Choose a circle to show how much each sentence is like you	Very Unlike Me	Unlike Me	Like Me	Very Like Me
	1	2	3	4
01. I like maths at school.	◯	◯	◯	◯
02. I am good at maths.	◯	◯	◯	◯
03. My teacher thinks I am good at maths.	◯	◯	◯	◯
04. My Mum and Dad think I am good at maths.	◯	◯	◯	◯
05. I enjoy doing maths in my own time (not at school).	◯	◯	◯	◯
06. I enjoy doing things in maths that I haven't tried before.	◯	◯	◯	◯

Practice Questions

These practice questions are to help you understand how to show your answer for different types of questions.

P01. Who is holding a card with an even number on it?
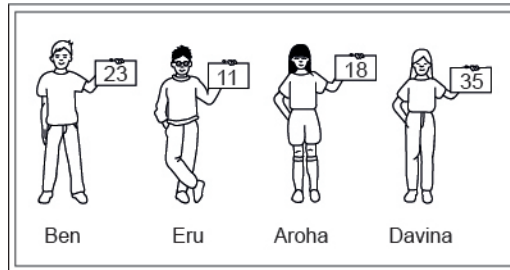
○　　Ben

○　　Eru

○　　Aroha

○　　Davina

P02. Complete this number pattern.

2, 4, ___, ___, 10

P03. What fraction of this circle is shaded?
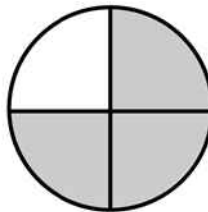
P04. Match the sentence with the correct shape.

☐   1. I have three sides

☐   2. I have 4 sides

a. ▢

b. △

c. ◯
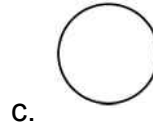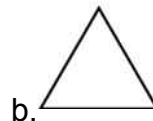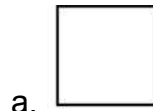
P05. Which numbers make this number sentence **TRUE**?

$$2 + ⭐ > 5$$

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

P06. Put the numbers 1, 2, 3, and 4 in the boxes to order these numbers from biggest (1) to smallest (4).

☐   3

☐   7

☐   2

☐   0

P07. Select whether the following statements are True or False.

	TRUE	FALSE
In the number 213, the value of 1 is ten.	⬭	⬭
In the number 504, the value of 5 is fifty.	⬭	⬭

01. The graph below shows the dollar amounts of a manufacturer's annual sales during a 4 year period.
Which of the following is closest to the mean of the domestic sales for this 4 year period?

Manufacturing Sales

○ $5 million

○ $5.5 million

○ $6 million

○ $6.5 million

02. The table shows the Maths and English scores of Art and 4 of his friends.
Which scattergram correctly shows the relationship between Maths and English scores for the group of friends?

Student	Maths	English
Art	84	78
Bonnie	67	76
Cathy	92	85
Don	75	75
Ellie	78	88
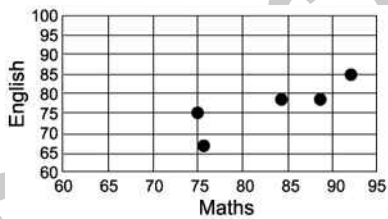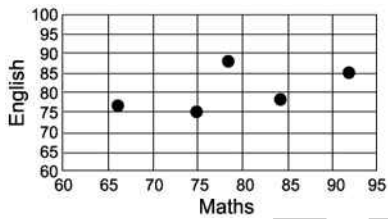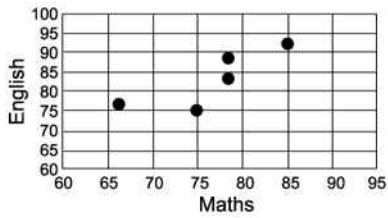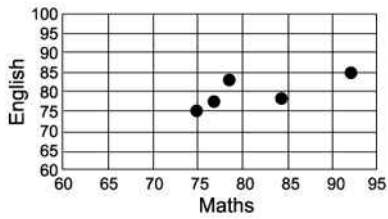
03. The graph shows the number of CDs sold each year at a small music store.
If the number of CDs sold each year continues to increase as shown in the plot, which is the **BEST** prediction of the number of CDs the store will sell during its 8th year of business?
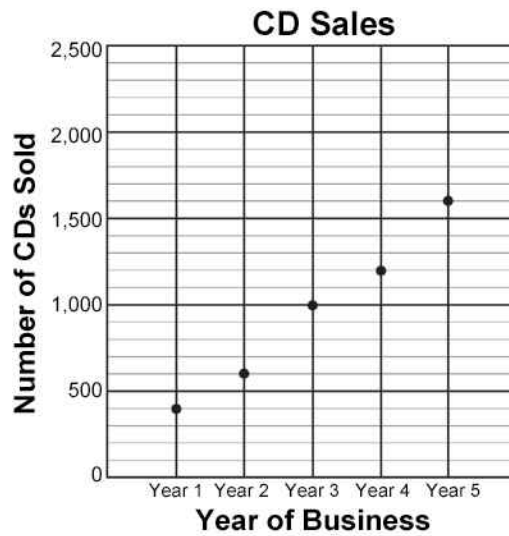
- ◯ 3400
- ◯ 3000
- ◯ 2400
- ◯ 2000

04. Which of the following pieces of information would **NOT** be useful in deciding what type of car is the **MOST** economical to drive?

- ◯ Median income of drivers
- ◯ Range of insurance costs
- ◯ Average kilometres per litre
- ◯ Typical cost of repairs per year
- ◯ Cost of routine maintenance

05. The box-and-whisker graph shown below represents the results of a survey of the estimated petrol mileage of 100 car models.
Which statistics (mean, median, mode, range) can be determined from this graph?
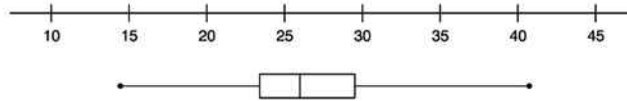
○   Mean only

○   Median only

○   Range and mean

○   Range and median

06. For the set of values, determine which of the following statements is **TRUE**.
{ 25, 32, 38, 38, 42, 45, 46, 54 }
i. The median of the set is 40
ii. The mean of the set is 40
iii. The mode of the set is 40

○   i only

○   ii only

○   i and ii only

○   ii and iii only

07. $2^4 \times 3^4$ is the same as

○ 5^4

○ 5^8

○ 6^4

○ 6^8

08. Which equation is equivalent to
4(2 - 5x) = 6 - 3(1 - 3x)?

    ⬭   8x = 5

    ⬭   8x = 17

    ⬭   29x = 5

    ⬭   29x = 17

09. Janis ate $\frac{1}{3}$ of the cake. Maija ate $\frac{1}{4}$ of the cake. Their mother ate $\frac{1}{5}$ of the cake. How much of the cake is left?

    ⬭ $\frac{9}{12}$

    ⬭ $\frac{3}{12}$

    ⬭ $\frac{47}{60}$

    ⬭ $\frac{13}{60}$

10. Which following point on the number line is closest to $\sqrt{N}$?

    ⬭   A

    ⬭   B

    ⬭   C

    ⬭   D

    ⬭   E

11. A scientist is comparing the weights of the four molecules listed in the table shown. Which of these molecules is the heaviest?

WEIGHTS OF MOLECULES	
Salt	9.350×10^{-28}
Pure water	2.879×10^{-26}
Hydrochloric acid	5.832×10^{-22}
Potassium hydroxide	8.976×10^{-24}

○   Salt

○   Pure water

○   Hydrochloric acid

○   Potassium hydroxide

12. What is $\dfrac{x^2 - 4xy + 4y^2}{3xy - 6y^2}$ reduced to lowest terms?

○ $\dfrac{x - 2y}{3}$

○ $\dfrac{x - 2y}{3y}$

○ $\dfrac{x + 2y}{3}$

○ $\dfrac{x + 2y}{3y}$

13. Which is an irrational number?

○ $\sqrt{5}$

○ $\sqrt{9}$

○ -1

○ $-\dfrac{2}{3}$

14. Calculate $4\frac{3}{4} - 3\frac{1}{2} \times 1\frac{2}{7}$

- $1\frac{17}{28}$
- $9\frac{1}{4}$
- $1\frac{3}{4}$
- $\frac{1}{4}$

15. $\frac{6 \times 10^3}{3 \times 10^5}$ =

- 0.5×10^2
- 2×10^2
- $2 \times 10^{0.6}$
- 0.5×10^{-2}
- 2×10^{-2}

16. If x^2 is added to x, the sum is 42.
Which of the following could be the value of x?

- -7
- -6
- 14
- 42

17. A **linear** relationship between *x* and *y* is shown in the table below.
What is the value of *a*?

x	-5	. . . . .	0	1	2	3
y	a		5	2	-1	-4

⬭ $a = 20$

⬭ $a = 3$

⬭ $a = 8$

⬭ $a = -10$

18. A study was conducted to determine the effectiveness of varying amounts of vitamin C in reducing the number of common colds.
A survey of 450 people provided the following information.
Which of the following statements would be a valid conclusion from this table?

	Daily amount of Vitamin C taken		
	None	50 mg	100 mg
No colds	57	26	17
At least one cold	223	84	43

⬭   The data proves that vitamin C reduces the number of common colds.

⬭   The data proves that vitamin C has no effect on the number of common colds.

⬭   There appears to be a strong association between the consumption of vitamin C and the occurrence of common colds.

⬭   There appears to be little association between the consumption of vitamin C and the occurrence of common colds.

⬭   Since common colds are caused by viruses, there is no reason to conclude that vitamin C could have any effect.

19. Which of the following represents the graph of the equation below?

$y = -x^2 + 2$
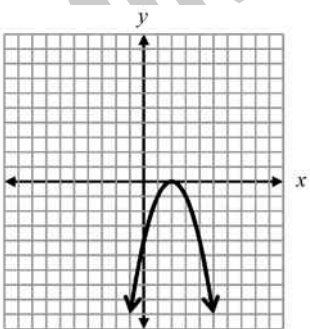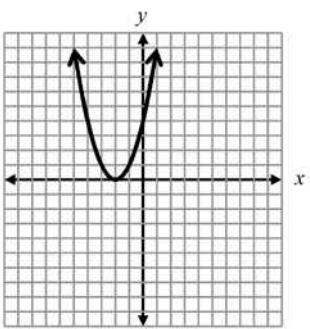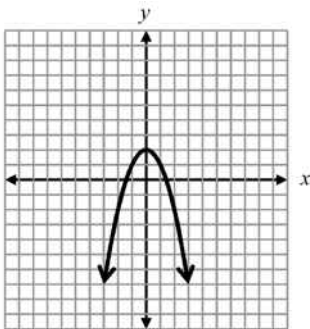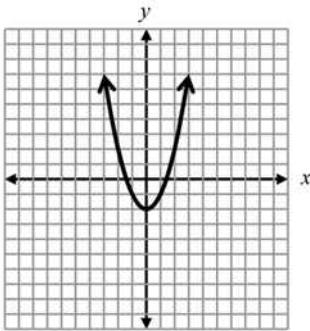
Use the following information to answer question20..

Mary did a survey of the different after school activities of 12 students.
The results are as follows.

Student	A	B	C	D	E	F	G	H	I	J	K	L
Hours playing sport	2	0	1	2	0	0	4	1	2	2	1	0
Hours watching TV	3	3	5	6	1	4	2	4	4	1	5	3
Hours on homework	0	4	1	0	3	2	1	2	0	0	1	3

20. Mary said "Students who spend more time watching TV, spend less time playing sport."
What would be the **BEST** graph to show this?

⬭   Pie graph

⬭   Box and whisker

⬭   Scattergraph

⬭   Pictograph

End of Section

21. There are two numbers with the following properties.
1) The second number is 3 more than the first number.
2) The product of the two numbers is 9 more than their sum.
Which of the following represents possible values of these two numbers?

⬭   -6, -3

⬭   -4, -1

⬭   -1, 4

⬭   -3, 6

22. Match up each line of her working, with a description.

Moana wants to concrete her drive, which is about 12 metres long, 3 metres wide and 100 mm thick. Concrete costs $160 per cubic metre. The following are *some* of her calculations.

☐	1. 12 × 3	a. Thickness of concrete
☐	2. 12 × 3 × 0.1	b. Rounded cost
☐	3. 3.6 × 160	c. Cost per square metre
☐	4. 580	d. Cost of concrete
		e. Surface area of drive
		f. Volume of concrete required

23. A certain company keeps a list of 50 employees and their annual salaries.
When the salary of the very highly paid president is added to the list, which of the following statistics is **MOST** likely to be approximately the same or nearly the same for the original list and the new list?

◯ The highest salary

◯ The range

◯ The mean

◯ The median

◯ The interquartile range

24. Tina solved a quadratic equation and found the solutions to be $-\frac{3}{2}$ and 6.
Which of the following is equivalent to the quadratic equation that Tina solved?

◯ $(x - 6)(3x + 2) = 0$

◯ $(x - 6)(2x + 3) = 0$

◯ $(x + 6)(2x - 3) = 0$

◯ $(x + 6)(3x - 2) = 0$

25. A set contains the numbers

$\frac{8}{2}, \ -2.3, \ 0, \ \frac{2}{7}, \ \sqrt{9}, \ 0.3\dot{1}, \ \sqrt{15}, \ -12, \ 2\pi$

Which of the following statements is **TRUE**?

◯   The set contains 8 irrational numbers

◯   The set contains 7 irrational numbers

◯   The set contains 3 irrational numbers

◯   The set contains 2 irrational numbers

26. Select **TRUE** or **FALSE** for the statements below.
When using a negative scale factor of enlargement -

	TRUE	FALSE
Object and image are on different sides of the centre of enlargement.	◯	◯
All sides are multiplied by the same scale factor.	◯	◯
The area of the images is always larger than the object.	◯	◯

27. The graph of $y = 4x + 1$ is shown.
How would the graph change if the 4 in the equation were replaced with a 2?
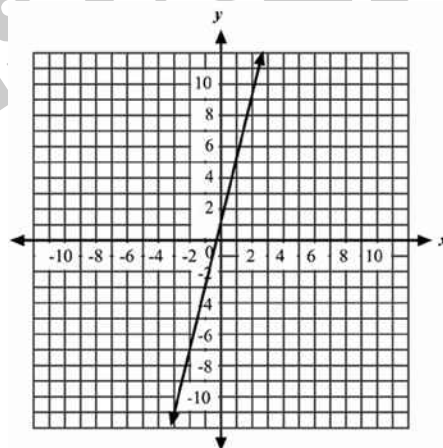

◯   The line would be parallel with a shift up of 2 units.

◯   The line would be parallel with a shift down of 2 units.

◯   The line would have a greater slope, but it would pass through the y-axis at the same point.

◯   The line would have a lesser slope, but it would pass through the y-axis at the same point.

28. Which of the following could be the next step in solving the equation
$3(x + 2) = 3 - (x + 1)$?

○ $3x + 6 = 3 - x - 1$

○ $3x + 2 = 3 - x - 1$

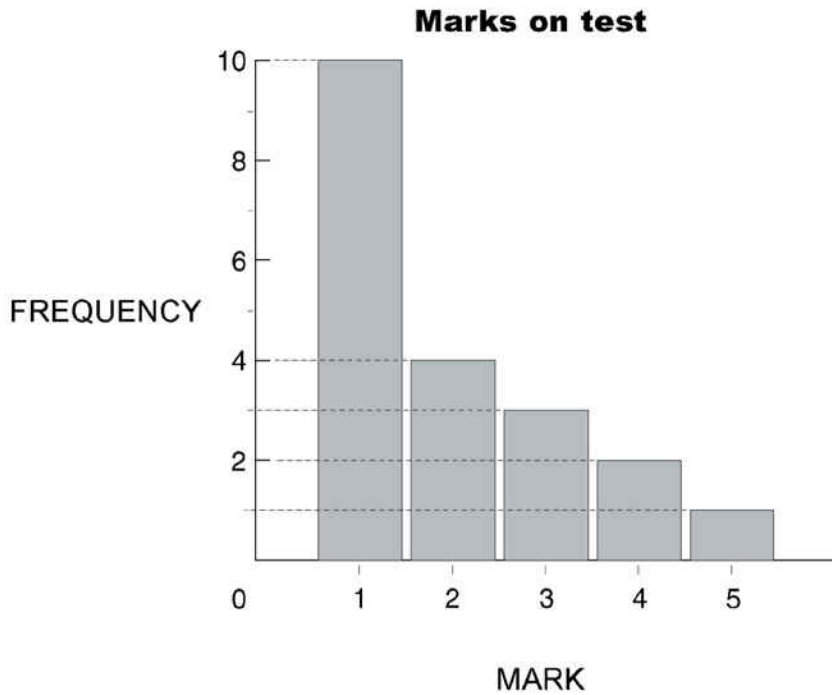○ $3x + 6 = 3 - x + 1$

○ $3x + 5 = 3 - x + 1$

29. Triangle *PQR* is a scalene right triangle.
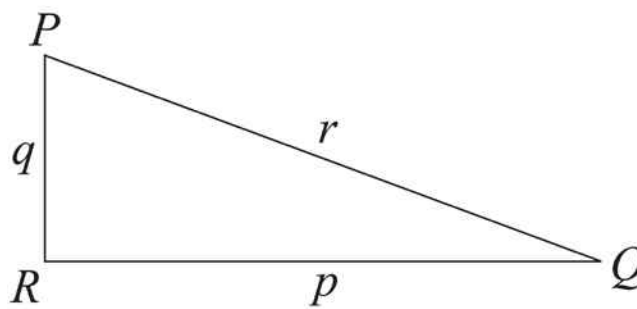
Which of the following is correct?

○ $\cos P = \frac{r}{p}$

○ $\sin Q = \frac{q}{p}$

○ $\cos P = \frac{p}{r}$

○ $\tan Q = \frac{q}{p}$

30. The graph shows the marks gained by each student in a class on a test.

Marks on test

What is the mean mark?

⬭　　1

⬭　　2

⬭　　3

⬭　　4

31. The weights of the 20 players on a school soccer team are summarised in the box-and-whisker plot shown below.
Which of the following statements is **TRUE**?

Players' Weights in kg's
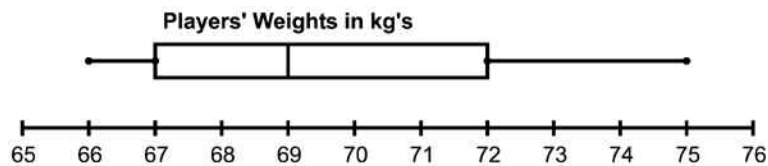
⬭　　The mean weight of the team is 69 kg.

⬭　　Half the players' weights are between 67 and 72 kg.

⬭　　The lightest player in the team is 67 kg.

⬭　　The range of weights of players on the team is 5 kg.

32. Two points, *A* and *B*, are located on the grid below.
What is the distance between *A* and *B*?
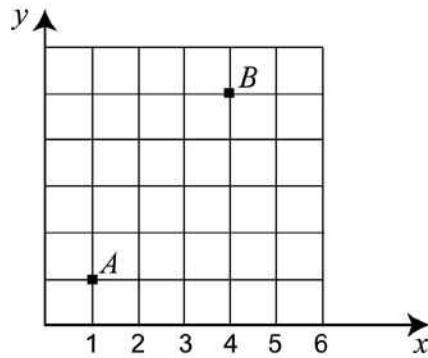
- ○ $3\sqrt{2}$ units
- ○ $4\sqrt{2}$ units
- ○ 5 units
- ○ 6 units

33. Vector *p* shows the distance and direction a boat's engine would carry the boat in one day if there were no current. Vector *c* shows the distance and direction the current would carry the boat in one day if the boat's engine were off.
Which vector shows the direction and distance this boat will actually travel in one day?
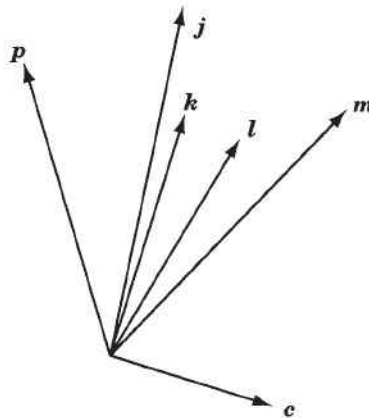
- ○ *j*
- ○ *k*
- ○ *l*
- ○ *m*

**34.** The students at Albermarle High held a car wash each week for 10 weeks to earn money for the student council. The students made the scatter plot below to represent the amount of money they earned each week.
Which of the following equations **BEST** represents the line of best fit for these data?

○   *y* = 110

○   *y* = 110*x*

○   *y* = *x* + 55

○   *y* = -*x* + 55

Use the following information to answer question35..

Raffle 1   Raffle 2
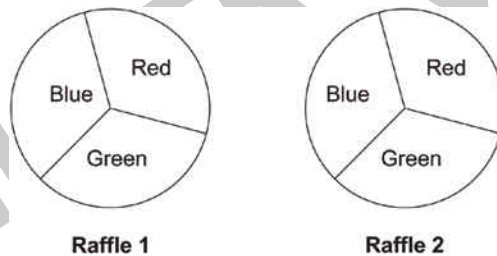
35. Wayne went to a school fair and came across two raffles each with coloured sectors on a wheel, red, blue and green. Each sector had the same area. If each wheel had a single spin, the chance of green winning both raffles is

○ $\frac{1}{9}$

○ $\frac{1}{6}$

○ $\frac{2}{9}$

○ $\frac{1}{3}$

○ $\frac{2}{3}$

36. Fully factorise

$-8x^2y + 12xy^2 - 4xy$

---

37. Suppose that $a_1, a_2, a_3, \ldots$ is the sequence of numbers such that
$a_1 = 3, \ a_2 = \sqrt{a_1} + 1, \ a_3 = \sqrt{a_2} + 1$, and, in general, $a_{n+1} = \sqrt{a_n} + 1$ for all $n \geq 1$.
To the nearest hundredth, the value of a_5 is

○   1.63

○   2.62

○   2.73

○   3.24

○   5.73

38. Each side of an equilateral triangle is increased by a scale factor of 1.5.
By how much will the area of the triangle increase?

○   2 times

○   2.25 times

○   3 times

○   4.5 times

39. Which fraction equals the product $\left(\frac{x+5}{3x+2}\right)\left(\frac{2x-3}{x-5}\right)$?

○ $\frac{2x-3}{3x+2}$

○ $\frac{3x+2}{4x-3}$

○ $\frac{x^2-25}{6x^2-5x-6}$

○ $\frac{2x^2+7x-15}{3x^2-13x-10}$

40. The mean exam score for 31 students in a geometry class was 79. The median exam score for the same set of students was 75.
Two additional students took the exam at a later time and scored 65 and 93.
How did the mean and median change when these two additional scores were included?

- ⬭ The median increased and the mean stayed the same.

- ⬭ The median stayed the same and the mean increased.

- ⬭ The median and the mean both stayed the same.

- ⬭ The median and the mean increased.

41. Kiriama bought a rental property as an investment.
He increased the weekly rent by 15% to $345.

What was the rent before the increase?

_____

42. Brighto soap powder is packed in cube-shaped cartons. The side of each carton measures 10 cm.
The company decides to increase the length of each edge of the carton by 10 per cent.
If the original volume was *V* what is the new volume?

- ⬭ $V \times 10\%$

- ⬭ $V \times 110\%$

- ⬭ $V \times (110\%)^3$

- ⬭ $V \times (10\%)^3$

43. Daniel cleans swimming pools. For a fixed charge of $50 per month he cleans your pool twice. Extra cleanings cost $30 each.

Which of these equations represents the cost per month, C, to a customer whose pool is cleaned x times per month?

○ $C = 30 + 50x$

○ $C = 30 (x - 2) + 50$

○ $C = 50 (2) + 30x$

○ $C = (30 + 50)x + 2$

44. If a is a real number and $a^2 < \sqrt{a}$ then

○ $0 < a < 1$

○ $a < 0$

○ $-1 < a < 1$

○ $1 < a$

45. The cylinder and the cone shown below have the same radius, r. The height of the cone is twice the height, h, of the cylinder.

What is the ratio of the volume of the cylinder to the volume of the cone?
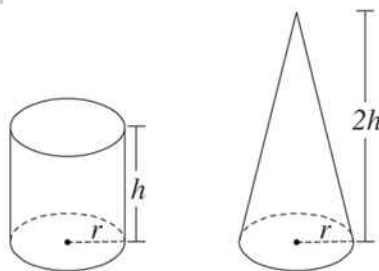
○   2:1

○   3:1

○   2:2

○   3:2

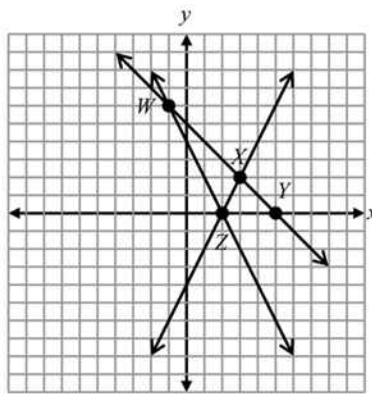**46.** Indicate whether the following numbers are **Rational** or **Irrational**.

	Rational	**Irrational**
$\frac{1}{7}$	◯	◯
$\frac{1}{\sqrt{16}}$	◯	◯
$\sqrt{161}$	◯	◯

47. Solve the system of equations below.

$x + y = 5$

$-4x - 2y = -8$

Which point on the graph below is the solution to the system of linear equations?

◯   *W*

◯   *X*

◯   *Y*

◯   *Z*

48. After conducting an experiment to test a hypothesis they proposed, a pair of students concluded that the hypothesis was incorrect.

Assuming that their data are correct, which of the following would be the **LEAST** appropriate response for their teacher to make to them?

◯   Encouragement, because they have discovered evidence that casts doubt on a plausible hypothesis.

◯   A recommendation that they reformulate their hypothesis with the new data in mind.

◯   A suggestion that the students repeat the experiment to check their results.

◯   An explanation of what the students did wrong.