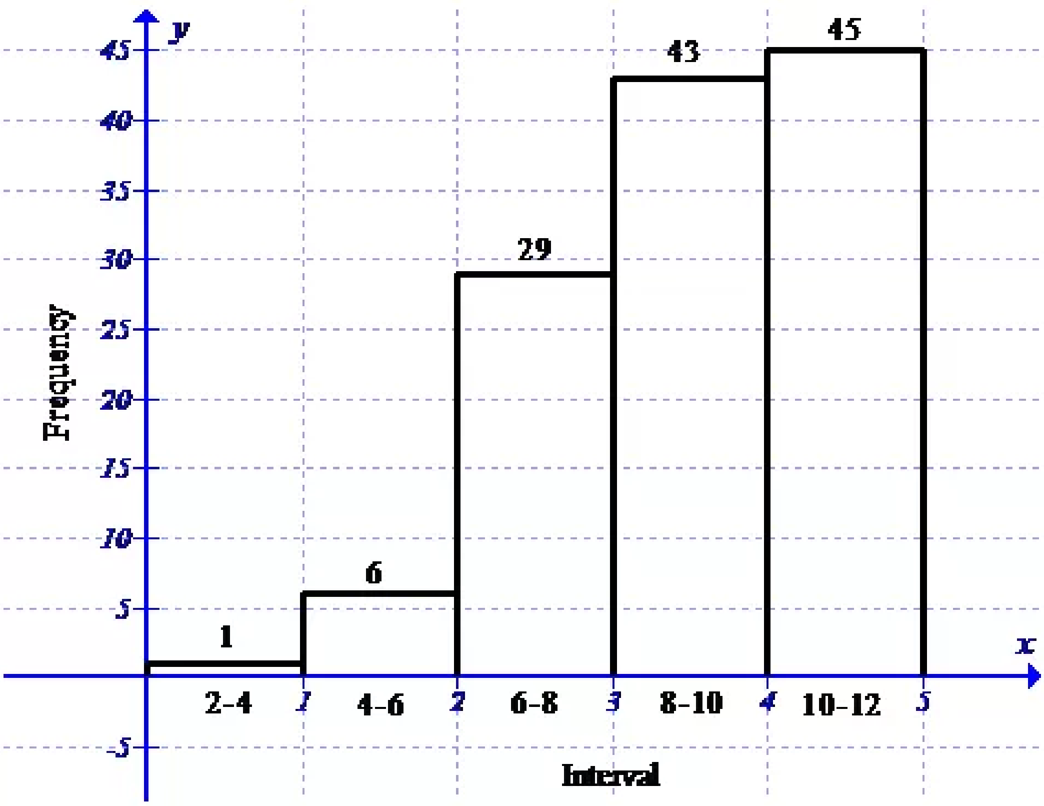
Answer 9AA.

There are 45 data in the data set.

Taking interval width 2 prepares a cumulative distribution table as follows:

Class interval (lb)	Frequency	Cumulative frequency
2-4	1	1
4-6	5	6
6-8	23	29
8-10	14	43
10-12	2	45

The cumulative frequency histogram for the data will be:



Answer 9CU.

Consider the data:

\$1397, \$693, \$678, \$620, \$573, \$559, \$524, \$472, \$467, \$452

The median of the data is:

$$\begin{aligned} M &= \frac{\$573+\$559}{2} \\ &= \$566 \end{aligned}$$

The 1st quartile is:

$$Q_1 = \$472$$

The 3rd quartile is:

$$Q_3 = \$678$$

The inter quartile range is:

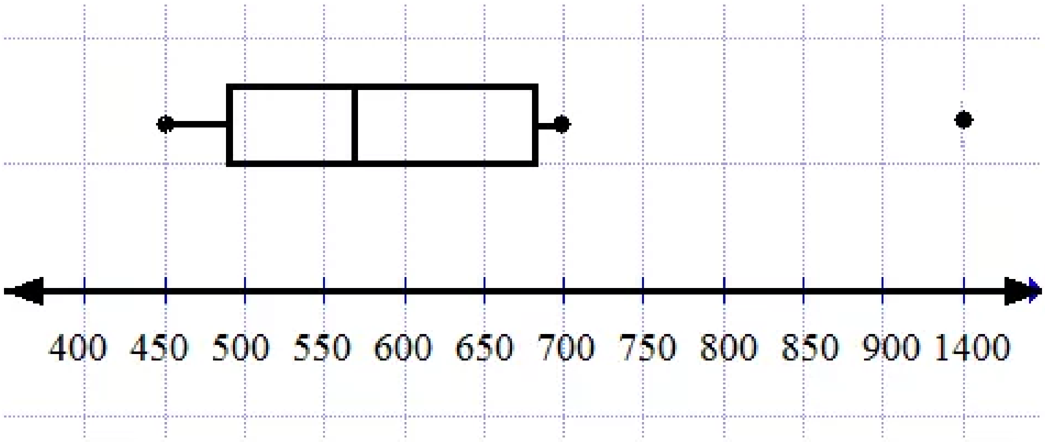
$$\begin{aligned} r &= \$678-\$472 \\ &= \$206 \end{aligned}$$

Now

$\$472-\$1.5(206)=\$163$ and $\$678+\$1.5(206)=\$987$.

Therefore \$1397 is outlier.

The box-and-whisker plot:



Here the most data are spread fairly evenly from \$450 million to \$700 million. The only outlier in the plot is \$1397.

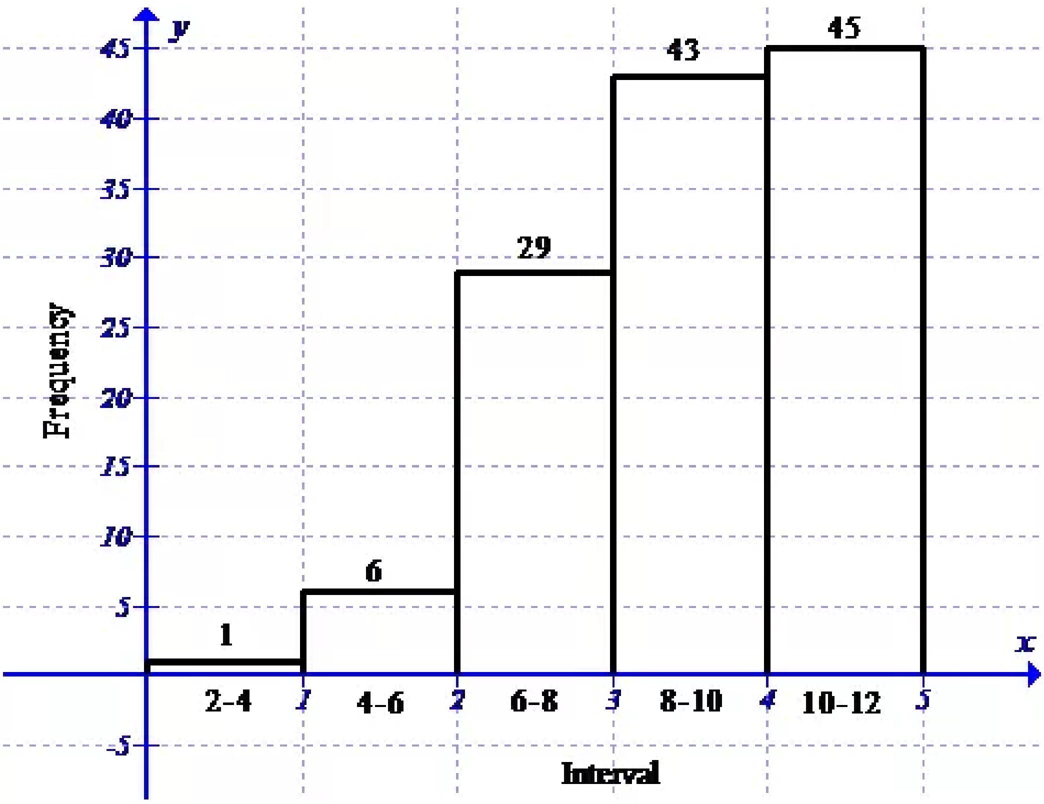
Answer 10AA.

There are 45 data in the data set.

Taking interval width 2 prepares a cumulative distribution table as follows:

Class interval (lb)	Frequency	Cumulative frequency
2-4	1	1
4-6	5	6
6-8	23	29
8-10	14	43
10-12	2	45

The cumulative frequency histogram for the data will be:



The 80th percentile of the data will be:

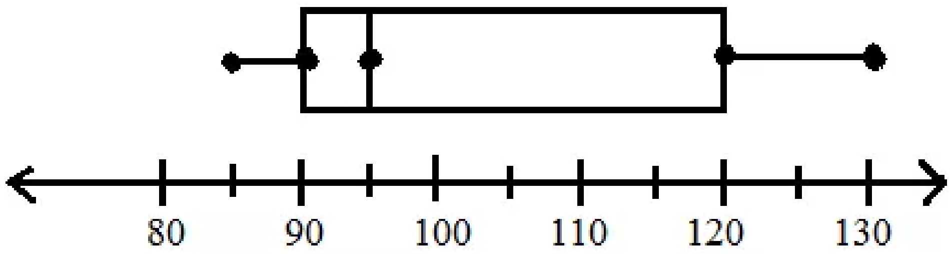
$80\% \text{ of } 45 = 36$

Thus 36 students are below the 80th percentile.

Hence the weight for a baby in the 80th percentile is: $\boxed{8 \text{ lb} - 10 \text{ lb}}$.

Answer 10PA.

Consider the box-and-whisker plot:

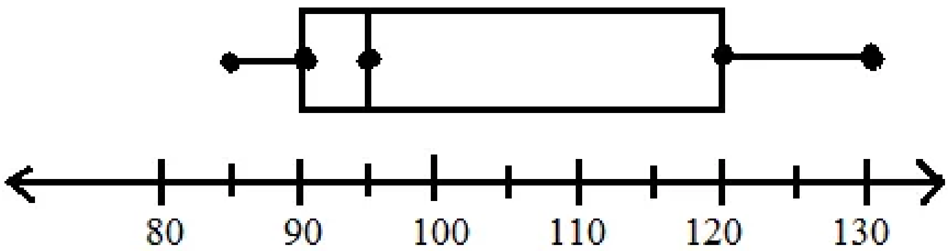


From the box and whisker plot it can be observed that lowest value is 85 and the highest value is 130.

Therefore the range of the data is: $130-85=\boxed{45}$.

Answer 11PA.

Consider the box-and-whisker plot:

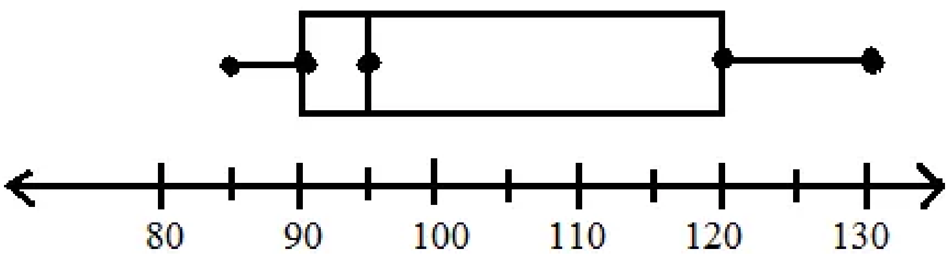


From the box and whisker plot it can be observed that the first quartile is 90 and the third quartile is 120.

Therefore the inter quartile range of the data is: $120-90=\boxed{30}$.

Answer 12PA.

Consider the box-and-whisker plot:

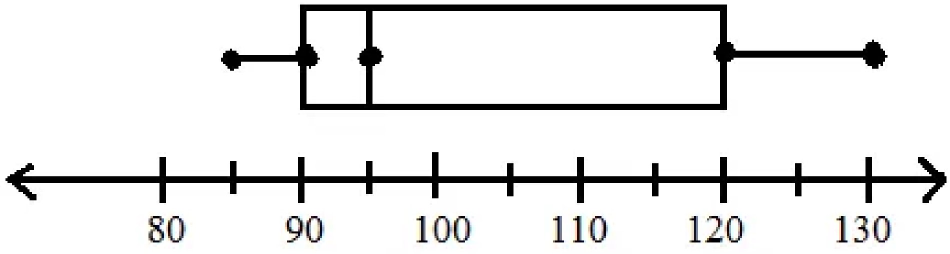


From the box and whisker plot it can be observed that the first quartile is 90.

Therefore the percent of the data is less than 90 is 25% or $\frac{25}{100}=\boxed{\frac{1}{4}}$.

Answer 13PA.

Consider the box-and-whisker plot:



From the box and whisker plot it can be observed that the median of the data is 95.

Therefore the percent of the data is greater than 95 is 50% or $\frac{50}{100}=\boxed{\frac{1}{2}}$.

Answer 14PA.

Consider the data:

15, 8, 10, 1, 3, 2, 6, 5, 4, 27, 1

Arrange the data in ascending order as follows:

1, 1, 2, 3, 4, 5, 6, 8, 10, 15, 27

Here the lowest value is 1 and the highest value is 27.

The median of the data is:

$$M=5$$

The 1st quartile is:

$$Q_1=2$$

The 3rd quartile is:

$$Q_3=10$$

The inter quartile range is:

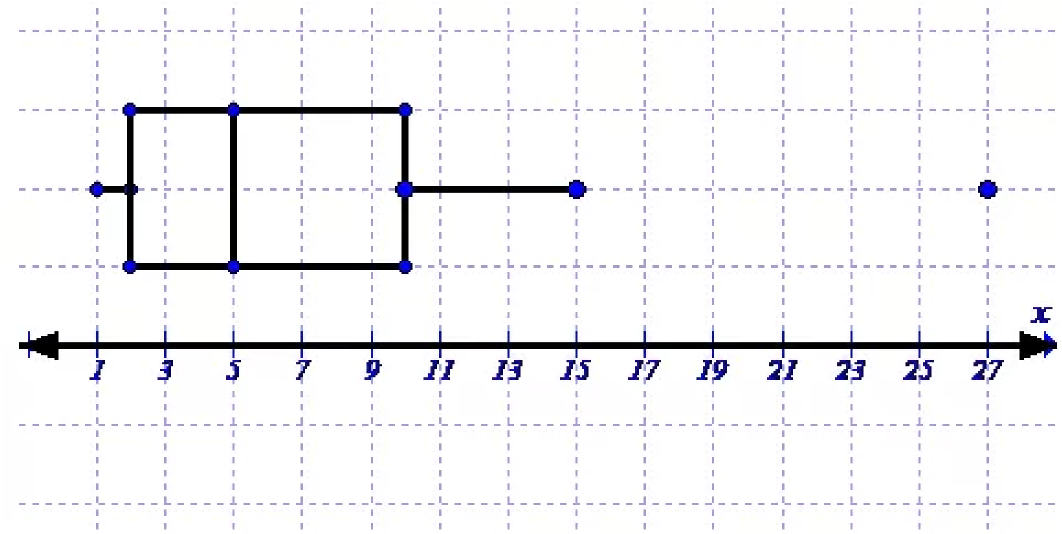
$$10-2=8$$

The outliers are:

$2-1.5(8)=-10$ and $10+1.5(8)=22$

Since -10 is not a value of the data set, therefore the only outlier is 27.

Therefore the box-and-whisker plot:



Answer 15PA.

Consider the data:

20, 2, 12, 5, 4, 16, 17, 7, 6, 16, 5, 0, 5, 30

Arrange the data in ascending order as follows:

0, 2, 4, 5, 5, 5, 6, 7, 12, 16, 16, 17, 20, 30

Here the lowest value is 0 and the highest value is 30.

The median of the data is:

$$M = \frac{6+7}{2}$$
$$= 6.5$$

The 1st quartile is:

$$Q_1 = 5$$

The 3rd quartile is:

$$Q_3 = 16$$

The inter quartile range is:

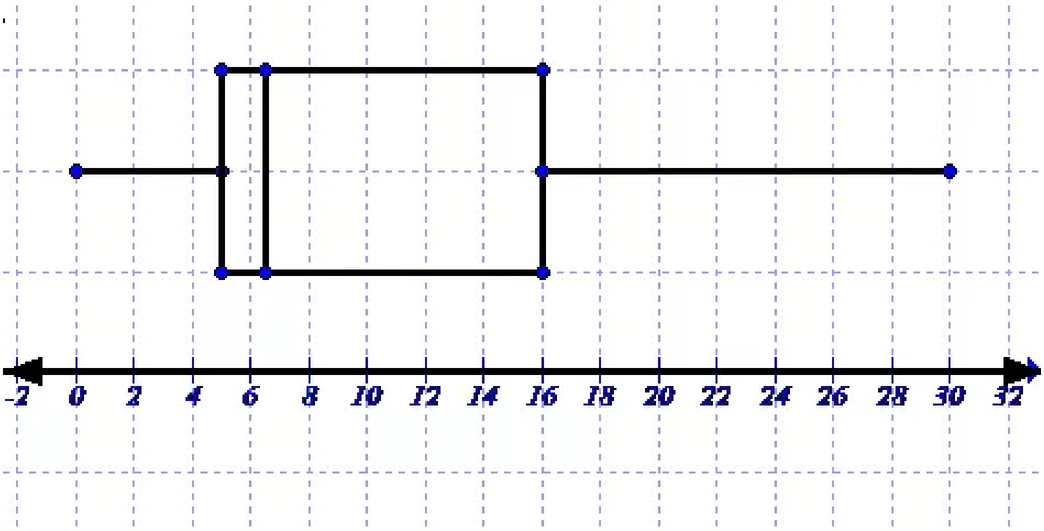
$$16-5=11$$

The outliers are:

$5-1.5(11)=-11.5$ and $16+1.5(11)=32.5$

Since $-11.5<0$ and $32.5>30$, therefore there is not outlier.

Therefore the box-and-whisker plot:



Answer 16PA.

Consider the data:

4, 1, 1, 1, 10, 15, 4, 5, 27, 5, 14, 10, 6, 2, 2, 5, 8

Arrange the data in ascending order as follows:

1, 1, 1, 2, 2, 4, 4, 5, 5, 5, 6, 8, 10, 10, 14, 15, 27

Here the lowest value is 1 and the highest value is 27.

The median of the data is:

$$M=5$$

The 1st quartile is:

$$Q_1=\frac{2+2}{2}$$
$$=2$$

The 3rd quartile is:

$$Q_3=\frac{10+10}{2}$$
$$=10$$

The inter quartile range is:

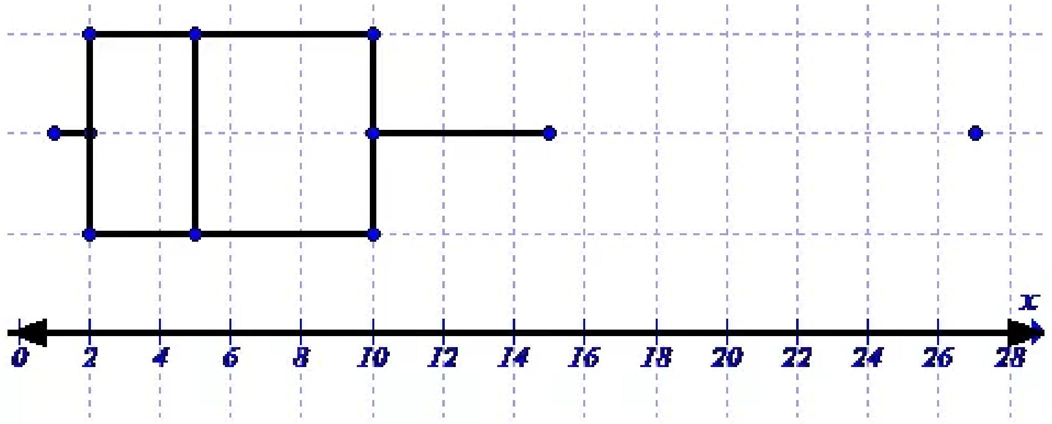
$$\begin{aligned} Q_3 - Q_1 &= 10 - 2 \\ &= 8 \end{aligned}$$

The outliers are:

$2 - 1.5(8) = -6$ and $10 + 1.5(8) = 22$

Since $-6 < 1$ and $22 < 27$, therefore the only outlier is 27.

Therefore the box-and-whisker plot:



Answer 17PA.

Consider the data:

51, 27, 55, 54, 69, 60, 39, 46, 46, 53, 81, 23

Arrange the data in ascending order as follows:

23, 27, 39, 46, 46, 51, 53, 54, 55, 60, 69, 81

The median of the data is:

$$\begin{aligned} M &= \frac{51 + 53}{2} \\ &= 52 \end{aligned}$$

The 1st quartile is:

$$Q_1 = \frac{39+46}{2} = 42.5$$

The 3rd quartile is:

$$Q_3 = \frac{55+60}{2} = 57.5$$

The inter quartile range is:

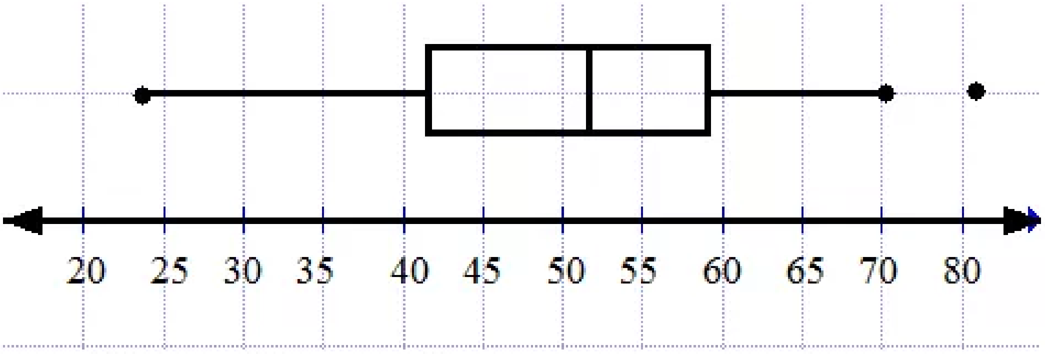
$$r = 57.5 - 42.5 = 15$$

Now

$42.5 - 1.5(15) = 20$ and $57.5 + 1.5(15) = 80$.

Therefore 81 is outlier.

The box-and-whisker plot:



Answer 18PA.

Consider the data:

15.1, 9.0, 8.5, 5.8, 6.2, 8.5, 10.5, 11.5, 8.8, 7.6

Arrange the data in ascending order as follows:

5.8, 6.2, 7.6, 8.5, 8.5, 8.8, 9.0, 10.5, 11.5, 15.1

The median of the data is:

$$M = \frac{8.5+8.8}{2} = 8.65$$

The 1st quartile is:

$$Q_1 = 7.6$$

The 3rd quartile is:

$$Q_3 = 10.5$$

The inter quartile range is:

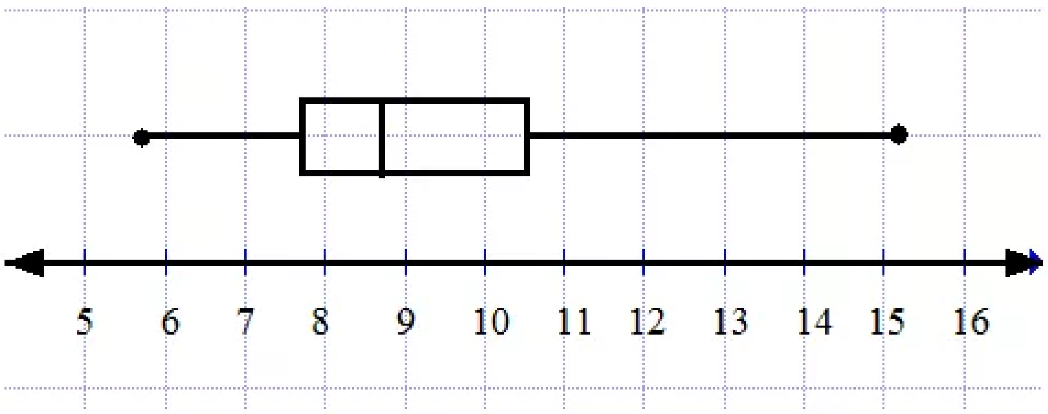
$$r = 10.5 - 7.6$$
$$= 2.9$$

Now

$7.6 - 1.5(2.9) = 3.25$ and $10.5 + 1.5(2.9) = 14.85$.

Therefore 15.1 is outlier.

The box-and-whisker plot:



Answer 19PA.

Consider the data:

1.3, 1.2, 14, 1.8, 1.6, 5.7, 1.3, 3.7, 3.3, 2, 1.3, 1.3, 7.7, 8.5, 2.2

Arrange the data in ascending order as follows:

1.2, 1.3, 1.3, 1.3, 1.3, 1.6, 1.8, 2, 2.2, 3.3, 3.7, 5.7, 7.7, 8.5, 14

The median of the data is:

$$M = 2$$

The 1st quartile is:

$Q_1 = 1.3$

The 3rd quartile is:

$Q_3 = 5.7$

The inter quartile range is:

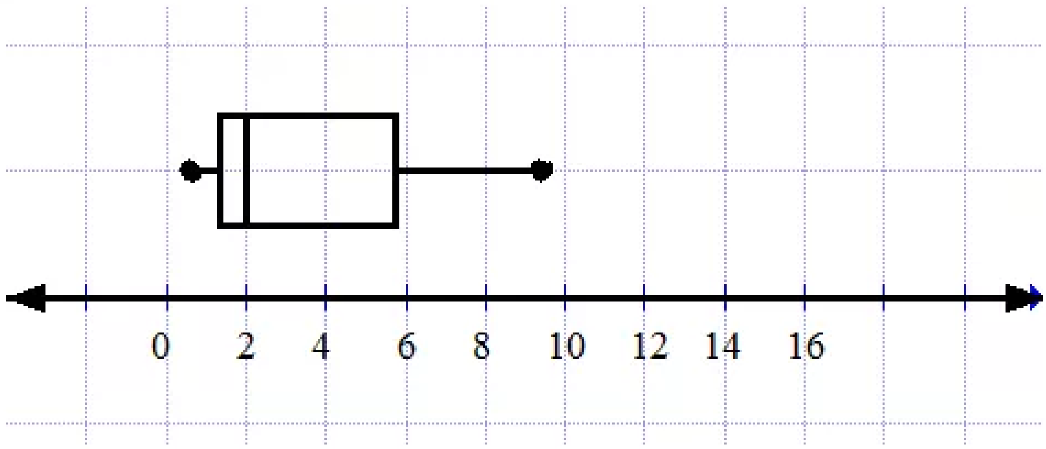
$$\begin{aligned} r &= 5.7 - 1.3 \\ &= 4.4 \end{aligned}$$

Now

$1.3 - 1.5(4.4) = -5.3$ and $5.7 + 1.5(4.4) = 12.3$.

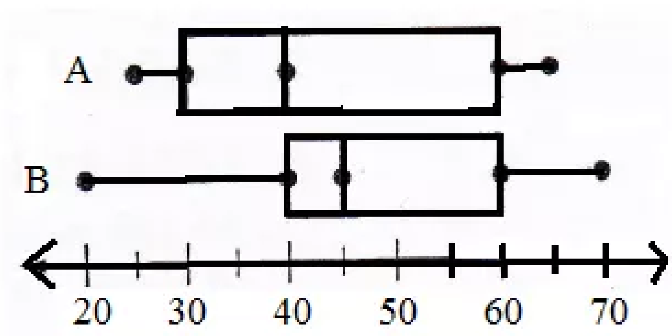
Therefore 14 is outlier.

The box-and-whisker plot:



Answer 20PA.

Consider the box-and-whisker plot:

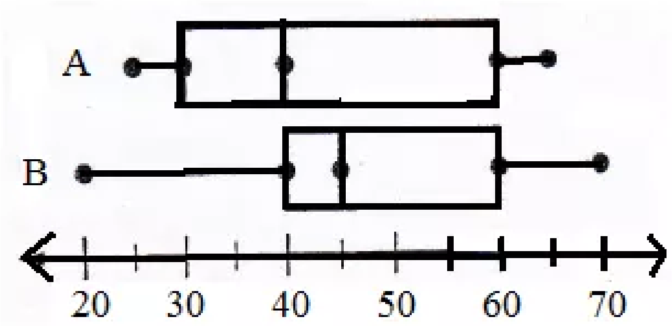


From the box-and-whisker plot it can be verified that the data set A has the least value 25 and the data set B has the least value 20.

Therefore the data set B has the least value.

Answer 21PA.

Consider the box-and-whisker plot:

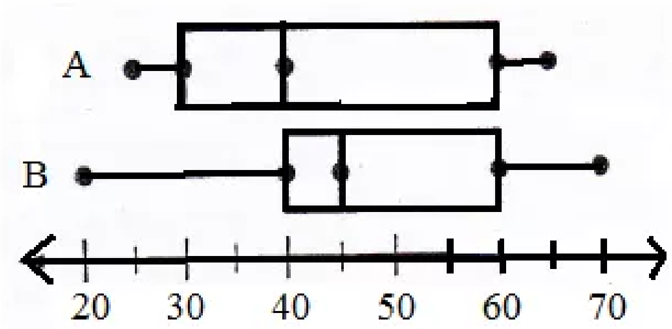


From the box-and-whisker plot it can be verified that the data set A has the highest value 65 and the data set B has the highest value 70.

Therefore the data set B has the greatest value.

Answer 22PA.

Consider the box-and-whisker plot:



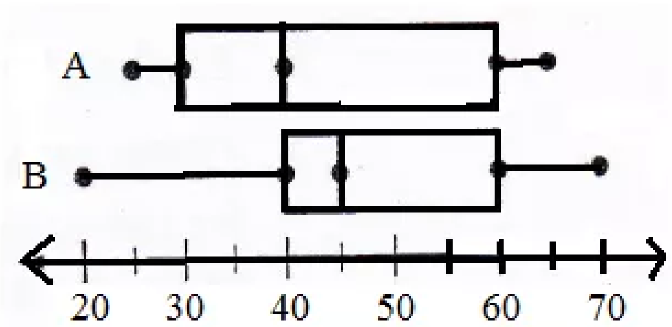
From the box-and-whisker plot it can be verified that the inter quartile range of the data set A is: $60-30=30$.

The inter quartile range of the data set B is: $60-40=20$.

Therefore the data set A has the greatest inter quartile range.

Answer 23PA.

Consider the box-and-whisker plot:



From the box-and-whisker plot it can be verified that the range of the data set A is: $65-25=40$.

The range of the data set B is: $70-20=50$.

Therefore the data set B has the greatest range.

Answer 24PA.

Consider the data:

A: 15, 17, 22, 28, 32, 40, 16, 24, 26, 38, 19

B: 24, 32, 25, 27, 37, 29, 30, 30, 28, 31, 27

Arrange the data in ascending order as follows:

A: 15, 16, 17, 19, 22, 24, 26, 28, 32, 38, 40

B: 24, 25, 27, 27, 28, 29, 30, 30, 31, 32, 37

The median of the data is:

$$M_1 = 24,\ M_2 = 29$$

The 1st quartile is:

$$Q_{11} = 17, Q_{12} = 27$$

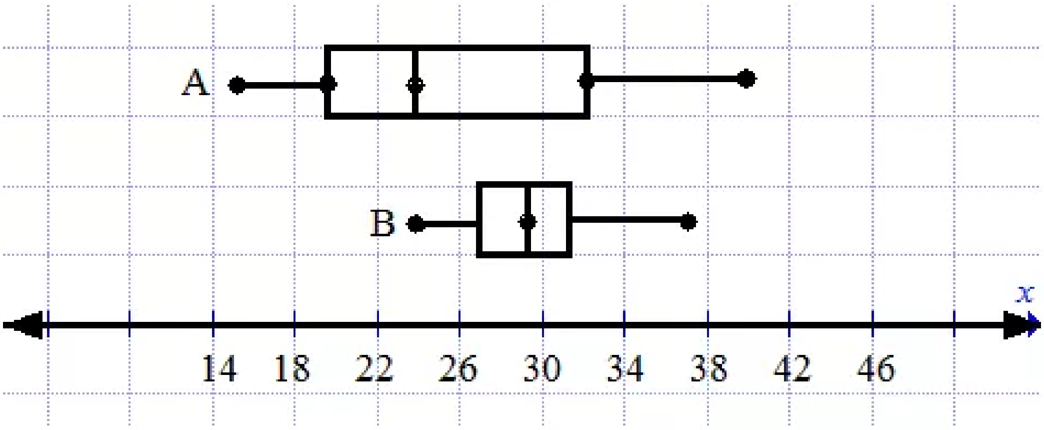
The 3rd quartile is:

$$Q_{21} = 32,\ Q_{22} = 31$$

The inter quartile range is:

$$\begin{aligned} r_1 &= 32 - 17 \\ &= 15 \end{aligned} \quad \text{and} \quad \begin{aligned} r_2 &= 31 - 27 \\ &= 4 \end{aligned}$$

The box-and-whisker plot:



Answer 25PA.

Consider the data:

A: 50, 45, 47, 55, 51, 58, 49, 51, 51, 48, 47

B: 40, 41, 48, 39, 41, 41, 38, 37, 35, 37, 45

Arrange the data in ascending order as follows:

A: 45, 47, 47, 48, 49, 50, 51, 51, 51, 55, 58

B: 35, 37, 37, 38, 39, 40, 41, 41, 41, 45, 48

The median of the data is:

$$M_1 = 50,\ M_2 = 40$$

Answer 26PA.

Consider the data:

A: 1.5, 3.8, 4.2, 3.5, 4.1, 4.4, 4.1, 4.0, 4.0, 3.9

B: 6.8, 4.2, 7.6, 5.5, 12.2, 6.7, 7.1, 4.8

Arrange the data in ascending order as follows:

A: 1.5, 3.5, 3.8, 3.9, 4.0, 4.0, 4.1, 4.1, 4.2, 4.4

B: 4.2, 4.8, 5.5, 6.7, 6.8, 7.1, 7.6, 12.2

The median of the data is:

$$M_1 = 4.0,\ M_2 = 6.75$$

The 1st quartile is:

$$Q_{11} = 3.8, Q_{12} = 5.15$$

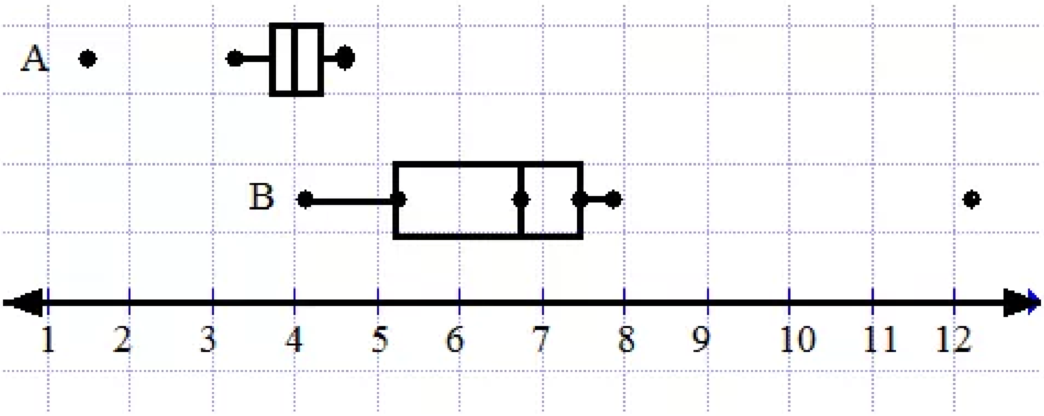
The 3rd quartile is:

$$Q_{21} = 4.1,\ Q_{22} = 7.35$$

The inter quartile range is:

$$r_1 = 4.1 - 3.8 = 1.3 \quad \text{and} \quad r_2 = 7.35 - 5.15 = 2.2$$

The box-and-whisker plot:



Answer 27PA.

Consider the data:

A: 4.4, 4.5, 4.6, 4.5, 4.4, 4.4, 4.1, 4.9, 2.9

B: 5.1, 4.9, 4.2, 3.9, 4.5, 4.1, 4.3, 4.5, 5.2

Arrange the data in ascending order as follows:

A: 2.9, 4.1, 4.4, 4.4, 4.4, 4.5, 4.5, 4.6, 4.9

B: 3.9, 4.1, 4.2, 4.3, 4.5, 4.5, 4.9, 5.1, 5.2

The median of the data is:

$$M_1 = 4.4,\ M_2 = 4.5$$

The 1st quartile is:

$Q_{11} = 4.25, Q_{12} = 4.15$

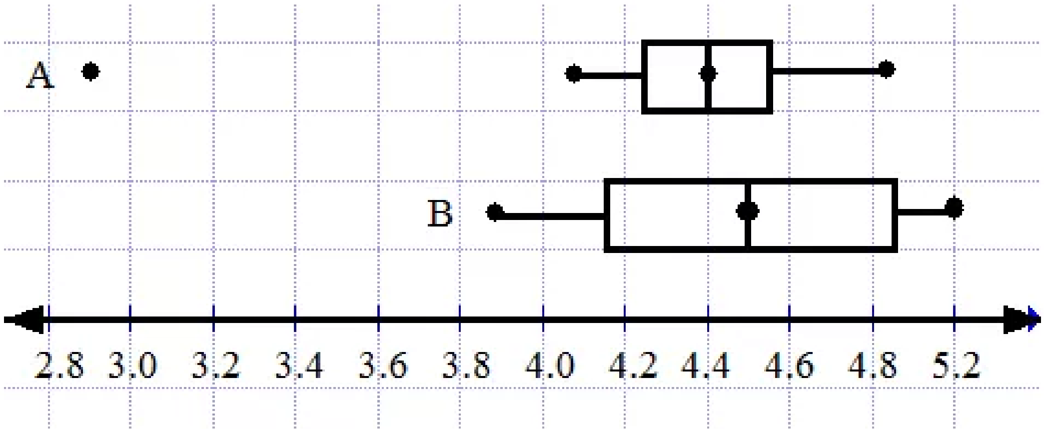
The 3rd quartile is:

$Q_{21} = 4.55,\ Q_{22} = 5.0$

The inter quartile range is:

$r_1 = 4.55 - 4.25 = 0.3$ and $r_2 = 5.0 - 4.15 = 0.85$

The box-and-whisker plot:



Answer 28PA.

Consider the data:

17, 10, 5.5, 4.5, 4.5, 4, 3.5, 3.5

Arrange the data in ascending order as follows:

3.5, 3.5, 4, 4.5, 4.5, 5.5, 10, 17

The median of the data is:

$M = 4.5$

The 1st quartile is:

$Q_1 = 3.75$

The 3rd quartile is:

$Q_3 = 7.75$

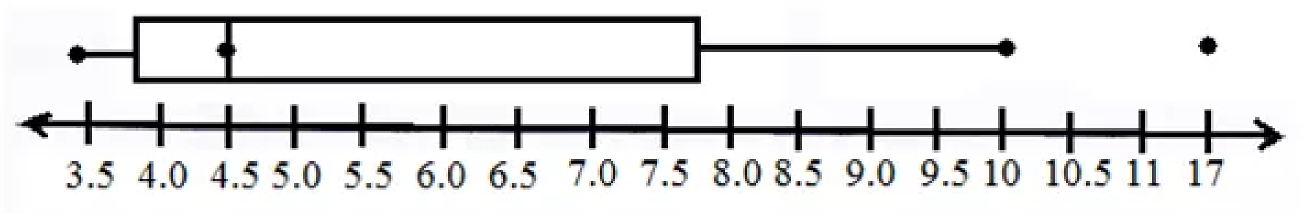
The inter quartile range is: $7.75 - 3.75 = 4$.

Now

$3.75 - 1.5(4) = -2.25$ and $7.75 + 1.5(4) = 13.75$.

Hence 17 is the outlier of the data.

The box-and-whisker plot:



Answer 29PA.

Consider the data:

17, 10, 5.5, 4.5, 4.5, 4, 3.5, 3.5

Arrange the data in ascending order as follows:

3.5, 3.5, 4, 4.5, 4.5, 5.5, 10, 17

The median of the data is:

$M = 4.5$

The 1st quartile is:

$$Q_1 = 3.75$$

The 3rd quartile is:

$$Q_3 = 7.75$$

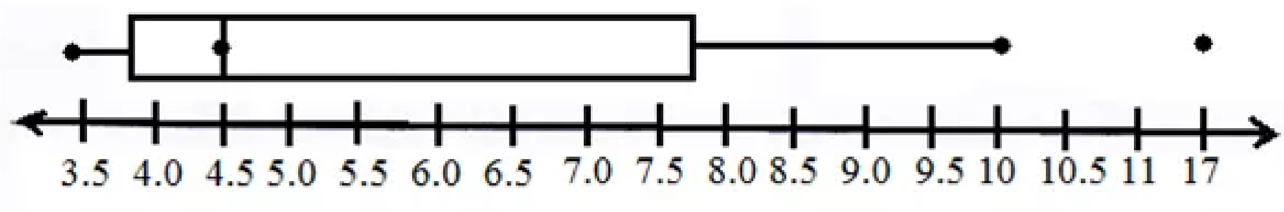
The inter quartile range is: $7.75 - 3.75 = 4$.

Now

$3.75 - 1.5(4) = -2.25$ and $7.75 + 1.5(4) = 13.75$.

Hence 17 is the outlier of the data.

The box-and-whisker plot:



Observing the plot it can be said that the upper half of the data is very dispersed while the range of the lower half of the data is only 1.

Answer 30PA.

Consider the data:

$181, $100, $98, $89, $76, $58, $60, $58, $55, $57, $54, $64, $44, $39, $66, $52, $52, $56, $38, $56, $51, $49, $38, $50, $48, $48, $40, $36, $36, $39, $36, $47, $36, $47, $38, $35, $46, $35, $55, $45, $43, $35

Arrange the data in ascending order as follows:

$35, $35, $35, $36, $36, $36, $36, $38, $38, $38, $39, $39, $40, $43, $44, $45, $46, $47, $47, $48, $48, $49, $50, $51, $52, $52, $54, $55, $55, $56, $56, $57, $58, $58, $60, $64, $66, $76, $89, $98, $100, $181

The median of the data is:

$$M = \frac{48+49}{2} = 48.5$$

The 1st quartile is:

$Q_1 = 39$

The 3rd quartile is:

$Q_3 = 57$

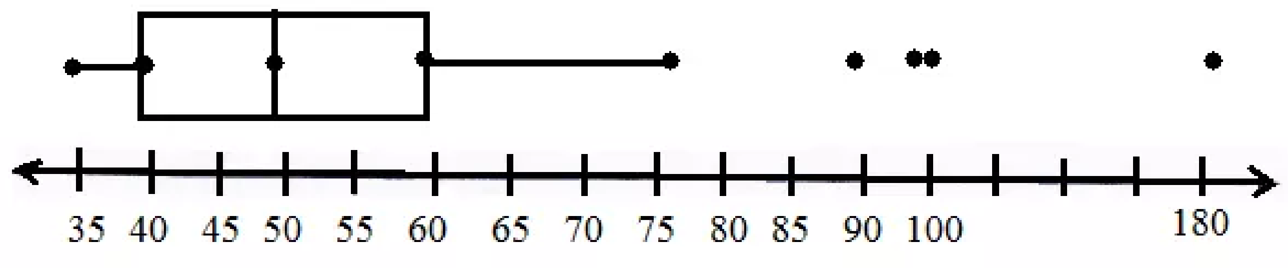
The inter quartile range is: $57 - 39 = 18$.

Now

$39 - 1.5(18) = 12$ and $57 + 1.5(18) = 84$.

Hence 89, 98, 100 and 181 are the outlier of the data.

The box-and-whisker plot:



Answer 31PA.

Consider the data:

\$181, \$100, \$98, \$89, \$76, \$58, \$60, \$58, \$55, \$57, \$54, \$64, \$44, \$39, \$66, \$52, \$52, \$56, \$38, \$56, \$51, \$49, \$38, \$50, \$48, \$48, \$40, \$36, \$36, \$39, \$36, \$47, \$36, \$47, \$38, \$35, \$46, \$35, \$55, \$45, \$43, \$35

Arrange the data in ascending order as follows:

\$35, \$35, \$35, \$36, \$36, \$36, \$36, \$38, \$38, \$38, \$39, \$39, \$40, \$43, \$44, \$45, \$46, \$47, \$47, \$48, \$48, \$49, \$50, \$51, \$52, \$52, \$54, \$55, \$55, \$56, \$56, \$57, \$58, \$58, \$60, \$64, \$66, \$76, \$89, \$98, \$100, \$181

The median of the data is:

$$M = \frac{48+49}{2} = 48.5$$

The 1st quartile is:

$Q_1 = 39$

The 3rd quartile is:

$Q_3 = 57$

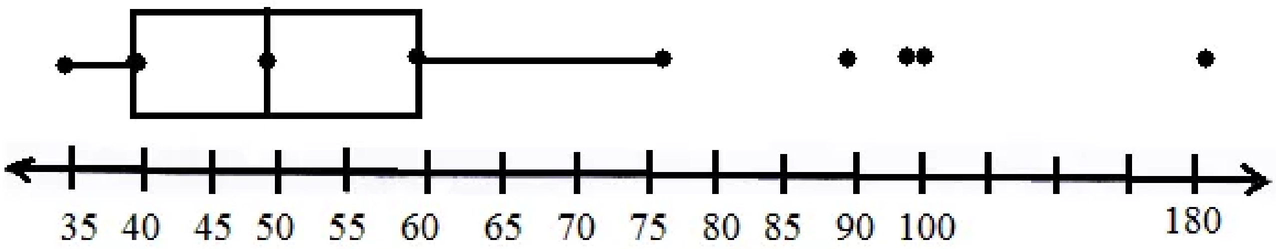
The inter quartile range is: $57 - 39 = 18$.

Now

$39 - 1.5(18) = 12$ and $57 + 1.5(18) = 84$.

Hence 89, 98, 100 and 181 are the outlier of the data.

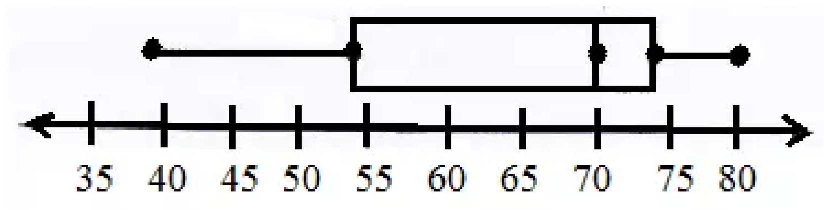
The box-and-whisker plot:



The bottom half of the data goes from \$35,000 to \$48,000 and the top half of the data goes from \$48,000 to \$141,000. Therefore the $\boxed{\text{top half}}$ of the data is more dispersed.

Answer 32PA.

Consider the box and whisker plot:



Observing the data it can be said that the lowest value is 38 and the highest value is 80.

Therefore the range of the data is:

$80 - 38 = \boxed{42}$

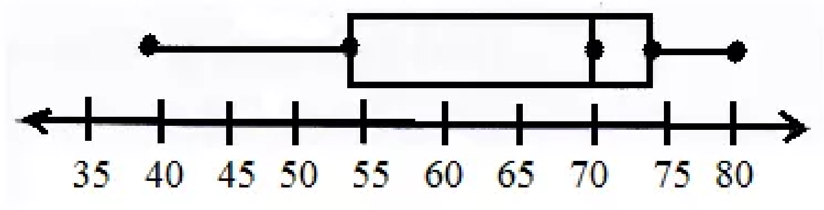
Again the lower quartile is: $Q_1 = 53$ and the upper quartile is: $Q_3 = 74$.

Thus the inter quartile range is:

$$Q_3 - Q_1 = 74 - 53$$
$$= \boxed{21}$$

Answer 33PA.

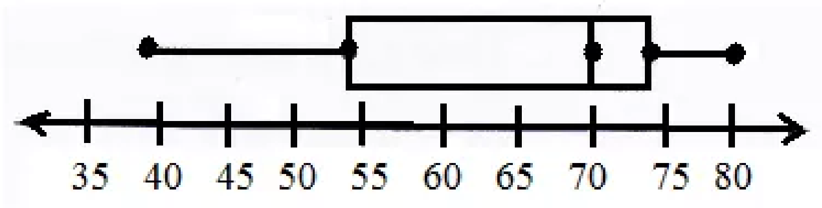
Consider the box and whisker plot:



Observing the data it can be said that the lower half of the data contain ages from 38 to 70 and the upper half of the data contains ages from 70 to 80. Hence the lower half is more dispersed.

Answer 34PA.

Consider the box and whisker plot:

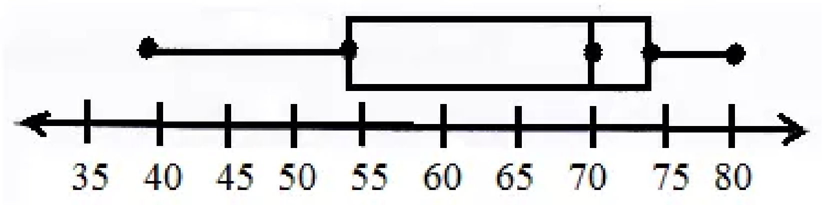


Observing the data it can be said that the lower half of the data contain ages from 38 to 70 and the upper half of the data contains ages from 70 to 80. Again the data that contain half of the data is 54 to 74.

Hence the three intervals will be: $\boxed{38-70, 54-74 \text{ and } 70-80}$

Answer 35PA.

Consider the box and whisker plot:



Observing the data it can be said that in the age group 54 to 70 there are 25% data and in the age group 70 to 74 there are also 25% data. Since both groups contain the same amount of data, therefore Jamie is not right.

Answer 36PA.

Consider the data:

253, 223, 193, 189, 152, 150, 138, 137, 135, 131, 131, 129, 128, 126, 124, 119, 118, 108, 107, 102, 101, 100, 96, 92, 87, 83, 82, 81, 80, 78, 78, 76, 74, 74, 73, 73, 72, 71, 69, 68, 67, 65, 64, 63, 63, 63, 62, 61, 61, 61

The median of the data is:

$$M = \frac{87+83}{2} = 85$$

The lower quartile is:

$$Q_1 = 71$$

The upper quartile is:

$$Q_3 = 128$$

The inter quartile range is:

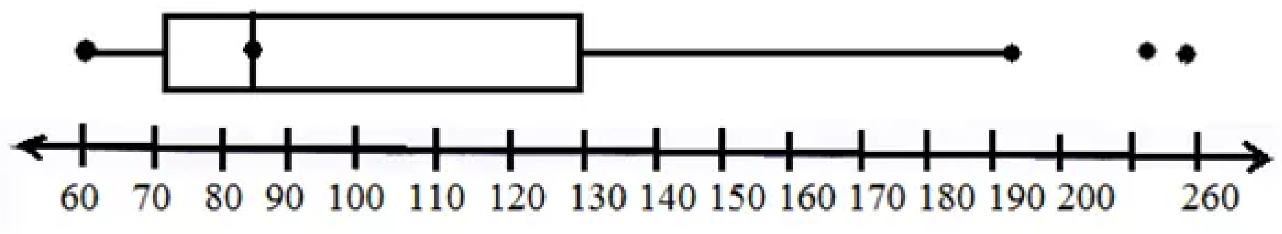
$$Q_3 - Q_1 = 128 - 71 = 47$$

Now

$71 - 1.5(47) = 0.5$ and $128 + 1.5(47) = 198.5$

Hence 253 and 223 are outliers.

The box-and-whisker plot of the data will be:



Answer 37PA.

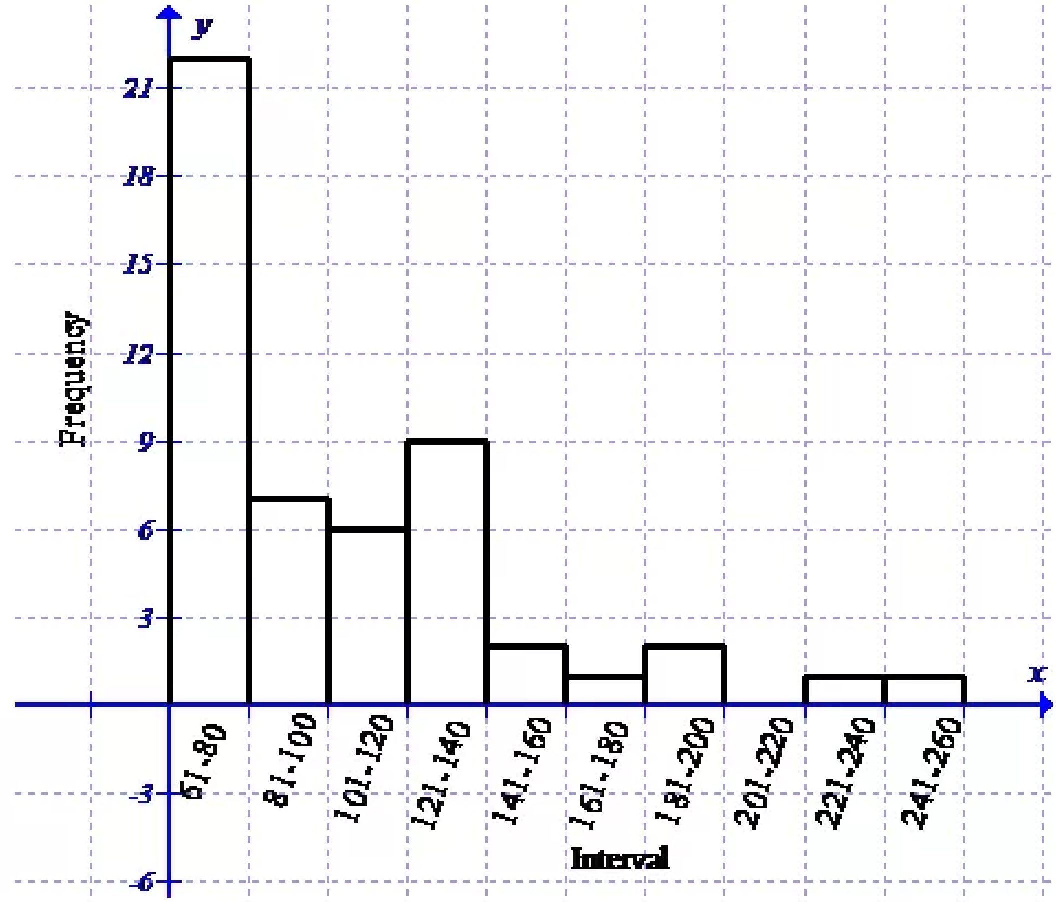
Consider the data:

253, 223, 193, 189, 152, 150, 138, 137, 135, 131, 131, 129, 128, 126, 124, 119, 118, 108, 107, 102, 101, 100, 96, 92, 87, 83, 82, 81, 80, 78, 78, 76, 74, 74, 73, 73, 72, 71, 69, 68, 67, 65, 64, 63, 63, 63, 62, 61, 61, 61

To draw the histogram of the data first make a table as follows:

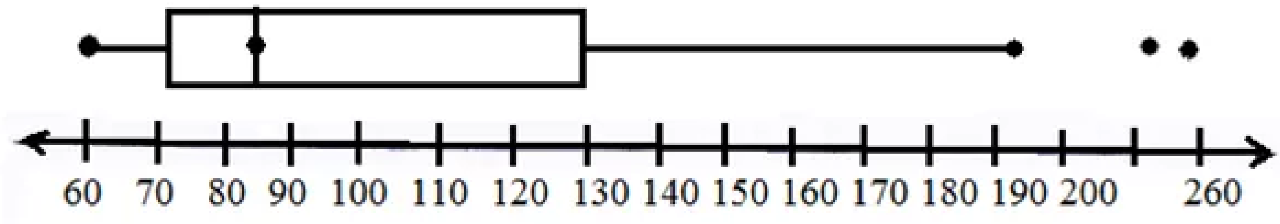
Interval	Tally	Frequency
61-80	卌 卌 卌 卌 ||	22
81-100	卌 ||	7
101-120	卌 |	6
121-140	卌 ||||	9
141-160	||	2
161-180	|	1
181-200	||	2
201-220	-	0
221-240	|	1
240-260	|	1

Therefore the histogram of the data can be made as follows:

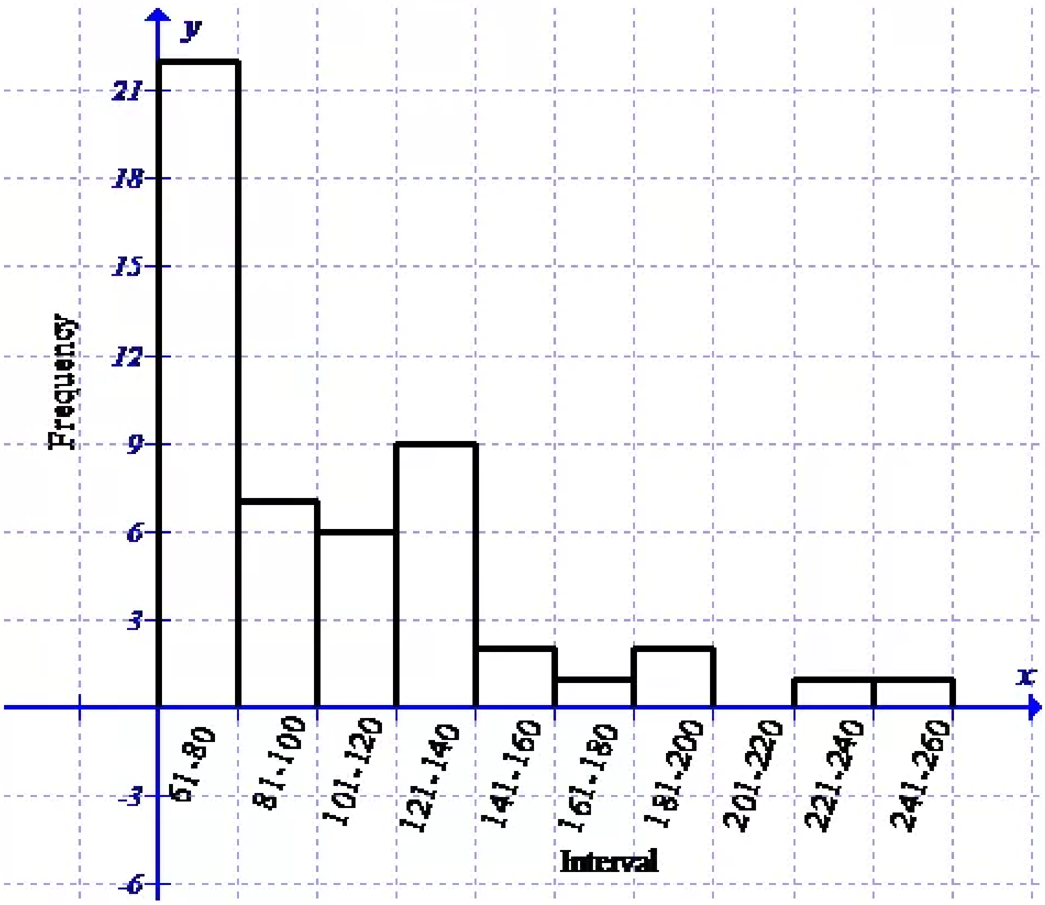


Answer 38PA.

Consider the box and whisker plot of the data:



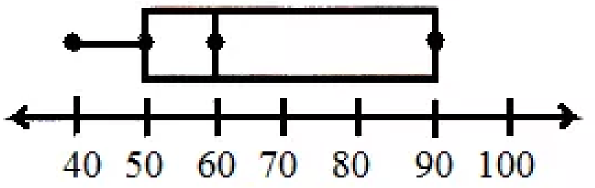
Consider the histogram of the data:



Observing the two plots there are various conclusion that can be derived from the data. From the box and whisker plot one can easily determine median, range and dispersion of the data while observing the histogram one can't determine the median or range but density of the data and numbers of data value that is present in the data set.

Answer 39PA.

Consider the box and whisker plot:



Observing the data it can be said that lowest value is 40, highest value is 90. The lower quartile is 50, the upper quartile is 90. The median of the data is 60.

Therefore the possible data that represent the plot will be:

40, 45, 50, 52, 57, 60, 67, 74, 90, 90, 90

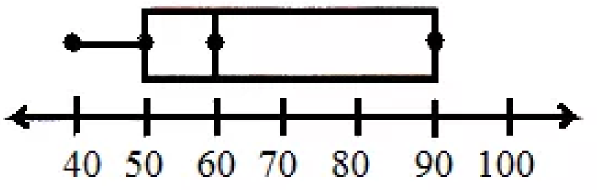
Answer 40PA.

Consider the data:

40, 45, 50, 52, 57, 60, 67, 74, 90, 90, 90

Observing the data it can be said that lowest value is 40, highest value is 90. The lower quartile is 50, the upper quartile is 90. The median of the data is 60.

The box and whisker plot:



In a newspaper it is found that the sale of computers in a shop in one week

25, 43, 27, 31, 35, 28, 43

Arrange the data in ascending order as follows:

25, 27, 28, 31, 35, 43, 43

The median of the data is: $M = 31$.

The lower quartile is: $Q_1 = 27$.

The upper quartile is: $Q_2 = 43$.

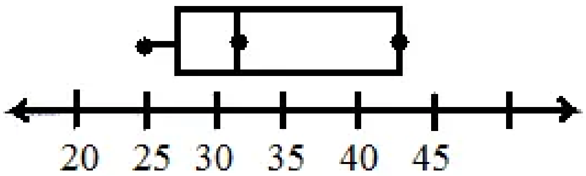
The inter quartile range: $43 - 27 = 16$.

Now

$27 - 1.5(16) = 3$ and $43 + 1.5(16) = 67$

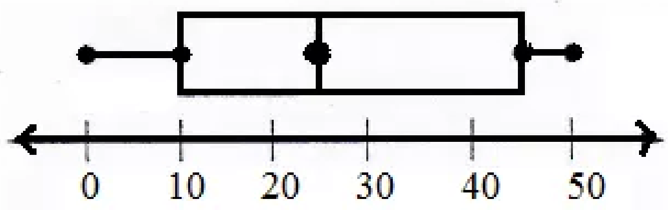
Thus there is no outlier.

The box and whisker plot of the data is:



Answer 41PA.

Consider the box-and-whisker plot:

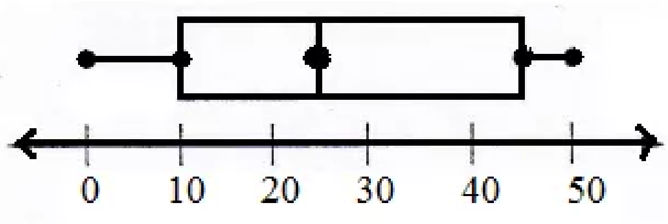


From the box and whisker plot of the data it can be verified that the median of the data is: 25.

Hence the correct option is: $\boxed{\text{(C)}}$.

Answer 42PA.

Consider the box-and-whisker plot:



From the box and whisker plot of the data it can be verified that in between 0 to 45 there are 75% data value. The lowest value of the data is 0 and 3rd quartile is 45. Since the under third quartile is 75% of data, therefore the correct option is: $\boxed{\text{(D)}}$.

Answer 43MYS.

Consider the data:

13, 32, 45, 45, 54, 55, 67, 82, 93

Here the lowest value is 13 and the highest value is 93.

The range of the data is: $93-13=\boxed{80}$.

The median of the data is: $M=\boxed{54}$.

The lower quartile is:

$$\begin{aligned} Q_1 &= \frac{32+45}{2} \\ &= 38.5 \end{aligned}$$

The upper quartile is:

$$\begin{aligned} Q_3 &= \frac{67+82}{2} \\ &= 74.5 \end{aligned}$$

The inter quartile range is:

$$\begin{aligned} Q_3 - Q_1 &= 74.5 - 38.5 \\ &= 36 \end{aligned}$$

Now

$38.5-1.5(36)=-15.5$ and $74.5+1.5(36)=128.5$

Since $-15.5<13 \text{ and } 128.5>93$, therefore there is no outliers.

Answer 44MYS.

Consider the data:

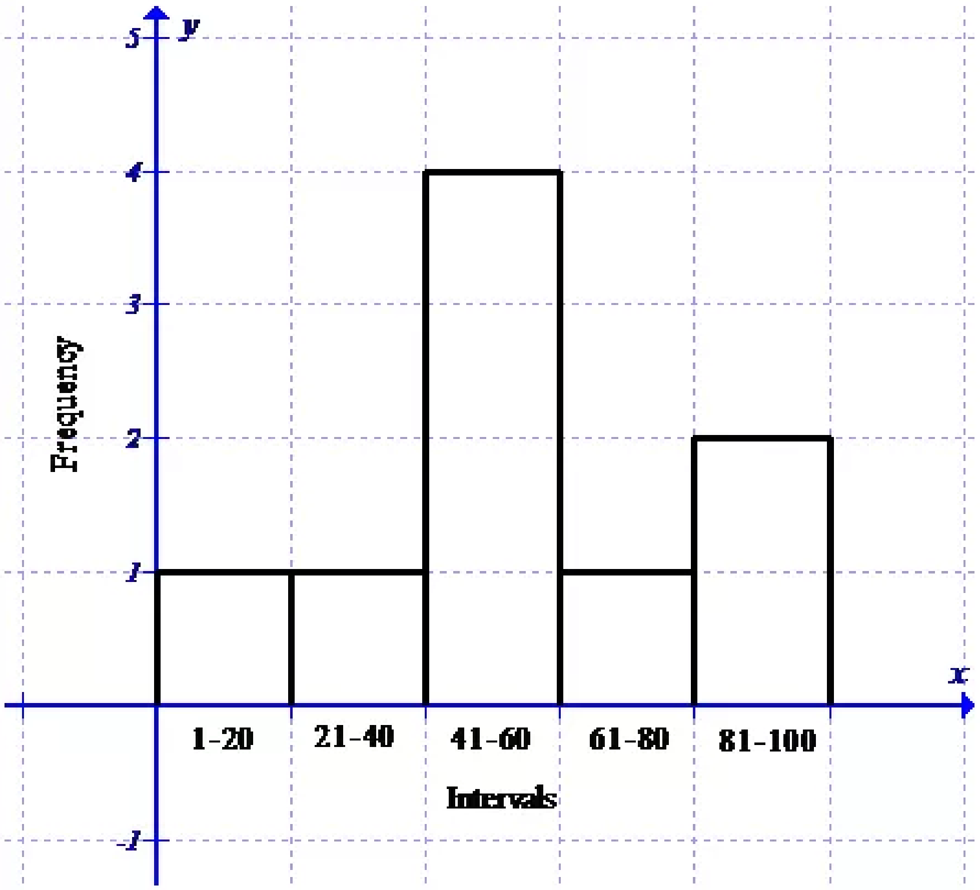
13, 32, 45, 45, 54, 55, 67, 82, 93

Here the lowest value is 13 and the highest value is 93.

Now taking a class width of 20 a frequency table can be prepared as:

Intervals	Tally	Frequency
$1 \le s \le 20$	|	1
$21 \le s \le 40$	|	1
$41 \le s \le 60$	||||	4
$61 \le s \le 80$	|	1
$81 \le s \le 100$	||	2

Using the frequency table a histogram can be drawn as follows:



Answer 45MYS.

Consider the expression:

$$\frac{3}{y-3}-\frac{y}{y+4}$$

To simplify the expression follows the steps:

$$\begin{aligned}\frac{3}{y-3}-\frac{y}{y+4}&=\frac{3(y+4)-y(y-3)}{(y-3)(y+4)}\\&=\frac{3y+12-y^2+3y}{(y-3)(y+4)}\\&=\boxed{\frac{-y^2+6y+12}{(y-3)(y+4)}}\quad \text{Simplify}\end{aligned}$$

Answer 46MYS.

Consider the expression:

$$\frac{2}{r+3}+\frac{3}{r-2}$$

To simplify the expression follows the steps:

$$\begin{aligned}\frac{2}{r+3}+\frac{3}{r-2}&=\frac{2(r-2)+3(r+3)}{(r+3)(r-2)}\\&=\frac{2r-4+3r+9}{(r+3)(r-2)}\\&=\boxed{\frac{5(r+1)}{(y-3)(y+4)}}\quad \text{Simplify}\end{aligned}$$

Answer 47MYS.

Consider the expression:

$$\frac{w}{5w+2}-\frac{4}{15w+6}$$

To simplify the expression follows the steps:

$$\begin{aligned}\frac{w}{5w+2}-\frac{4}{15w+6}&=\frac{w}{5w+2}-\frac{4}{3(5w+2)}\\&=\frac{w\cdot 3-4}{3(5w+2)}\\&=\boxed{\frac{3w-4}{3(5w+2)}}\quad \text{Simplify}\end{aligned}$$

Answer 48MYS.

Consider the expression:

$$\frac{7a^2}{5}\cdot\frac{15}{14a}$$

To simplify the expression follows the steps:

$$\frac{7a^2}{5}\cdot\frac{15}{14a}=\frac{\cancel{7}\cdot a\cdot\cancel{a}}{\cancel{5}}\cdot\frac{\cancel{15}^{3}}{\cancel{14}_{2}\cdot\cancel{a}}$$

$$=\boxed{\frac{3a}{2}} \qquad \text{Simplify}$$

Answer 49MYS.

Consider the expression:

$$\frac{6r+3}{r+6}\cdot\frac{r^2+9r+18}{2r+1}$$

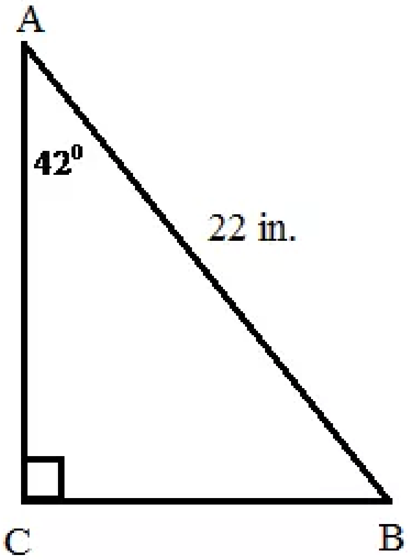
To simplify the expression follows the steps:

$$\frac{6r+3}{r+6}\cdot\frac{r^2+9r+18}{2r+1}=\frac{3(r+1)}{\cancel{r+6}}\cdot\frac{(r+3)\cancel{(r+6)}}{2r+1}$$

$$=\boxed{\frac{3(r+1)(r+3)}{2r+1}} \qquad \text{Simplify}$$

Answer 50MYS.

Consider the right triangle:



Since *ABC* is a right triangle with measure of *C* is $\boxed{90^0}$, therefore measure of the angle *B* is:

$$90^0 - 42^0 = \boxed{48^0}.$$

Now

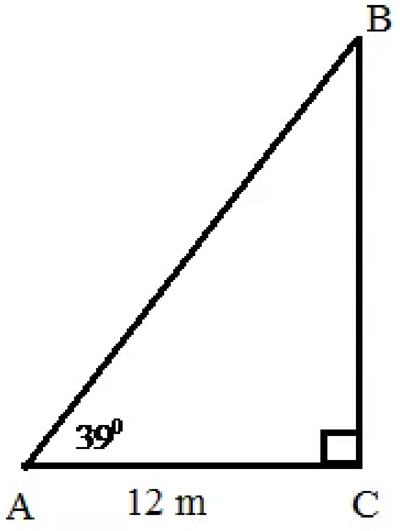
$$\begin{aligned}\sin 42^0 &= \frac{BC}{AB}\\ BC &= AB\sin 42^0\\ &= 22\times 0.669 \text{ in}\\ &= \boxed{14.7 \text{ in}}\end{aligned}$$

Again

$$\begin{aligned}\cos 42^0 &= \frac{AC}{AB}\\ AC &= AB\cos 42^0\\ &= 22\times 0.743 \text{ in}\\ AC &= \boxed{16.3 \text{in}}\end{aligned}$$

Answer 51MYS.

Consider the right triangle:



Since *ABC* is a right triangle with measure of *C* is $\boxed{90^0}$, therefore measure of the angle *B* is:

$$90^0 - 39^0 = \boxed{51^0}.$$

Now

$$\cos 39^0 = \frac{AC}{AB}$$

$$AB = \frac{AC}{\cos 39^0}$$

$$= \frac{12}{0.777}\ \text{m}$$

$$AB = \boxed{15.4\,\text{m}}$$

Again

$$\sin 39^0 = \frac{BC}{AB}$$

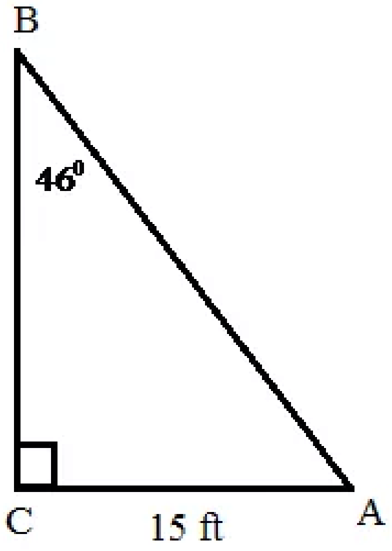
$$BC = AB \sin 39^0$$

$$= 15.4 \times 0.629\ \text{m}$$

$$= \boxed{9.7\ \text{m}}$$

Answer 52MYS.

Consider the right triangle:



Since *ABC* is a right triangle with measure of *C* is $\boxed{90^0}$, therefore measure of the angle *A* is:

$90^0 - 46^0 = \boxed{44^0}$.

Now

$$\sin 46^0 = \frac{AC}{AB}$$

$$AB = \frac{AC}{\sin 46^0}$$

$$= \frac{15}{0.719} \text{ ft}$$

$$AB = \boxed{20.9 \text{ ft}}$$

Again

$$\cos 46^0 = \frac{BC}{AB}$$

$$BC = AB \cos 46^0$$

$$= 20.9 \times 0.694 \text{ ft}$$

$$BC = \boxed{14.5 \text{ ft}}$$

Answer 53MYS.

Consider the equation:

$$a^2 - 7a + 6 = 0$$

To solve the equation follows the steps:

$$a^2 - 7a + 6 = 0$$
$$a^2 - 6a - a + 6 = 0$$
$$a(a-6) - 1(a-6) = 0$$
$$(a-6)(a-1) = 0$$
$$a - 6 = 0 \quad \text{or} \quad a - 1 = 0$$
$$a = 6 \quad \text{or} \quad a = 1$$

Therefore the solution to the equation is: $\boxed{\{1,6\}}$.

Answer 54MYS.

Consider the equation:

$$x^2 - 6x + 2 = 0$$

To solve the equation follows the steps:

$$x^2 - 6x + 2 = 0$$
$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4 \cdot 1 \cdot 2}}{2 \cdot 1}$$
$$= \frac{6 \pm \sqrt{28}}{2}$$
$$= \frac{6 \pm 2\sqrt{7}}{2}$$
$$= 3 \pm \sqrt{7}$$
$$= 3 \pm 2.6$$
$$x = 5.6, 0.4$$

Therefore the solution to the equation is: $\boxed{\{5.6, 0.4\}}$.

Answer 55MYS.

Consider the equation:

$$t^2+8t-18=0$$

To solve the equation follows the steps:

$$t^2+8t-18=0$$

$$t=\frac{-8\pm\sqrt{8^2-4\cdot1\cdot(-18)}}{2\cdot1}$$

$$=\frac{-8\pm\sqrt{136}}{2}$$

$$=\frac{-8\pm2\sqrt{34}}{2}$$

$$=-4\pm\sqrt{34}$$

$$=-4\pm5.8$$

$$t=1.8,-9.8$$

Therefore the solution to the equation is: $\boxed{\{1.8,-9.8\}}$.

Answer 56MYS.

Consider the expression:

$$(7p^2-p-7)-(p^2+11)$$

To simplify the expression follows the steps:

$$\begin{aligned}(7p^2-p-7)-(p^2+11)&=7p^2-p-7-p^2-11\\&=(7p^2-p^2)-p-(7+11) &&\text{Combining the like terms}\\&=\boxed{6p^2-p-18} &&\text{Simplify}\end{aligned}$$

Answer 57MYS.

Consider the expression:

$$(3a^2-8)+(5a^2+2a+7)$$

To simplify the expression follows the steps:

$$\begin{aligned}(3a^2-8)+(5a^2+2a+7)&=3a^2-8+5a^2+2a+7\\&=(3a^2+5a^2)+2a+(7-8) &&\text{Combining the like terms}\\&=\boxed{8a^2+2a-1} &&\text{Simplify}\end{aligned}$$