

[1] Complete:

1) $\left(-\frac{1}{2}\right)^3 = \dots\dots\dots$

2) $y^3 y^6 = \dots\dots\dots$

3) $1.34 \times 10^5 = \dots\dots\dots$

4) If the age of Ahmed now is x years, then his age two years ago is $\dots\dots\dots$ years

5) A class contain 30 students. 18 of them are girls. one student is absent. then the probability that the absent student is a girl = $\dots\dots\dots$

6) $(5^2)^3 = 5^{\dots\dots\dots}$

7) $\sqrt{16} = \dots\dots\dots$

8) If $2x = 5$, then $4x = \dots\dots\dots$

9) If $x < 2$, then $x + 3 < \dots\dots\dots$

10) As throwing a fair die once and observing the upper face, then the probability of appearance of an even number = $\dots\dots\dots$

11) If the probability of success of a student = $\frac{7}{10}$, then the probability of this failure = $\dots\dots\dots$

12) $\left(\frac{3}{2}\right)^4 = \dots\dots\dots$

13) $\frac{a^2 y^4}{a^3 y^3} = \dots\dots\dots$

13) If x is an odd natural number, then the next odd natural number directly is $\dots\dots\dots$

14) As tossing a coin once , then the probability of appearance of a head is

15) $9 + 4 \times 3^2 = \dots\dots\dots$

16) $\sqrt{\left(-\frac{1}{3}\right)^2} = \dots\dots\dots$

17) The first three terms in the sequence $n^2 + 5$ are,, ($n = 1, 2, 3$)

18) If $x < y$, $y < z$, then $x < \dots\dots\dots$

19) The probability of the impossible event =

20) A class contain 30 student , 12 of them are boys.

A prize is specialized to the student who gets the greatest mark in the exam at the end of the year then the probability that a girl wins this prize is

21) $\frac{y^{10}}{y^2} = \dots\dots\dots$ where $y \neq 0$

22) $(3^2)^5 = \dots\dots\dots$

23) $\sqrt{(10)^2 - (6)^2} = \dots\dots\dots$

24) If the price of one book is x pound , then the price of 3 copies of this book = pounds.

25) In the experiment of throwing a die once , the probability of appearance of a number greater than 3 on the upper face is

26) If $0.00000074 = 7.4 \times 10^n$, then $n = \dots\dots\dots$

- 28) If : $x - (-3) = 2$, then $x = \dots\dots\dots$
- 29) If : $x + 1 > 0$, then $x > \dots\dots\dots$
- 30) A bag contains 36 marbles. if the probability of drawing a green marble = $\frac{1}{4}$, then the number of green marbles = $\dots\dots\dots$ marbles.
- 31) 600 students were examined. 480 students succeeded , then the probability of success of one student of them = $\dots\dots\dots$
- 32) $(-1)^3 + (-1)^4 = \dots\dots\dots$
- 33) Half the number $2^{10} = \dots\dots\dots$
- 34) The S.S. of the inequality $-x > 0$ in Z is $\dots\dots\dots$
- 35) A letter of the word AHMED is selected randomly. then the probability of selecting the letter D = $\dots\dots\dots$
- 36) $\sqrt{5^2} = \dots\dots\dots$
- 37) $4 + 2 \times 3 = \dots\dots\dots$
- 38) 1, 3, 5, 7, $\dots\dots\dots$, $\dots\dots\dots$, $\dots\dots\dots$ (in the same pattern)
- 39) If : $7x = 21$ then $x = \dots\dots\dots$
- 40) In an experiment of throwing a fair die once , the number of elements of the sample space is $\dots\dots\dots$

41) A bag containing cards numbered by the numbers 1, 2, 3, 4, 5, 6, 7, 8 and 9. as drawing a card from them randomly, then the probability that the drawn number is divisible by 3 is

42) If $x + 7 = 9$, then $x = \dots\dots$

43) $16 + 4 \div 2 - 3 \times 10^{-2} = \dots\dots\dots$

44) If the area of a square is 100 cm^2 , then its side length = $\dots\dots \text{ cm}$.

45) $(a^{-2})^3 = \dots\dots\dots$

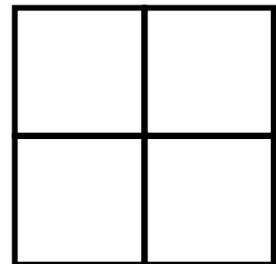
46) If a fair die is flipped once, then the probability of getting a number divisible by 3 equals

47) If $: 0.00053 = 5.3 \times 10^m$, then $m = \dots\dots\dots$

48) If the substitution set is N , then the S.S. of the equation $2x = 5$ is

49) $\sqrt{16 + 9} = \dots\dots\dots$

50) The number of squares in the opposite figure =



51) As tossing a fair coin once, the probability of appearance of a tail =

52) As choosing a letter randomly from the letters of the word " MAHMOUD ", then the probability of choosing the letter M is

53) $\left(\frac{x}{y}\right)^n \div \left(\frac{x}{y}\right)^m = \dots\dots\dots$

54) $2.37 \times 10^{-4} = \dots\dots\dots$

55) $\sqrt{\left(-\frac{5}{6}\right)^2} = \dots\dots\dots$

56) The rule that represents the pattern :

6, 9, 14, 21, is

57) The additive inverse of the number $\left(-\frac{1}{2}\right)^2$ is

58) $3x^{-3} = \frac{3}{\dots\dots\dots}$

59) If : $x + 1\frac{1}{4} = 6\frac{1}{4}$, then $x = \dots\dots\dots$

60) The S.S. of the inequality $x < 3$ in \mathbb{N} is

61) As tossing a coin once, the probability of appearance of a head =

62) A class contains 40 students. 25 of them support ALAhly, the rest supports other clups. if a student is chosen randomly, then the probability that he supports ALAhly is

$$63) \left(\frac{1}{2}\right)^5 \div \left(\frac{1}{2}\right)^3 = \dots\dots\dots$$

$$64) \frac{(2 a b^{-2})^{\text{Zero}}}{a^{-2}} = \dots\dots\dots$$

65) If the age of Amgad now is x years, then his age after two years is years.

66) In an experiment of the throwing a fair die once the probability of appearance of a number greater than 4 on the upper face is

$$67) \sqrt{10^2 - 8^2} = \dots\dots\dots$$

68) x^{-3} is undefined when $x = \dots\dots\dots$

69) If : $\frac{x}{6} = \frac{5}{3}$, then $\frac{1}{2} x = \dots\dots\dots$

70) If : $x < y$ and $y < z$, then $x < \dots\dots\dots$

71) The probability of the impossible event =

72) As throwing a fair die once, the probability of appearance of an even number =

$$73) (-3 x^a)^4 = \dots\dots\dots$$

$$74) \frac{(-2 x^2)^3}{(4 x)^2} = \dots\dots\dots$$

75) A bag contains 24 balls of the same size. some of them are blue , some are green and the rest are red.

if the probability of drawing a blue = $\frac{1}{8}$, then the number of blue balls =

76) $-\sqrt{\frac{4}{9}} = \dots\dots\dots$

77) $2 a^0 = \dots\dots\dots$

78) $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \dots\dots\dots, \dots\dots\dots$ (in the same pattern)

79) If : $a + 5 > 0$, then $a > \dots\dots\dots$

80) In an experiment of tossing a metal coin once , the probability of appearance of a tail =

81) The opposite table shows the sports activities which are favourite to a group of pupils if one pupil is chosen from this group randomly , then the probability that he prefer swimming equals

Activity	Football	Handball	Swimming
Number of pupils	20	12	8

82) $3^{-2} = \dots\dots\dots$

83) $0.00000027 = 2.7 \times 10^{\dots\dots\dots}$

84) $\sqrt{8^2 + 6^2} = 8 + \dots\dots\dots$

85) In the opposite figure : $m(\angle A) = \dots\dots\dots$

86) The S.S. of the inequality

$-2 \leq x < 2$ in Z is $\dots\dots\dots$

87) As throwing a fair die once , the probability of appearance of a number divisible by 4 on the upper face is $\dots\dots\dots$

88) $(2^{-1})^{-3} = \dots\dots\dots$

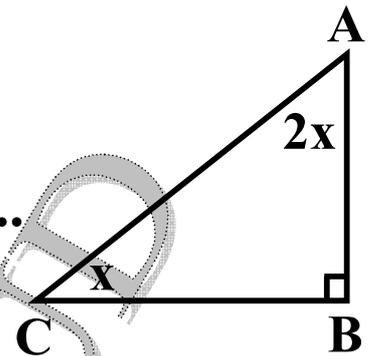
89) $\sqrt{0.09} = \dots\dots\dots$

90) The opposite table represents the relation : $y = \dots\dots\dots$

X	1	2	3	4
y	2	3	4	5

91) As throwing a fair die once , the probability of getting a number greater than 6 on the upper face equals $\dots\dots\dots$

92) As choosing a number of the set $\{ 1, 2, 3, 6, 12, 15 \}$ randomly , the probability that this number is an even number equals $\dots\dots\dots$



93) $(x^n)^n = \dots\dots\dots$

94) $\left(-\frac{1}{5}\right)^0 = \dots\dots\dots$

95) If the thickness of a piece of paper = 0.012 cm ,
then the height of a sheet formed from 600 pieces
of paper = cm

96) The opposite table represents the relation

X	1	2	3	4
y	-3	-1	1	3

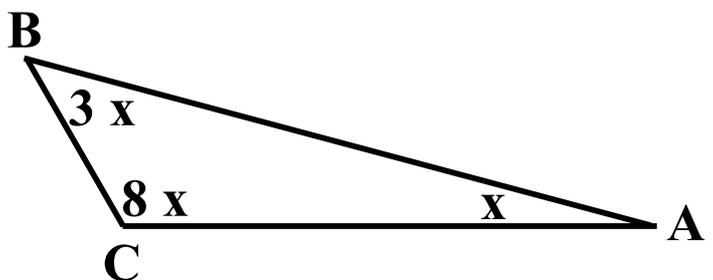
97) If : $x + 3 = 3$, then $x = \dots\dots\dots$

98) A class contains 20 boys and 15 girls. if a pupil is
chosen randomly , then the probability that the
pupil is a boy =

99) $2 \times 6 - 4 \div 2 = \dots\dots\dots$

100) $\sqrt{\left(-\frac{5}{6}\right)^2} = \dots\dots\dots$

101) In the opposite figure
 $m(\angle A) = \dots\dots\dots$



102) If the substitution set is $\{-1, 0, 1, 2, 3, 4\}$, then the S.S. of the inequality $x + 5 \leq 7$ is

103) As thrown a die once, the probability of getting a number divisible by 7 is

104) If the probability of success of a student = 0.8, then the probability of this failure =

[2] Choose

1) Which of the following ordered pairs satisfies the

relation $y = \frac{1}{3}x + 3$?

- a) (3, 3) b) (3, 4) c) (-3, 0) d) (3, 6)

2) If the thickness of a piece of paper is 0.012 cm., which of the following represents the height of 400 pieces of paper ?

- a) 48×10^{-3} b) 48×10^{-2} c) 4.8×10^0 d) 48

3) Which of the following does not express a linear relation between x and y ?

- a) $x + y = 6$ b) $\sqrt{x} = y + 3$ c) $y = x + 5$ d) $y = \frac{3x}{4}$

4) The quarter of $4^{40} = \dots\dots\dots$

- a) 4^{10} b) 4^{20} c) 4^{39} d) 2^{20}

5) Which of the following ordered pairs satisfies the relation : $y = x + 3$?

- a) (2 , 4) b) (1 , 3) c) (1 , 4) d) (4 , 5)

6) If $a > b$, then $- a \dots\dots\dots - b$

- a) $>$ b) $<$ c) $=$ d) \geq

7) The opposite table represents the relation between x and y which of the following represents this relation ?

- a) $y = 2x$ b) $y = x^2 + 1$ c) $y = x^2 - 1$ d) $y = 3x - 1$

X	1	2	3	4
y	2	4	6	8

8) Which of the following is equal to $\frac{1}{4}$ million ?

- a) 25×10^5 b) 0.25×10^5 c) 0.25×10^6 d) 0.25×10^4

9) Which of the following expresses a linear relationship ?

- a) $y + x^2 = 6$ b) $xy = 12$
 c) $x + y = 6$ d) $y = \sqrt{x} + 7$

X	1	2	3	4
y	3	4	5	6

10) The relation between x and y in the opposite table is

a) $y = x + 2$

b) $y = x - 2$

c) $y = 3x$

d) $y = 2x + 1$

X	1	2	3	4
y	3	4	5	6

11) Which is the greatest of the following :

a) 8.9×10^4

b) 8.9×10^5

c) 9.8×10^4

d) 9.8×10^5

12) The ordered pair which satisfies the linear relationship $y = 2x - 5$ is

a) (1, 2)

b) (2, 1)

c) (-1, 2)

d) (2, -1)

[3]

- 1) Find three consecutive natural numbers with sum 81
- 2) Two numbers, one of them is thrice the other and their sum is 44. Find the two numbers
- 3) In an experiment of flipping a die once and observing the apparent number of points on the upper face , write down the space sample , then find the probability of each of :
 - 1) Event of appearance of a prime number.
 - 2) Event of appearance of a number greater than 6
- 4) A bag contains 4 red balls, 3 white balls and 5 blue balls. A ball is drawn from the bag randomly. Calculate the probability that the drawn ball is :

a) red

2) not blue

3) green

- 5) the number of inhabitants in a town grows according to the rule $x = 2 (1.03)^n$ million person where x express the number of inhabitants in millions and n express the number of years :
- What is the number of inhabitants after two years?
 - What is the number of inhabitants now?
 - What is the number of inhabitants one year ago?
- 6) Three consecutive odd natural numbers are with sum 117 find these numbers.
- 7) From the set $\{ 1 , 2 , 3 \}$, a two different – digit number is formed write down the sample space , then find the probability of event A where A = event of the unit digit is an even number.
- 8) The area of a square equals the area of a triangle with base length 9 cm. and its height is 8 cm. Find the side length of the square.
- 9) A rectangle is of length equals to twice the width and its perimeter is 24 cm. find its dimensions.
- 10) In an experiment of throwing a fair die and observing the apparent number on the upper face , find the probability that the number is :
- odd
 - divisible by 5
- 11) The length of a rectangle is more than its width by 2 metres. If its perimeter equals 68 metres , find its dimensions.
- 12) A group is formed from 40 students 30 of them succeeded in maths , 24 succeeded in English , 20 succeeded in both maths and English. If a student is chosen randomly , find the probability that the chosen student :

- a) Succeeded in maths.
- b) Succeeded in both subjects.
- c) Failed in English.

13) Three persons own 76 feddans. If the share of the first exceeds the second by 4 and the share of the third is less than the second by 3 , find the share of each of them.

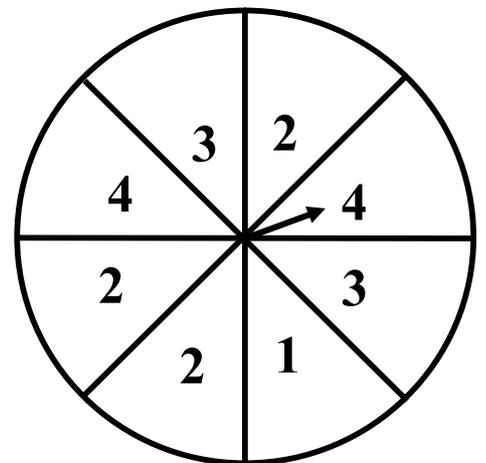
14) A fair die is flipped once. The apparent number on the upper face is observed. Find the probability of:

- a) A = getting a prime number
- b) B = getting a number divisible by 6
- c) C = getting a number greater than 6

15) In the opposite figure :



16) The opposite figure represents 8 circular sectors which are not intersecting. If all the sectors are equal in area , what is the probability that the arrow stops at one of the sectors numbered by 2 ?



17) A rectangle with length = twice its width if its length decreased by 5 cm. and its width increased by 6 cm. , then the rectangle becomes a square. Find the dimensions of the rectangle.

18) a Card is drawn randomly from 8 cards numbered from 1 to 8 write down the space sample , then find the probability of each of the following events :

- a) A = event of getting an even number.
b) B = event of getting a prime number.
c) C = event of getting a number divisible by 3
- 19) The side lengths of a triangle are x , $x + 3$, $x + 6$ centimetres and its perimeter is 36 cm. find the length of its sides.
- 20) A ladder leans against a vertical wall such that the top of the ladder on a height of 4 metres above the horizontal ground and the base of the ladder is far from the wall with 3 metres find the length of the ladder.
- 21) A bag contains 4 green balls , 6 red balls and 5 black balls. If a ball is drawn randomly , find the probability that the drawn ball is:
a) red. b) white. c) not red.
- 22) The age of Ahmed equals three times the age of Hany and the difference between their ages equals 10 years. Find the age of each of them.
- 23) From the set $\{ 3 , 6 , 8 \}$ a two different-digit number is formed. What is the probability that:
a) The unit digit is odd.
b) The sum of the two digits is greater than 10
- 1) For a single toss of a coin , calculate the probability of E , heads.
- 2) For one roll of a die , calculate the probability of:
a) E_1 : odd number b) $E_2, < 3$ c) $E_2, = 3$
- 3) The set $\{ 1 , 2 , 3 , 4 \}$ is used in writing a 2 – different digit number. Find the probability of the following events:
A: The tens digit is even

B: Both of the two digits are even.

- 4) A group of 100 students , 54 students have success in English language , 69 students have succeeded in History and 35 students have succeeded in (both of them). One student in chosen at random from the group find the probability of the following events:**
- A is the event that he has succeeded in English language**
- B is the event that he has succeeded in History.**
- 5) A fair die is rolled once. Calculate the probability of rolling:**
- a) an even number**
 - b) a prime number**
 - c) a number greater than 3**
- 6) A card is drawn from a bag of 25 cards numbered from 1 to 25. calculate the probability that the drawn card carries:**
- a) a number divisible by 5**
 - b) a number ≥ 20**
 - c) a perfect spare number**
- 7) A letter is selected at random from the word SCHOOL. Calculate the probability of selecting the letter: a) S b) O c) R**
- 8) A box contains 5 white , 4 black and 7 red balls. A ball is drawn randomly from the box. Calculate the probability of the following events:**
- a) The ball is red**
 - b) The ball is white**
 - c) The ball is not white**

- 9) One card is selected randomly from 8 cards numbered from 1 to 8. write down the sample space. Then find the probability of the following events:
- Getting an even number.
 - Getting an odd number.
 - Getting a number greater than or equal to 6.
 - Getting a number divisible by 3.
- 10) A die is rolled once and the number of dots on the upper face is observed , write down the sample space then find the probability of the following events:
- Getting a number greater than 6
 - Getting a number satisfies the inequality:
 $1 \leq X \leq 6$
 - Getting a number satisfies the inequality:
 $2 < X < 4$
- 11) The set $\{ 2 , 3 , 5 \}$ is used in writing a 2 – digit number. Find the probability of the following events:
- The tens digit is odd.
 - The unit digit is odd.
 - The sum of the two digits is 7.
 - The product of the two digits is 15.
- 12) A class contains 40 students, 30 of them succeeded in Math, 24 succeeded in Science , and 20 succeeded in both:
A student is chosen at random, find the probability that this student is:
- Succeeded in math
 - Succeeded in science.
 - Failed in science.
 - Failed in both math and science.
- 13) A letter is selected at random from the name

"ZAMALEK"

Find the probability of selecting the letter A

- 14) Hussen is in grade 7 class of 46 students. 19 of them are girls. If a student is selected at random from the class, what is the probability that the student is:
 a) a boy b) a girl c) Hussen
- 15) A card is chosen at random from ten cards numbered from 1 to 10 , what is the probability that the selected card shows:
 a) an odd number
 b) a prime number
 c) an even number
 d) an odd number greater than 3 ?
- 16) a letter is chosen from the word ALEXANDRIA. What is the probability that the letter will be :
 a) R b) X c) A d) P
- 17) a sample consists of 100 persons who watch T.V, if someone was selected at random. What is the probability of that persons's preference?

Programs	Documentaries	Drama	News	Sport
Viewers	12	31	21	36

- a) sport b) news c) drama d) documentaries
- 18) Salwa has a bag in which there are 18 marbles: 10 are black and the other are red marbles. She draws 2 marbles from the bag and does not put them back , both marbles are red. She then draws a third one without looking then find the probability of being black.
- 19) The table shows the collected data from 400 students that were asked to name their favorite hobbies , if

one student selected randomly. Find the probability of being its favorite hobby is swimming.

Hobbies	Football	Swimming	Reading
Number of students	200	80	120

- 20) A bag contains 36 marbles, Noha draw one randomly, it was found red color. If the probability of getting red marbles is $\frac{1}{9}$ then find the number of red marbles in the bag.
- 21) A die is tossed once then find the probability of getting a number satisfies the inequality $2 < x < 3$
- 22) A bowl contains 32 colored beads, all in the same size. Some blue , some green , some red , and the rest is yellow, the probability that it is blue is $\frac{3}{8}$, how many blue beads are in the bowl
- 23) A bag contains 20 cards numbered from 1 to 20, Ahmed picked one randomly it was an odd number. He picked another one without replacing the first card. What is the probability to get a card with an even number?

[4]

- 1) The sum of three consecutive even numbers is 966. Find them
- 2) A man's age now is three times his son's age , and after two years , the sum of their ages will be 52 years , what is the age of each now?
- 3) Two natural numbers , one of them is twice the other and their sum is 108. Find the two numbers.

- 4) The length of a rectangle exceeds its width by 4 metres and its perimeter is 68 metres find the dimensions of the rectangle.
- 5) The price of one metre of wool exceeds 2 pounds than the price of one metre of silk. If the price of 3 metres of wool and 4 metres of silk is 673 pounds. Find the price of one metre of each kind.
- 6) The length of a rectangle is twice its width. If the length decreases 5 cm and the width increases 6 cm , then the rectangle becomes a square. Find the area of the rectangle.
- 7) A farmer rents a land of area 76 feddans to three persons , Mohamed , Salah and Ashor such that Mohamed's share is 4 feddans more than Salah's share and Ashor's share is 3 feddans less than salah's share. What is the share of each one of them?
- 8) Laila is $\frac{3}{4}$ as tall as Sara. The difference between their heights is 0.4 metres. How tall is each girl?
- 9) Two complementary angles their measures $2x^\circ$, $2x - 18^\circ$ find them.
- 10) A city organized a marathon that had 448 local participants more than the visitors of the city , the total number in the race was 3640. find the number of both the local and visitors runners.
- 11) The price of one kilogram of bananas exceeds the price of one kilogram of grapes by one pound. If the price of 2 kg of bananas and 4 kg of grapes is 20 pound. Find the price of one kg for both bananas and grapes.

[5] Find the S.S. of the following in Q:

1) $x + 4 > 1$

2) $y - 5 > 7$

3) $8x - 3x + 1 \geq 29$

4) $-3m + 6(m - 4) > 9$

5) $-5\frac{1}{2} > a + 1\frac{1}{4}$

6) $3(x + 2) < -x + 4$

7) $19 < y + 14$

8) $3(x + 2) \geq -2(x + 1)$

9) $6d + 1 \leq 5d - 3$

10) $3(y + 2) + 8 < 10 - (2 - y)$

11) $6x + 2 \geq 14 + 5x$

12) $4 - 5(x - 2) \leq -2(-9 + 2x)$

13) $4n - 2(n - 1) \geq 0$

14) $1 - (4d - 1) > 2(d - 3)$

15) $3(7y - \frac{1}{3}) \geq 20y - 1$

16) $x - 3(2x + 1) < 5(1 + x) + 2$

17) $3x - 5 = 10$ where $x \in \mathbb{Z}$

18) $5x + 2 < 12$ where $x \in \mathbb{Z}$ then represent the S.S. on the number line.

[6]

1) Calculate the value of each of the following:

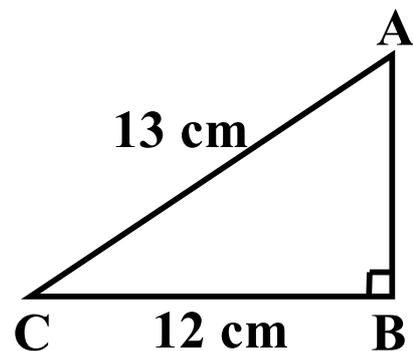
a) $9 + 5 \times 2^3$

b) $\left(-\frac{5}{8}\right)^0 \times \sqrt{6\frac{1}{4}} \times \left(-\frac{2}{5}\right)^2$

2) In the opposite figure :

$m(\angle B) = 90^\circ$, $BC = 12$ cm , and

$AC = 13$ cm. find the length of \overline{AB}



3) Simplify to the simplest form:

a) $\sqrt{\frac{25x^2y^2}{36}}$

b) $\frac{(2ab^{-2})^0}{3^0a^{-2}b}$

2) The table opposite , shows the relation between x and y which of the following represents that relation:

X	1	2	3	4	5	6
y	2	5	8	11	14	17

($y = 2x$, $y = x^2 + 1$, $y = x^2 - 1$, $y = 3x - 1$)

[7] Find the S.S of the following:

1) $3x - 5 = 10$ where $x \in \mathbb{Z}$

2) $5x + 2 < 12$ where $x \in \mathbb{Z}$ then represent the S.S. on the number line.

[1] Find the S.S. of the following: in Q

1) $5 < 2x - 1 < 7$

2) $6 - 4x \leq 3$

3) $5x + 2 \geq 12$

4) $2(x + 1) \leq 1$

5) $3x - 2 < 5x - 8$

6) $5x + 2 \geq 12$

7) $-3 \leq 2x + 7 < 2$

8) $4 - 2x \geq -3$

9) $5 < 2x - 1 < 7$

10) $\frac{1}{2}x - 4 < \frac{3}{2}$

11) $-3 \leq 2x - 1 < 2$

12) $2x + 1 \leq 9$

Solution:

1) $\therefore 5 < 2x - 1 < 7$

$\therefore 5 + 1 < 2x - 1 + 1 < 7 + 1$

$\therefore 6 < 2x < 8$

$\therefore \frac{6}{2} < \frac{2x}{2} < \frac{8}{2}$

$\therefore 3 < x < 4$

$\therefore \text{S.S.} = \{x : x \in \mathbb{Q}, 3 < x < 4\}$

2) $\therefore 6 - 4x \leq 3$

$\therefore -4x \leq 3 - 6 \quad \therefore -4x \leq -3$

$\therefore \frac{-4x}{-4} \geq \frac{-3}{-4}$

$\therefore x \geq \frac{3}{4} \quad \therefore \text{S.S.} = \left\{ x : x \in \mathbb{Q}, x \geq \frac{3}{4} \right\}$

3) $\therefore 5x + 2 \geq 12$

$\therefore 5x \geq 12 - 2 \quad \therefore 5x \geq 10$

$\therefore \frac{5x}{5} \geq \frac{10}{5}$

$\therefore x \geq 2 \quad \therefore \text{S.S.} = \{x : x \in \mathbb{Q}, x \geq 2\}$

4) $\therefore 2(x + 1) \leq 1$

$\therefore 2x + 2 \leq 1 \quad \therefore 2x \leq 1 - 2$

$\therefore 2x \leq -1$

$\therefore \frac{2x}{2} \leq \frac{-1}{2} \quad \therefore x \leq \frac{-1}{2}$

$$\therefore \text{S.S.} = \left\{ x : x \in \mathbf{Q}, x \leq \frac{-1}{2} \right\}$$

$$5) \therefore 3x - 2 < 5x - 8 \quad \therefore 3x - 5x < -8 + 2$$

$$\therefore -2x < -6$$

$$\therefore \frac{-2x}{-2} > \frac{-6}{-2} \quad \therefore x > 3 \quad \therefore \text{S.S.} = \{x : x \in \mathbf{Q}, x > 3\}$$

$$6) \therefore 5x + 2 \geq 12 \quad \therefore 5x \geq 12 - 2 \quad \therefore 5x \geq 10$$

$$\therefore \frac{5x}{5} \geq \frac{10}{5} \quad \therefore x \geq 2 \quad \therefore \text{S.S.} = \{x : x \in \mathbf{Q}, x \geq 2\}$$

$$7) \therefore -3 \leq 2x + 7 < 2 \quad \therefore -3 - 7 \leq 2x + 7 - 7 < 2$$

$$\therefore -10 \leq 2x < 2 \quad \therefore \frac{-10}{2} \leq \frac{2x}{2} < \frac{2}{2}$$

$$\therefore -5 \leq x < 2 \quad \therefore \text{S.S.} = \{x : x \in \mathbf{Q}, -5 \leq x < 2\}$$

$$8) \therefore 4 - 2x \geq -3 \quad \therefore -2x \geq -3 - 4 \quad \therefore -2x \geq -7$$

$$\therefore \frac{-2x}{-2} \leq \frac{-7}{-2} \quad \therefore x \leq \frac{7}{2} \quad \therefore \text{S.S.} = \left\{ x : x \in \mathbf{Q}, x \leq \frac{7}{2} \right\}$$

$$9) \therefore 5 < 2x - 1 < 7 \quad \therefore 5 + 1 < 2x - 1 + 1 < 7 + 1$$

$$\therefore 6 < 2x < 8 \quad \therefore \frac{6}{2} < \frac{2x}{2} < \frac{8}{2}$$

$$\therefore 3 < x < 4 \quad \therefore \text{S.S.} = \{x : x \in \mathbf{Q}, 3 < x < 4\}$$

$$10) \therefore \frac{1}{2}x - 4 < \frac{3}{2} \quad \therefore \frac{1}{2}x < \frac{3}{2} + 4 \quad \therefore \frac{1}{2}x < \frac{11}{2}$$

$$\therefore x < \frac{11}{2} \times 2 \quad \therefore x < 11 \quad \therefore \text{S.S.} = \{x : x \in \mathbb{Q}, x < 11\}$$

$$11) \therefore -3 \leq 2x - 1 < 2 \quad \therefore -3 + 1 \leq 2x - 1 + 1 < 2 + 1$$

$$\therefore -2 \leq 2x < 3 \quad \therefore \frac{-2}{2} \leq \frac{2x}{2} < \frac{3}{2}$$

$$\therefore -1 \leq x < \frac{3}{2} \quad \therefore \text{S.S.} = \left\{ x : x \in \mathbb{Q}, -1 \leq x < \frac{3}{2} \right\}$$

$$12) \therefore 2x + 1 \leq 9 \quad \therefore 2x \leq 9 - 1 \quad \therefore 2x \leq 8$$

$$\therefore \frac{2x}{2} \leq \frac{8}{2} \quad \therefore x \leq 4 \quad \therefore \text{S.S.} = \{x : x \in \mathbb{Q}, x \leq 4\}$$

[2] For a single toss of a coin, calculate the probability of E, heads.

Solution:

$$P(E) = \frac{1}{2}$$

[3] For one roll of a die, calculate the probability of:

a) E_1 : odd number b) $E_2, < 3$ c) $E_2, = 3$

Solution:

$$\text{a) } P(E_1) = \frac{3}{6} = \frac{1}{2}$$

$$\text{b) } P(E_2) = \frac{2}{6} = \frac{1}{3}$$

$$\text{c) } P(E_3) = \frac{1}{6}$$

[4] The set $\{ 1 , 2 , 3 , 4 \}$ is used in writing a 2 – different digit number. Find the probability of the following events:

A: The tens digit is even

B: Both of the two digits are even.

Solution:

$$S = \{ 12 , 13 , 14 , 21 , 23 , 24 , 31 , 32 , 34 , 41 , 42 , 43 \}$$

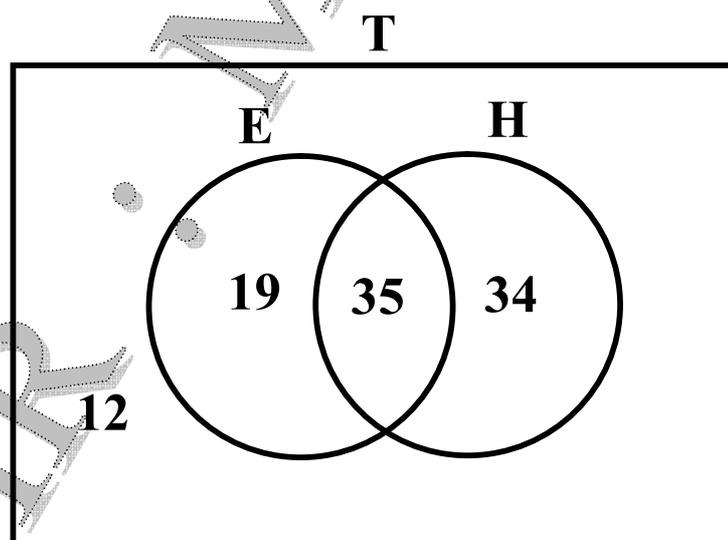
$$P (A) = \frac{6}{12} = \frac{1}{2}, P (B) = \frac{2}{12} = \frac{1}{6}$$

[5] A group of 100 students, 54 students have success in English language, 69 students have succeeded in History and 35 students have succeeded in (both of them). One student is chosen at random from the group find the probability of the following events:

A is the event that he has succeeded in English language

B is the event that he has succeeded in History.

Solution:



$$p (A) = \frac{54}{100} = \frac{27}{50}, P (B) = \frac{69}{100}$$

[6] A fair die is rolled once. Calculate the probability of rolling:

- an even number
- a prime number
- a number greater than 3

Solution:

$$\text{a) } p = \frac{3}{6} = \frac{1}{2}$$

$$\text{b) } p = \frac{3}{6} = \frac{1}{2}$$

$$\text{c) } p = \frac{3}{6} = \frac{1}{2}$$

Prime numbers are 2 , 3 , 5 , 7 , 11 , 13 , 17 ,

Even numbers are 0 , 2 , 4 , 6 , 8 , 10 ,

Odd numbers are 1 , 3 , 5 , 7 , 9 , 11 ,

[7] A card is drawn from a bag of 25 cards numbered from 1 to 25. Calculate the probability that the drawn card carries:

- a number divisible by 5
- a number ≥ 20
- a perfect square number

Solution:

a) 5 , 10 , 15 , 20 , 25

$$\text{a) } p = \frac{5}{25} = \frac{1}{5}$$

b) 20 , 21 , 22 , 23 , 24 , 25

$$\text{b) } p = \frac{6}{25}$$

c) 1 , 4 , 9 , 16 , 25

$$c) p = \frac{5}{25} = \frac{1}{5}$$

[8] A letter is selected at random from the word SCHOOL. Calculate the probability of selecting the letter: a) S b) O c) R

Solution:

$$a) p = \frac{1}{6}$$

$$b) p = \frac{2}{6} = \frac{1}{3}$$

$$c) p = \frac{0}{6} = 0$$

[9] A box contains 5 white, 4 black and 7 red balls. A ball is drawn randomly from the box. Calculate the probability of the following events:

- a) The ball is red
- b) The ball is white
- c) The ball is not white

Solution:

$$a) p = \frac{7}{16}$$

$$b) p = \frac{5}{16}$$

$$c) p = \frac{11}{16}$$

[10] One card is selected randomly from 8 cards numbered from 1 to 8. write down the sample space. Then find the probability of the following events:

- a) Getting an even number.
- b) Getting an odd number.
- c) Getting a number greater than or equal to 6.
- d) Getting a number divisible by 3.

Solution:

$$a) p = \frac{4}{8} = \frac{1}{2}$$

$$b) p = \frac{4}{8} = \frac{1}{2}$$

c) $p = \frac{3}{8}$

d) $p = \frac{2}{8} = \frac{1}{4}$

[11] A die is rolled once and the number of dots on the upper face is observed, write down the sample space then find the probability of the following events:

a) Getting a number greater than 6

b) Getting a number satisfies the inequality:

$$1 \leq X \leq 6$$

c) Getting a number satisfies the inequality:

$$2 < X < 4$$

Solution:

a) $p = \frac{0}{6} = 0$

b) $p = \frac{6}{6} = 1$

c) $p = \frac{1}{6}$

[12] The set $\{ 2, 3, 5 \}$ is used in writing a 2 – digit number. Find the probability of the following events:

a) The tens digit is odd.

b) The unit digit is odd.

c) The sum of the two digits is 7.

d) The product of the two digits is 15.

Solution:

$$S = \{ 22, 23, 25, 32, 33, 35, 52, 53, 55 \}$$

a) $p = \frac{6}{9} = \frac{2}{3}$

b) $p = \frac{6}{9} = \frac{2}{3}$

c) $p = \frac{2}{9}$

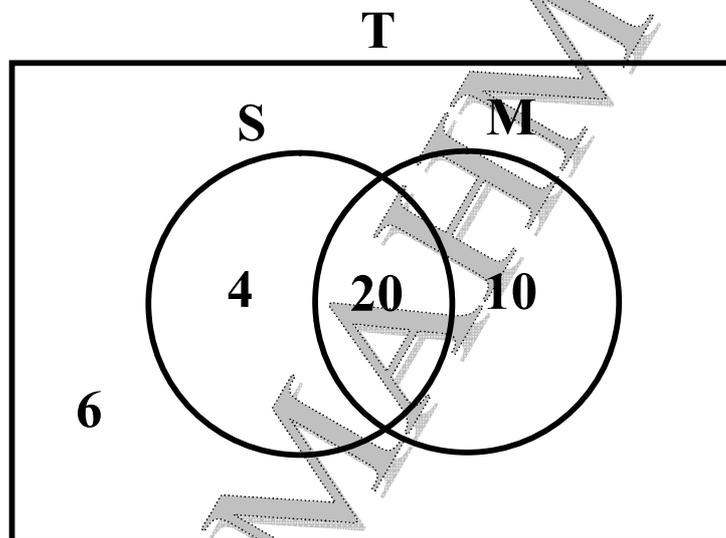
d) $p = \frac{2}{9}$

[13] A class contains 40 students, 30 of them succeeded in Math, 24 succeeded in Science, and 20 succeeded in both:

A student is chosen at random, find the probability that this student is:

- Succeeded in math
- Succeeded in science.
- Failed in science.
- Failed in both math and science.

Solution:



$$\text{a) } p = \frac{30}{40} = \frac{3}{4}$$

$$\text{b) } p = \frac{24}{40} = \frac{3}{5}$$

$$\text{c) } p = \frac{16}{40} = \frac{2}{5}$$

$$\text{d) } p = \frac{6}{40} = \frac{3}{20}$$

[14] A letter is selected at random from the name "ZAMALEK"

Find the probability of selecting the letter A

Solution:

$$p = \frac{2}{7}$$

[15] Hussen is in grade 7 class of 46 students. 19 of them are girls. If a student is selected at random from the class, what is the probability that the student is:

- a) a boy b) a girl c) Hussen

Solution:

a) $p = \frac{27}{46}$ b) $p = \frac{19}{46}$ c) $p = \frac{1}{46}$

[16] A card is chosen at random from ten cards numbered from 1 to 10, what is the probability that the selected card shows:

- a) an odd number
 b) a prime number
 c) an even number
 d) an odd number greater than 3 ?

Solution:

a) $p = \frac{3}{6} = \frac{1}{2}$ b) $p = \frac{3}{6} = \frac{1}{2}$
 c) $p = \frac{3}{6} = \frac{1}{2}$ d) $p = \frac{2}{6} = \frac{1}{3}$

[17] A letter is chosen from the word ALEXANDRIA.

What is the probability that the letter will be:

- a) R b) X c) A d) P

Solution:

a) $p = \frac{1}{10}$ b) $p = \frac{1}{10}$

c) $p = \frac{3}{10}$

d) $p = \frac{0}{10} = 0$

[18] A sample consists of 100 persons who watch T.V, if someone was selected at random. What is the probability of that persons's preference?

Programs	Documentaries	Drama	News	Sport
Viewers	12	31	21	36

a) Sport b) news c) drama d) documentaries

Solution:

a) $p = \frac{36}{100} = \frac{9}{25}$

b) $p = \frac{21}{100}$

c) $p = \frac{31}{100}$

d) $p = \frac{12}{100} = \frac{3}{25}$

[19] The table shows the collected data from 400 students that were asked to name their favorite hobbies , if one student selected randomly. Find the probability of being its favorite hobby is swimming.

Hobbies	Football	Swimming	Reading
Number of students	200	80	120

Solution:

$p = \frac{80}{400} = \frac{1}{5}$

[20] A bag contains 36 marbles, Noha draw one randomly, it was found red color. If the probability

of getting red marbles is $\frac{1}{9}$ then find the number of red marbles in the bag.

Solution:

$$\text{Numbers of red marbles} = \frac{1}{9} \times 36 = 4 \text{ marbles}$$

[21] A die is tossed once then find the probability of getting a number satisfies the inequality $2 < x < 3$

Solution:

$$P = 0$$

[22] A bowl contains 32 colored beads, all in the same size. Some blue, some green, some red, and the rest is yellow, the probability that it is blue is $\frac{3}{8}$, how many blue beads are in the bowl

Solution:

$$\text{Numbers of blue beads} = \frac{3}{8} \times 32 = 12 \text{ beads}$$

[23] A bag contains 20 cards numbered from 1 to 20, Ahmed picked one randomly it was an odd number. He picked another one without replacing the first card. What is the probability to get a card with an even number?

Solution:

$$P(E) = \frac{10}{20} = \frac{1}{2}$$

[24] The sum of three consecutive even numbers is 966.

Find them

Solution:

Let the three numbers are $x, x + 2, x + 4$

$$\therefore x + x + 2 + x + 4 = 966$$

$$\therefore 3x + 6 = 966 \quad \therefore 3x + 6 - 6 = 966 - 6$$

$$\therefore 3x = 960 \quad \therefore \frac{3x}{3} = \frac{960}{3} \quad \therefore x = 320$$

\therefore the three numbers are 320, 322 and 324

[25] A man's age now is three times his son's age, and after two years, the sum of their ages will be 52 years, what is the age of each now?

Solution:

Now :

let Son's age = x years, Man's age = $3x$ years

After 2 years :

Son's age = $x + 2$ years, Man's age = $3x + 2$ years

$$\therefore x + 2 + 3x + 2 = 52 \quad \therefore 4x + 4 = 52$$

$$\therefore 4x + 4 - 4 = 52 - 4 \quad \therefore 4x = 48 \quad \therefore \frac{4x}{4} = \frac{48}{4}$$

$$\therefore x \text{ (Son's age)} = 12 \text{ years}$$

$$\text{Man's age} = 3 \times 12 = 36 \text{ years}$$

[26] Two natural numbers, one of them is twice the other and their sum is 108. Find the two numbers.

Solution:

Let the first = x , the second = $2x$

$$\therefore x + 2x = 108 \quad \therefore 3x = 108 \quad \therefore \frac{3x}{3} = \frac{108}{3}$$

$$\therefore x = 36 \quad \text{the first} = 36, \text{ the second} = 2 \times 36 = 72$$

[27] The length of a rectangle exceeds its width by 4 metres and its perimeter is 68 metres find the dimensions of the rectangle

Solution:

Let the width = x metres, the length = $x + 4$ metres

$$\therefore (x + x + 4) \times 2 = 68 \quad \therefore (2x + 4) = \frac{68}{2} = 34$$

$$\therefore 2x = 34 - 4 = 30 \quad \therefore \frac{2x}{2} = \frac{30}{2} \quad \therefore x = 15$$

$$\therefore \text{the width} = 15 \text{ metres, the length} = 15 + 4 = 19 \text{ m}$$

[28] The price of one metre of wool exceeds 2 pounds than the price of one metre of silk. If the price of 3 metres of wool and 4 metres of silk is 370 pounds. Find the price of one metre of each kind.

Solution:

Let the price of one metre of silk = L.E. x

The price of one metre of wool = L.E. $(x + 2)$

$$\therefore 3(x + 2) + 4x = 370$$

$$\therefore 3x + 6 + 4x = 370 \quad \therefore 7x + 6 = 370$$

$$\therefore 7x + 6 - 6 = 370 - 6 \quad \therefore 7x = 364 \quad \therefore x = 52$$

\therefore The price of one metre of silk = L.E. 52

\therefore The price of one metre of wool = $54 + 2 =$ L.E. 54

[29] The length of a rectangle is twice its width. If the length decreases 5 cm and the width increases 6 cm, then the rectangle becomes a square. Find the area of the rectangle.

Solution:

Let the width is x cm then the length = $2x$

$$\therefore x + 6 = 2x - 5 \qquad \therefore 2x - x = 6 + 5$$

$$\therefore x = 11 \text{ cm}$$

\therefore The width = 11 cm , the length = $2 \times 11 = 22$ cm

[30] Two complementary angles their measures $2x^\circ$, $2x - 18^\circ$ find them.

Solution:

$$\therefore 2x + 2x - 18 = 90 \qquad \therefore 4x - 18 = 90$$

$$\therefore 4x - 18 + 18 = 90 + 18 = 108$$

$$\therefore \frac{4x}{4} = \frac{108}{4} \qquad \therefore x = 27$$

\therefore the two angles of measures 27° and $2 \times 27 - 18 = 36^\circ$

[31] Laila is $\frac{3}{4}$ as tall as Sara. The difference between their heights is 0.4 metres. How tall is each girl?

Solution:

Let the height of Sara is x m

Then the height of Laila is $\frac{3}{4}x$

$$\therefore x - \frac{3}{4}x = 0.4 \quad \therefore \frac{1}{4}x = 0.4$$

$$\therefore x = 0.4 \times 4 = 1.6 \text{ m}$$

\therefore The height of Sara = 1.6 m

$$\text{The height of Laila} = \frac{3}{4} \times 1.6 = 1.2 \text{ m}$$

[32] Complete:

1) $\left(-\frac{1}{2}\right)^3 = \dots\dots\dots$

2) $y^3 y^6 = \dots\dots\dots$

3) $1.34 \times 10^5 = \dots\dots\dots$

4) If the age of Ahmed now is x years, then his age two years ago is $\dots\dots\dots$ years

5) A class contain 30 students. 18 of them are girls. one student is absent. then the probability that the absent student is a girl = $\dots\dots\dots$

6) $(5^2)^3 = 5^{\dots\dots\dots}$

7) $\sqrt{16} = \dots\dots\dots$

8) If $2x = 5$, then $4x = \dots\dots\dots$

9) If $x < 2$, then $x + 3 < \dots\dots\dots$

10) As throwing a fair die once and observing the upper face , then the probability of appearance of an even number =

Solution:

1) $\left(-\frac{1}{2}\right)^3 = -\frac{1}{8}$

2) $y^3 y^6 = y^9$

3) $1.34 \times 10^5 = 134000$

4) $x - 2$

5) $\frac{18}{30} = \frac{3}{5}$

6) $(5^2)^3 = 5^6$

7) $\sqrt{16} = 4$

8) $\frac{2x}{2} = \frac{5}{2} \quad \therefore x = \frac{5}{2} \times 4 = 10$

9) $\because x < 2$, then $x + 3 < 2 + 3 \quad \therefore x + 3 < 5$

10) $\frac{3}{6} = \frac{1}{2}$

[33] Complete:

1) If the probability of success of a student = $\frac{7}{10}$, then

the probability of this failure =

2) $\left(\frac{3}{2}\right)^4 = \dots\dots\dots$

3) $\frac{a^2 y^4}{a^3 y^3} = \dots\dots\dots$

4) If x is an odd natural number , then the next odd natural number directly is

5) As tossing a coin once , then the probability of appearance of a head is

6) $9 + 4 \times 3^2 = \dots\dots\dots$ 7) $\sqrt{\left(-\frac{1}{3}\right)^2} = \dots\dots\dots$

8) The first three terms in the sequence $n^2 + 5$ are,, ($n = 1, 2, 3$)

9) If $x < y$, $y < z$, then $x < \dots\dots\dots$

10) The probability of the impossible event =

Solution:

1) $1 - \frac{7}{10} = 0.3$

2) $\left(\frac{3}{2}\right)^4 = \frac{81}{16}$

3) $\frac{a^2 y^4}{a^3 y^3} = \frac{y}{a}$

4) $x + 2$

5) $\frac{1}{2}$

6) 45

7) $\sqrt{\left(-\frac{1}{3}\right)^2} = \frac{1}{3}$

8) $1 + 1 = 2, 4 + 5 = 9, 9 + 5 = 14$

9) $x < y, y < z$, then $x < z$

10) Zero

[34] The length of playground is 3 meters shorter than three times the width. The perimeter is 210 metres. Find the dimensions of the playground.

Solution:

Let the width is y metres

then the length = $3y - 3$ metres

The perimeter = $(3y - 3 + y) \times 2 = 210$

$$\therefore (4y - 3) \times 2 = 210$$

$$\therefore 8y - 6 = 210 \quad \therefore 8y = 210 + 6 = 216$$

$$\therefore \frac{8y}{8} = \frac{216}{8} \quad \therefore y = 27 \text{ metres}$$

\therefore the width = 27 metres

\therefore the length = $3 \times 27 - 3 = 78$ metres.

[35] The sum of the ages of 3 brothers now is 55 years if the eldest was born before the middle by 3 years and the middle was born before the youngest by two years, find the age of each of them.

Solution:

Let the age of the middle = y years

The age of the eldest = $y + 3$ years

The age of the youngest = $y - 2$ years

$$\therefore y + y + 3 + y - 2 = 55$$

$$\therefore 3y + 1 = 55$$

$$\therefore 3y = 55 - 1 = 54$$

$$\therefore \frac{3y}{3} = \frac{54}{3} \quad \therefore y = 18 \text{ years}$$

$$\therefore \text{the age of the middle} = 18 \text{ years}$$

$$\therefore \text{the age of the eldest} = 18 + 3 = 21 \text{ years}$$

$$\text{The age of the youngest} = 18 - 2 = 16 \text{ years}$$

[36] Solve each of the following equations:

$$1) x + 17 = 13, x \in \mathbb{N} \quad 2) 3x - 13 = 26, x \in \mathbb{N}$$

$$3) x - 6\frac{1}{4} = 12\frac{1}{2}, x \in \mathbb{Q} \quad 4) 8 + 2x = 14, x \in \mathbb{Z}$$

$$5) -4 + y = 13, y \in \mathbb{N} \quad 6) 8x + 4 = 12, x \in \mathbb{Q}$$

$$7) -4 + y = 13, y \in \mathbb{N} \quad 8) x + 3 = 18 - 3x, x \in \mathbb{N}$$

$$9) 8.91 + x = 11.09, x \in \mathbb{Q} \quad 10) 5x - 4 = 2x + 11, x \in \mathbb{Q}$$

$$11) 3(x + 2) + 7(x - 1) = 12$$

$$12) 3(2x - 2) - (2x + 2) = x - 3$$

$$13) 4(x - 1) - (x + 3) = 0$$

$$14) a + 5a - 2 = 2(3 - a)$$

$$15) 3y + 6(y + 3) - (8y - 16) = 60$$

$$16) 28(x - 3) - (x - 3) = 0$$

Solution:

$$1) \therefore x + 17 = 13 \quad \therefore x = 13 - 17 = -4 \notin \mathbb{N}$$

$$\therefore \text{S.S.} = \emptyset$$

$$2) 3x - 13 = 26 \quad \therefore 3x = 26 + 13 = 39$$

$$\therefore \frac{3x}{3} = \frac{39}{3} \quad \therefore x = 13 \quad \therefore \text{S.S.} = \{13\}$$

$$3) x - 6\frac{1}{4} = 12\frac{1}{2} \quad \therefore x = 12\frac{1}{2} + 6\frac{1}{4} = 18\frac{3}{4} \in \mathbb{Q}$$

$$\therefore \text{S.S.} = \left\{ 18\frac{3}{4} \right\}$$

$$4) 8 + 2x = 14 \quad \therefore 2x = 14 - 8 = 6$$

$$\therefore \frac{2x}{2} = \frac{6}{2} = 3 \quad \therefore \text{S.s.} = \{3\}$$

$$5) -4 + y = 13 \quad \therefore y = 13 + 4 = 17$$

$$\therefore y = \{17\}$$

$$6) 8x + 4 = 12 \quad \therefore 8x = 12 - 4 = 8$$

$$\frac{8x}{8} = \frac{8}{8} \quad \therefore x = 1 \quad \therefore \text{S.S.} = \{1\}$$

$$8) x + 3 = 18 - 3x \quad \therefore x + 3x = 18 - 3$$

$$\therefore 4x = 15 \quad \therefore \frac{4x}{4} = \frac{15}{4} \in \mathbb{Q}$$

$$\therefore \text{S.S.} = \left\{ \frac{15}{4} \right\}$$

$$10) 5x - 4 = 2x + 11 \quad \therefore 5x - 2x = 11 + 4$$

$$\therefore \frac{3x}{3} = \frac{15}{3} \quad \therefore x = 5 \quad \therefore \text{S.S.} = \{5\}$$

$$11) 3(x+2) + 7(x-1) = 12$$

$$\therefore 3x + 6 + 7x - 7 = 12$$

$$\therefore 10x - 1 = 12 \quad \therefore 10x = 12 + 1 = 13$$

$$\frac{10x}{10} = \frac{13}{10} \quad \therefore x = \frac{13}{10} \quad \therefore \text{S.S.} = \left\{ \frac{13}{10} \right\}$$

$$12) 3(2x-2) - (2x+2) = x-3$$

$$6x - 6 - 2x - 4 = x - 3$$

$$4x - 6 = x - 3 \quad \therefore 4x - x = -3 + 6 = 3$$

$$\therefore \frac{3x}{3} = \frac{3}{3} \quad \therefore x = 1 \quad \therefore \text{S.S.} = \{1\}$$

$$13) 4(x-1) - (x+3) = 0 \quad \therefore 4x - 4 - x - 3 = 0$$

$$\therefore 3x - 7 = 0 \quad \therefore \frac{3x}{3} = \frac{7}{3} \quad \therefore x = \frac{7}{3}$$

$$\therefore \text{S.S.} = \left\{ \frac{7}{3} \right\}$$

$$14) a + 5a - 2 = 2(3-a)$$

$$\therefore 5a - 2 = 6 - 2a \quad \therefore 5a + 2a = 6 + 2$$

$$\therefore \frac{7a}{7} = \frac{8}{7} \quad \therefore a = \frac{8}{7} \quad \therefore \text{S.S.} = \left\{ \frac{8}{7} \right\}$$

$$15) 3y + 6(y+3) - (8y-16) = 60$$

$$\therefore 3y + 6y + 18 - 8y + 16 = 60$$

$$\therefore y + 34 = 60 \quad \therefore y = 60 - 34 = 26 \quad \therefore \text{S.S.} = \{26\}$$

$$16) 28(x - 3) - (x - 3) = 0$$

$$28x - 84 - x + 3 = 0 \quad \therefore 27x - 81 = 0$$

$$\frac{27x}{27} = \frac{81}{27} \quad \therefore x = 3 \quad \therefore \text{S.S.} = \{3\}$$

[37] Complete:

1) $\frac{y^{10}}{y^2} = \dots\dots\dots$ where $y \neq 0$

2) A class contain 30 student , 12 of them are boys.

A prize is specialized to the student who gets the greatest mark in the exam at the end of the year then the probability that a girl wins this prize is

3) $(3^2)^5 = \dots\dots\dots$

4) $\sqrt{(10)^2 - (6)^2} = \dots\dots\dots$

5) If the price of one book is x pound , then the price of 3 copies of this book = pounds.

6) In the experiment of throwing a die once , the probability of appearance of a number greater than 3 on the upper face is

7) If $0.00000074 = 7.4 \times 10^n$, then n =

8) If : $x - (-3) = 2$, then x =

9) If : $x + 1 > 0$, then $x > \dots\dots\dots$

10) A bag contains 36 marbles. if the probability of drawing a green marble = $\frac{1}{4}$, then the number of green marbles = marbles.

Solution:

1) $\frac{y^{10}}{y^2} = y^8$

2) $\frac{18}{30} = \frac{3}{5}$

3) $(3^2)^5 = 3^{10}$

4) $\sqrt{(10)^2 - (6)^2} = 8$

5) $3x$

6) $\frac{3}{6} = \frac{1}{2}$

7) $n = -7$

8) If : $x - (-3) = 2 \quad \therefore x + 3 = 2 \quad \therefore x = 2 - 3 = -1$

9) If : $x + 1 > 0$, then $x > 0 - 1$

10) $\frac{1}{4} \times 36 = 9$ marbles.

[38] Complete:

1) 600 students were examined. 480 students succeeded, then the probability of success of one student of them =

2) $(-1)^3 + (-1)^4 = \dots\dots\dots$

3) Half the number $2^{10} = \dots\dots\dots$

4) The S.S. of the inequality $-x > 0$ in Z is

5) A letter of the word AHMED is selected randomly.

then the probability of selecting the letter D = ...

6) $\sqrt{5^2} = \dots\dots\dots$

7) $4 + 2 \times 3 = \dots\dots\dots$

8) 1, 3, 5, 7,,, (in the same pattern)

9) If : $7x = 21$ then $x = \dots\dots\dots$

10) In an experiment of throwing a fair die once, the number of elements of the sample space is

Solution:

1) $\frac{480}{600} = \frac{4}{5}$

2) $(-1)^3 + (-1)^4 = -1 + 1 = 0$

3) Half the number $2^{10} = \frac{1}{2} \times 2^{10} = 2^9$

4) $\because -x > 0 \quad \therefore x < 0$

5) $\frac{1}{5}$

6) $\sqrt{5^2} = 5$

7) $4 + 2 \times 3 = 4 + 6 = 10$

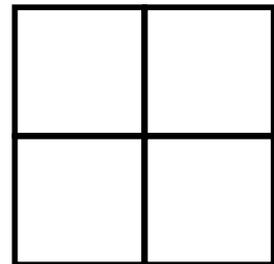
8) 1, 3, 5, 7, 9, 11, 13

9) If : $7x = 21$ then $\frac{7x}{7} = \frac{21}{7} \quad \therefore x = 3$

10) 6

[39] Complete:

- 1) If $x + 7 = 9$, then $x = \dots\dots$
- 2) $16 + 4 \div 2 - 3 \times 10^{-2} = \dots\dots$
- 3) If the area of a square is 100 cm^2 ,
then its side length = $\dots\dots \text{ cm}$.
- 4) $(a^{-2})^3 = \dots\dots$
- 5) If a fair die is flipped once, then the probability of
getting a number divisible by 3 equals $\dots\dots$
- 6) If $: 0.00053 = 5.3 \times 10^m$, then $m = \dots\dots$
- 7) If the substitution set is \mathbb{N} , then the S.S. of the
equation $2x = 5$ is $\dots\dots$
- 8) $\sqrt{16 + 9} = \dots\dots$
- 9) The number of squares in the
opposite figure = $\dots\dots$

**Solution:**

- 1) If $x + 7 = 9$, then $x = 9 - 7 = 2$
- 2) $16 + 4 \div 2 - 3 \times 10^{-2} = 10 - 0.03 = 9.79$
- 3) $\sqrt{100} = 10 \text{ cm}$.
- 4) $(a^{-2})^3 = a^{-6}$

$$5) \frac{2}{6} = \frac{1}{3}$$

$$6) \text{ If } : 0.00053 = 5.3 \times 10^m, \text{ then } m = -4$$

$$7) \because 2x = 5 \quad \therefore \frac{2x}{2} = \frac{5}{2} \notin \mathbb{N} \quad \therefore \text{S.S.} = \emptyset$$

$$8) \sqrt{16+9} = \sqrt{25} = 5$$

$$9) 5$$

$$10) \frac{1}{2}$$

[40] Complete:

1) As choosing a letter randomly from the letters of the word " MAHMOUD ", then the probability of choosing the letter M is

$$2) \left(\frac{x}{y}\right)^n \div \left(\frac{x}{y}\right)^m = \dots\dots\dots$$

$$3) 2.37 \times 10^{-4} = \dots\dots\dots$$

$$4) \sqrt{\left(-\frac{5}{6}\right)^2} = \dots\dots\dots$$

5) The additive inverse of the number $\left(-\frac{1}{2}\right)^2$ is

$$6) 3x^{-3} = \frac{3}{\dots\dots\dots}$$

7) If : $x + 1\frac{1}{4} = 6\frac{1}{4}$, then $x = \dots\dots\dots$

8) The S.S. of the inequality $x < 3$ in \mathbb{N} is $\dots\dots\dots$

9) As tossing a coin once, the probability of appearance of a head = $\dots\dots\dots$

10) $\left(\frac{1}{2}\right)^5 \div \left(\frac{1}{2}\right)^3 = \dots\dots\dots$

Solution:

1) $\frac{2}{7}$

2) $\left(\frac{x}{y}\right)^n \div \left(\frac{x}{y}\right)^m = \left(\frac{x}{y}\right)^{n-m}$

3) $2.37 \times 10^{-4} = 0.000237$

4) $\sqrt{\left(-\frac{5}{6}\right)^2} = \frac{5}{6}$

5) $-\frac{1}{2}$

6) $3x^{-3} = \frac{3}{x^3}$

7) If : $x + 1\frac{1}{4} = 6\frac{1}{4}$, then $x = 6\frac{1}{4} - 1\frac{1}{4} = 5$

8) $\{2, 1, 0\}$

$$9) \frac{1}{2}$$

$$10) \left(\frac{1}{2}\right)^5 \div \left(\frac{1}{2}\right)^3 = \left(\frac{1}{2}\right)^2 = \frac{1}{4}$$

[41] Complete:

$$1) \frac{(2ab^{-2})^{\text{Zero}}}{a^{-2}} = \dots\dots\dots$$

$$2) \sqrt{10^2 - 8^2} = \dots\dots\dots$$

[42] Find three consecutive natural numbers with sum 81

Solution:

Let the three numbers are x , $x + 1$ and $x + 2$

$$\therefore x + x + 1 + x + 2 = 81$$

$$\therefore 3x + 3 = 81 \quad \therefore 3x = 81 - 3$$

$$\therefore 3x = 78 \quad \therefore \frac{3x}{3} = \frac{78}{3} \quad \therefore x = 26$$

\therefore The three numbers are 26, 27 and 28

[43] Three consecutive odd natural numbers are with sum 117 find these numbers.

Solution:

Let the three numbers are x , $x + 2$ and $x + 4$

$$\therefore 3x + 6 = 117$$

$$\therefore 3x = 117 - 6 = 111$$

$$\therefore \frac{3x}{3} = \frac{111}{3}$$

$$\therefore x = 37$$

\therefore The three numbers are 37 , 39 and 41

[44] A rectangle is of length equals to twice the width and its perimeter is 24 cm. find its dimensions.

Solution:

Let the width = y cm then the length = $2y$ cm

$$\therefore (y + 2y) \times 2 = 24 \quad \therefore 6y = 24$$

$$\therefore \frac{6y}{6} = \frac{24}{6}$$

$$\therefore y = 4 \text{ cm}$$

\therefore The width = 4 cm

The length = $2 \times 4 = 8$ cm

[45] The length of a rectangle is more than its width by 2 metres. If its perimeter equals 68 metres , find its dimensions.

Solution:

Let the width = y cm

the length = $y + 2$

$$\therefore (y + y + 2) \times 2 = 68$$

$$\therefore (2y + 2) \times 2 = 68 \quad \therefore 4y + 4 = 68$$

$$\therefore 4y = 68 - 4 \quad \therefore 4y = 64$$

$$\therefore \frac{4y}{4} = \frac{64}{4} \quad \therefore y = 16$$

\therefore the width = 16 cm , the length = $16 + 2 = 18$ cm

[46] The age of Ahmed equals three times the age of Hany and the difference between their ages equals 10 years. Find the age of each of them.

Solution:

Let the age of Hany = x years

The age of Ahmed = $3x$ years

$$\therefore 3x - x = 10 \quad \therefore 2x = 10 \quad \therefore \frac{2x}{2} = \frac{10}{2}$$

$$\therefore x = 5$$

then the age of Hany = 5 cm

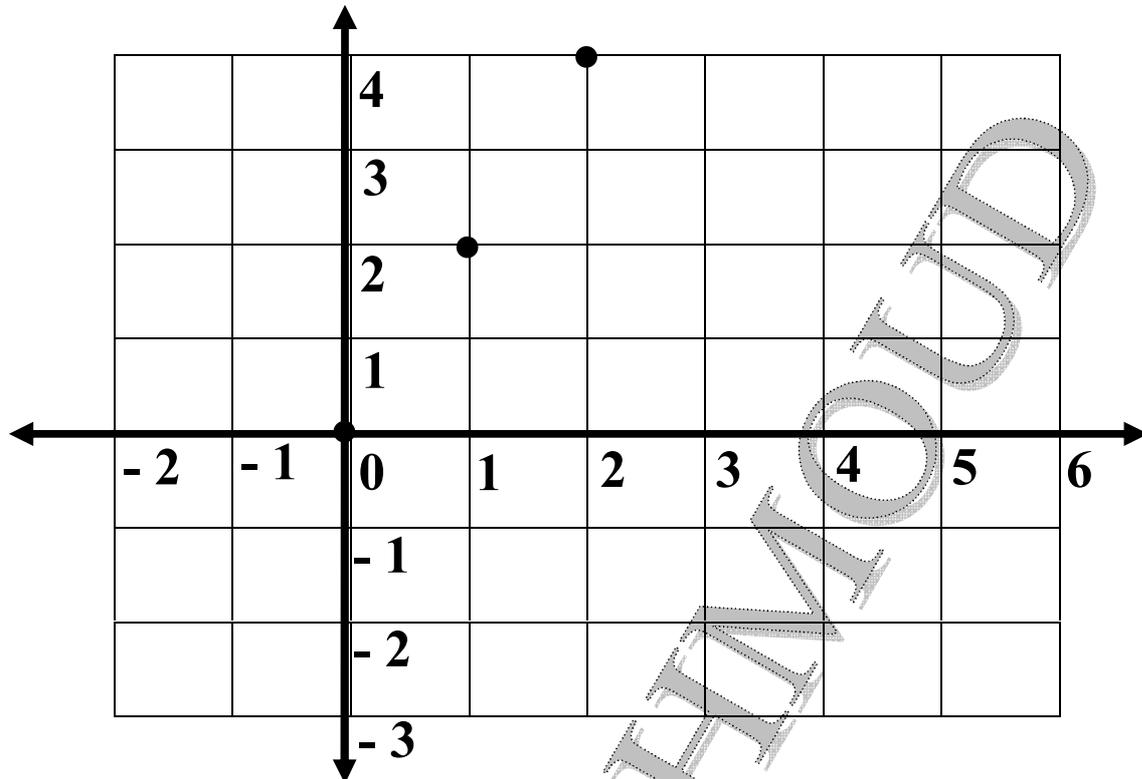
\therefore the age of Ahmed = $3 \times 5 = 15$ years

[47] Graph the linear relation: $y = 2x$

Solution:

x	0	1	2
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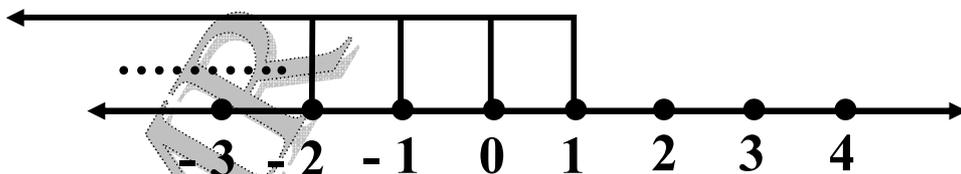
y	0	2	4
---	---	---	---



[48] Find the S.S. of the inequality: $5x + 2 < 12$ where $x \in \mathbb{Z}$ then represent the S.S. on the number line.

Solution:

$$\begin{aligned} \because 5x + 2 < 12 & \quad \therefore 5x < 12 - 2 & \quad \therefore 5x < 10 \\ \therefore \frac{5x}{5} < \frac{10}{5} & \quad \therefore x < 2 & \quad \therefore \text{S.S.} = \{ 1, 0, -1, -2, \dots \} \end{aligned}$$



[49] Simplify to the simplest form:

a) $\sqrt{\frac{25x^2y^2}{36}}$

b) $\frac{(2ab^{-2})^0}{3^0a^{-2}b}$

Solution:

$$a) \sqrt{\frac{25x^2y^2}{36}} = \frac{5xy}{6}$$

$$b) \frac{(2ab^{-2})^0}{3^0a^{-2}b} = \frac{1}{a^{-2}b} = \frac{a^2}{b}$$

[50] Calculate the value of each of the following:

$$a) 9 + 5 \times 2^3$$

$$b) \left(-\frac{5}{8}\right)^0 \times \sqrt{6\frac{1}{4}} \times \left(-\frac{2}{5}\right)^2$$

Solution:

$$a) 9 + 5 \times 2^3 = 9 + 5 \times 8 = 9 + 40 = 49$$

$$b) \left(-\frac{5}{8}\right)^0 \times \sqrt{6\frac{1}{4}} \times \left(-\frac{2}{5}\right)^2 = 1 \times \frac{5}{2} \times \frac{4}{25} = \frac{2}{5}$$

[51] Find the value of the following in the simplest form:

$$\frac{(-2)^6 \times (-2)^4}{(-2)^8} = \frac{2^6 \times 2^4}{2^8} = 2^{6+4-8} = 2^2 = 4$$

3) x^{-3} is undefined when $x = \dots\dots\dots$

4) If the age of Amgad now is x years, then his age after two years is $\dots\dots$ years.

[1] Calculate each of the following, then put the result in the simplest form:

1) $\left(\frac{1}{2}\right)^3$

2) $\left(\frac{3}{5}\right)^2$

3) $\left(1\frac{2}{3}\right)^4$

4) $(0.05)^2$

5) $(0.\dot{6})^2$

6) $\left(1-1\frac{2}{3}\right)^2$

7) $\left(\frac{1}{3}\right)^4$

8) $\left(-\frac{3}{5}\right)^3 \times \left(-\frac{25}{27}\right)$

[2] Complete:

1) $\left(\frac{1}{2}\right)^0 + \frac{1}{4} = \dots\dots$

2) The multiplicative inverse of the number $\left(\frac{2}{5}\right)^0 = \dots$

3) The additive inverse of the number $(-3)^0$ is $\dots\dots$

4) The multiplicative inverse of the number $(-1)^0$ is $\dots\dots$

5) The additive inverse of $\left(-\frac{2}{5}\right)^2$ is $\dots\dots\dots$

6) If $x = y$, then $\left(\frac{3}{5}\right)^{x-y} = \dots\dots\dots$

7) $\left(\frac{5}{3}\right)^2 \times \left(\frac{3}{5}\right)^0 = \dots\dots\dots$

[3] Calculate each of the following, then put the result in the simplest form:

1) $\left(\frac{1}{3}\right)^4$

2) $\left(\frac{2}{3}\right)^4$

3) $\left(-\frac{1}{7}\right)^3$

4) $\left(-\frac{1}{2}\right)^3 \times \left(\frac{4}{3}\right)^2$

5) $\left(-\frac{3}{4}\right)^2 \times \frac{8}{27}$

6) $\left(-\frac{5}{6}\right)^2 \div 3\frac{3}{4}$

[4]

If $x = -\frac{3}{2}$, $y = \frac{1}{2}$, $z = -\frac{4}{3}$ then find in the simplest form :

1) $x^2 y^2 z^2$

2) $x^2 \div z^2$

3) $x^2 \div y z^2$

4) $9 x y^3 + 4 y^2 z^2$

5) $\frac{x^2 y^2 z^2}{x + y}$

6) $\frac{2}{3} z^3 - \frac{8}{3} x^3 y - \frac{9}{2} z^2 y^3$

[5] Find in the simplest form:

1) $\left(\frac{2}{3}\right)^3 \times \left(\frac{2}{3}\right)^2$

2) $\left(-\frac{2}{3}\right)^3 \times \left(\frac{2}{3}\right)^2$

3) $\left(\left(-\frac{3}{2}\right)^2\right)^5$

4) $\left(\frac{xy}{z}\right)^5$

[6] Calculate each of the following, then put the result in the simplest form:

1) $\left(\frac{1}{4}\right)^2 \times \left(\frac{1}{4}\right)^2$

2) $\left(-\frac{1}{5}\right)^3 \times \left(\frac{1}{5}\right)^2$

$$3) \left(-\frac{3}{5}\right)^7 \div \left(\frac{3}{5}\right)^5$$

$$4) \frac{2^6 \times 2}{2^3 \times 2^4}$$

[7] Calculate each of the following, then put the result in the simplest form:

$$1) \left(\frac{a b}{c}\right)^5$$

$$2) \left(\frac{5 x}{3 y}\right)^2$$

$$3) \left(-\frac{c^2}{d}\right)^3$$

$$4) \left(\frac{x^2}{y^3}\right)^2$$

$$5) \left(-\frac{x^3}{y^2}\right)^2$$

$$6) \left(\frac{4 x^3 y^2}{2 x^2 y}\right)^7$$

[8] Calculate each of the following, then put the result in the simplest form:

$$1) \left[\left(\frac{1}{2}\right)^2\right]^2$$

$$2) \left[\left(-\frac{3}{2}\right)^2\right]^5$$

$$3) \left[\left(2\frac{1}{2}\right)^3\right]^2$$

$$4) \left(\frac{4}{25}\right)^3 \div \left(\frac{2}{5}\right)^3$$

$$5) \left(2\frac{1}{2}\right)^4 \times \left(\frac{4}{25}\right)^2$$

[4] Choose:

$$1) 3^2 \times 3^5 = \dots\dots\dots (3^7 \text{ or } 3^3 \text{ or } 3^{10} \text{ or } 3^{35})$$

$$2) 3^5 \times 2^5 = \dots\dots\dots (5^{10} \text{ or } 6^{10} \text{ or } 6^5 6^{25})$$

$$3) 5^2 + 5^2 = \dots\dots\dots (10^2 \text{ or } 10^4 \text{ or } 5^4 50)$$

[9] Choose:

$$1) (5 a)^0 = \dots\dots\dots, a \neq 0 (5 \text{ or } a \text{ or } 5^a \text{ or } 1)$$

$$2) (5^2)^3 = \dots\dots\dots (5^6 \text{ or } 5^5 \text{ or } 5^{23} \text{ or } 5)$$

3) The quarter of the number $4^{20} = \dots\dots\dots$

(4^5 or 4^{10} or 4^{19} or 2^{10})

[10]

If $a = \frac{1}{2}$, $b = \frac{3}{4}$ and $c = -\frac{2}{3}$, find the numerical value of each :

1) $(c^2 b)^3$ 2) $(4 a^3 c)^2$ 3) $(a^2 b c^2)^2$

[11]

If $a = \frac{5}{3}$, $b = -\frac{3}{2}$ and $c = \frac{2}{5}$, find the numerical value of each of :

1) $\frac{(a^2 c^2)^2}{b}$ 2) $\left(\frac{2 a b}{5 c}\right)^3$

[12] Find in the simplest form:

1) $\left(-\frac{y^2}{x}\right)^2$

2) $\left(-\frac{x^2}{y^2}\right)^2$

3) $\left(-\frac{3}{5}\right)^7 \div \left(\frac{3}{5}\right)^5$

4) $\left(\left(2\frac{1}{2}\right)^3\right)^2$

5) $\left(\frac{x^2}{y^3}\right)^2$

6) $\left(-\frac{z^2}{x}\right)^3$

7) $\left(-\frac{xy^6}{z^2}\right)^2$

8) $\left(\frac{2}{7}\right)^5 \div \left(\frac{2}{7}\right)^3$

[13]

If $x = -\frac{1}{2}$, $y = \frac{3}{4}$, $z = -\frac{3}{2}$ find in the simplest form the

numerical value of each of the following :

1) $x^3 y^2$

2) $y^3 x^2$

3) $x^3 \div y^2 z^2$

4) $\left(\frac{xy}{z}\right)^5$

5) $\left(\frac{x^2}{y^3}\right)^2$

6) $\left(\frac{y^2}{x}\right)^3$

7) $\left(\frac{x^3 y^2}{z^2}\right)^3$

8) $\left(\frac{-3x^2}{4y^4}\right)^3$

9) $(-2x^3 y^2)(3x^4 y^6)$

[14] Complete:

1) $\frac{5}{5^{-3}} = 5^{1-(-3)} = \dots\dots$

2) $(b^{-1})^{-3} = b^{\dots\dots}$

3) $(3x^{-1})^2 = 9x^{\dots\dots} = \frac{9}{\dots\dots}$

4) $10^{-3} = \frac{1}{\dots\dots}$

[15] Join:

1) $(x^2)^n$

a) x^{n^2}

2) $(x^n)^n$

b) $\frac{3m^z}{2n^z}$

3) $(xy^a)^b$

c) $27x^{3a}$

4) $\left(\frac{x}{y^a}\right)^b$

5) $(-3x^a)^3$

6) $(3x^a)^3$

7) $\frac{3}{2}\left(\frac{m}{n}\right)^z$

8) $\left(\frac{3m}{2n}\right)^z$

d) $\frac{3^z m^z}{2^z n^z}$

e) x^{2n}

f) $-27x^{3a}$

g) $\frac{n^b}{y^{ab}}$

h) $x^b y^{ab}$

i) $\frac{x^b}{y^{ab}}$

j) $x y^{ab}$

[16] Complete:

1) $5z^{\text{zero}} = \dots\dots$

3) $(3a^2)^{-1} = \frac{1}{\dots\dots}$

2) $2x^{-3} = \frac{2}{\dots\dots}$

4) $2x^{-2}y^{-3} = \frac{2}{\dots\dots}$

[17] Evaluate:

1) 5^{-1}

3) 5^{-2}

5) $4^{-2} \times 4^5$

7) $(3^{-2})^{-2}$

9) $\frac{3}{3^{-2}}$

2) 4^{-1}

4) 4^{-2}

6) $3^7 \times 3^{-3}$

8) $(5^{-1})^{-3}$

10) $\frac{6^{-2}}{6^{-3}}$

11) $\frac{8 \times 8^{-2}}{8^{-3}}$

12) $\frac{7^{-2} \times 7^5}{7^3}$

13) $\left(\frac{n^{-3}}{n}\right)^{-2}$

14) $\left(\frac{y^5}{y^{-2}}\right)^{-3}$

15) $(3^{\text{zero}} - 2^{-2})^{-2}$

16) $(3^{\text{zero}} \times 2^{-2})^{-2}$

[18] Identify the numbers which are not in the standard form $a \times 10^n, n \in \mathbb{Z}$:

- 1) 6.2×10^5 2) 0.46×10^7 3) 7.834×10^{16}
 4) 82.3×10^6 5) 0.8×10^5 6) 6.75×10

[19] Write the following numbers in standard form $a \times 10^n, n \in \mathbb{Z}$:

- 1) 600000 2) 48000000 3) 7 millions
 4) 0.0006 5) 0.000053 6) 0.000864

[20] Find the value of n:

- 1) $0.00052 = 5.2 \times 10^n$ 2) $0.000357 = 3.57 \times 10^n$
 3) $0.00000006 = 6 \times 10^n$ 4) $(0.004)^2 = 1.6 \times 10^n$

[21] Write the following numbers in standard form $a \times 10^n, n \in \mathbb{Z}$:

- 1) 68×10^5 2) 720×10^6 3) 0.75×10^8
 4) 68×10^{-5} 5) 750×10^{-9} 6) 0.4×10^{-10}

[22] Write the following numbers in standard form $a \times 10^n, n \in \mathbb{Z}$:

- 1) $(4.4 \times 10^3) \times (2 \times 10)^5$ 2) $(3.8 \times 10^8) \div (1.9 \times 10^6)$

$$3) (3.8 \times 10^5) + (4.6 \times 10^4) \quad 4) (5.3 \times 10^8) - (8.0 \times 10^7)$$

[23] Arrange the following numbers in a descending order:

$$3.6 \times 10^{-3} \quad 5.2 \times 10^{-5} \quad 1 \times 10^{-2}$$

$$8.35 \times 10^{-2} \quad 6.08 \times 10^{-8}$$

[24] Evaluate:

$$1) 3 + [5 + 2(8 \div 4)]$$

$$2) 2^3 + [4 + (2 - 1)]$$

$$3) 7(6^2 \div 2 \times 3)$$

$$4) 2 \times 6 - 4 \div 2$$

$$5) 9 + 4 \times 3^2$$

$$6) 196 \div (7 - 5)^2$$

$$7) 4 \times 7 - 3^2$$

$$8) 1^5 + 6^3 - 5^2$$

$$9) 144 - 8 \div 2^3$$

$$10) 4 \times 2^3 - 20$$

$$11) 12(2^3) \div 24 + 3^2$$

$$12) 9(4^2) \div 2^2 \times 3$$

[25]

Find the value of $16a \div 4b + 3ba$ where $a = 9$, $b = 6$

[26] Simplify:

$$1) 2 - [(7 - 3) - 2]$$

$$2) [4 - (5 - 2)] - 1$$

$$3) \frac{15 + 7}{15 - 4}$$

$$4) \frac{8 + 20 - 4}{8 - 4}$$

$$5) 2[(5^2 + 1) - (4^2 - 1)]$$

$$6) 5[(2^2 - 1) - (2^2 - 2)]$$

$$7) \frac{5 + 2 \times 5}{2^2 + 1} + 5^2 - 5$$

$$8) \frac{3^2 \times 6 \div 3}{2 \times 1 + (3 + 1)^2}$$

[27] Find the numerical value of each of the following where $x = 2$, $y = 5$

$$1) (x + y)^2$$

$$2) (y - x)^3$$

$$3) \left(\frac{x}{y}\right)^2$$

$$4) \frac{6^2}{y-1}$$

[28] Find the two square roots of each of the following:

1) 64

2) $\frac{1}{4}$

3) 121

4) 10000

5) $\frac{25}{36}$

6) $\frac{9}{100}$

[29] simplify each of the following in the simplest form:

1) $\sqrt{16}$

2) $-\sqrt{25}$

3) $\pm\sqrt{1.44}$

4) $\pm\sqrt{40000}$

5) $-\sqrt{4^2}$

6) $\pm\sqrt{8^2}$

7) $\sqrt{\frac{9}{49}}$

8) $\sqrt{\frac{4}{81}}$

[30] Complete:

1) $\frac{6y x^4}{2y^2 x^3} = \dots\dots$

2) $\frac{(-2x^2y)^3}{(-4xy^2)^2} = \dots\dots$

3) $\left(\frac{m^2}{n^{-3}}\right)^{-1} \left(\frac{3m^{-2}}{n^{-2}}\right)^{-2} = \dots\dots$

4) $\frac{(2ab^{-2})^{\text{zero}}}{3^{\text{zero}} a^{-2} b} = \dots\dots$

5) $2.37 \times 10^{-4} = \dots\dots$

[31] Put each of the following in the simplest form:

1) $\frac{x^2 y \left(\frac{y^2}{2x}\right)^3}{x}$

2) $\frac{a^{-1}}{b^2} \left(\frac{a^{-1}}{2b^2}\right)^{-2}$

[32] Put the suitable sign $>$ or $<$:

- 1) 6.4×10^3 4.6×10^3
- 2) 6.2×10^4 4.1×10^5
- 3) 0.0041 3.2×10^{-2}
- 4) 4370 3.41×10^4
- 5) 2.10×10^{-5} 1.82×10^{-5}
- 6) 914×10^{-4} 1.2×10^{-5}
- 7) 6.920×10^5 96230
- 8) 3.69×10^{-4} 0.0000623

[33]

If $a = -\frac{1}{2}$, $b = 2$, $c = \frac{3}{4}$ then find the numerical value of

$$a^3b^2 + b^2c - 8abc$$

[34] Find the S.S. of the following equations

where $x \in \mathbb{Q}$

- | | |
|------------------|------------------|
| 1) $x + 5 = 7$ | 2) $x - 6 = 8$ |
| 3) $x - 8 = 5$ | 4) $x + 6 = 9$ |
| 5) $2x = 8$ | 6) $3x = 9$ |
| 7) $2x = 5$ | 8) $3x = 4$ |
| 9) $4x + 7$ | 10) $5x - 7 = 8$ |
| 11) $3x - 6 = 8$ | 12) $2x - 9 = 7$ |
| 13) $3x - 7 = 9$ | 14) $6x + 7 = 4$ |
| 15) $4x - 8 = 5$ | 16) $2x - 7 = 6$ |

[35] Find the S.S. of the following inequalities

where $x \in \mathbb{Q}$

- | | |
|----------------|----------------|
| 1) $x + 5 > 4$ | 2) $x - 3 > 7$ |
| 3) $x - 7 > 9$ | 4) $x + 6 > 4$ |
| 5) $x - 4 < 6$ | 6) $x - 4 < 2$ |

7) $2x > 5$

8) $3x > 5$

9) $3x + 1 < 4$

10) $2x + 6 < 5$

11) $3x + 4 < 6$

12) $3x - 3 < 5$

13) $2x - 4 \leq 5$

14) $3x - 3 \geq 6$

15) $3x + 7 \geq 8$

16) $5x - 7 \geq 8$

[36] Complete in the same pattern:

a)

4	5	6	7
n	n + 1	n + ?	?

b)

2	4	6	8
x	2x	?	?

[37] Complete in the same pattern:

1)	54	53	52	51
	a	a - 1	a - ?	?

2)	13	15	17	19
	m	m + ?	?	?

[38] Find the relationship between the variables in the following

1)	x	0	1	2	3	4
	y	1	6	11	16	21

2)	x	1	2	3	4
	y	3	4	5	6

3)	x	0	1	2	3	4
	Y	0	5	10	15	20

4)	x	-2	-1	0	1	2
	y	12	11	10	9	8

[39]

If $a = -\frac{1}{2}$, $b = 2$, $c = \frac{3}{4}$ then find the numerical value of $a^3b^2 + b^2c - 8abc$

[40] Complete:

1) The additive inverse of the rational number $\left(-\frac{2}{5}\right)^2$

is

2) The multiplicative inverse of the rational number

$$\sqrt{\frac{10}{2.5}} = \dots\dots$$

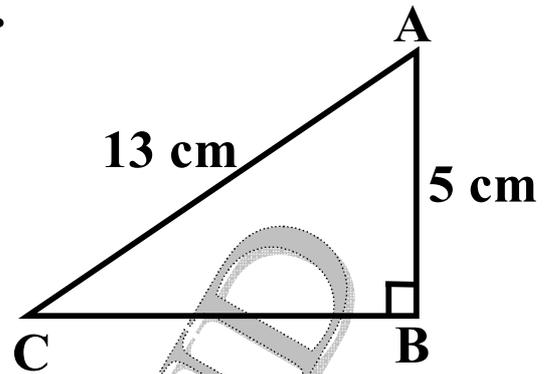
3) $\left(-\frac{3}{7}\right)^7 \div \left(\frac{3}{7}\right)^5 = \dots\dots$ In the simplest form

4) In the opposite figure :

If $m(\angle B) = 90^\circ$, then $BC = \dots$

5) $\left(-\frac{1}{2}\right)^3 - \left(-\frac{1}{2}\right)^2 = \dots\dots$

6) $\sqrt{\left(-\frac{5}{6}\right)^2} = \dots\dots\dots$



[41] If $y = 2x + 1$ Find:

- 1) y at $x = 3$ 2) y at $x = -5$
- 3) x at $y = 1$ 4) x at $y = -1$

[42] Represent in the form of a graph the following linear relations:

- 1) $y = x$ 2) $y = x + 2$
- 3) $y = 3x + 1$ 4) $y = -x + 3$

[43] Write down the next three terms in each of the following patterns:

- 1) 2, 4, 6, 8,,,
- 2) 1, 3, 5, 7,,,
- 3) 3, 6, 9, 12,,,
- 4) 5, 10, 15, 20,,,
- 5) 20, 18, 16, 14,,,
- 6) 0.4, 0.6, 0.8, 1.0,,,
- 7) $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \dots\dots, \dots\dots, \dots\dots$
- 8) -1, 1, 3, 5,,,
- 9) 2, 5, 10, 17,,,

[44] Write down the first three terms of the following patterns where $n = 1, 2, 3$

- 1) $2n + 3$ 2) $n^2 + 5$

3) $\frac{1}{3n}$

4) $5 - 2n$

[45] Find a rule to describe each of the following patterns:

1) 10 , 20 , 30 , 40 , ...

2) 1 , 7 , 13 , 19 ,

3) 10 , 9 , 8 , 7 ,

4) 20 , 18 , 16 , 14 ,

5) 5 , 7 , 9 , 11 ,

6) 12 , 9 , 6 ,

7) $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$,

8) $\frac{1}{8}$, $\frac{1}{7}$, $\frac{1}{6}$,

[46] Complete-

- 1) When tossing a coin once and observing the upper face, then the probability of the appearance of a head is.....
- 2) A die is tossed once. The probability of the appearance a p[ri]me number is.....
- 3) The probability of the impossible event equals.....
- 4) A die is tossed once. The probability of the appearance an even number is.....and an odd number is.....

[47] When tossing a regular die once and observing the upper face, find the probability of the event {7}

[48] Which of the following is a probability of an event?

(-0.7, 36.3%, 1.2, 150%)

[49] A die is tossed once and observe the number on the upper face. Calculate the following probability of :

- 1) The appearance of a number less than 6
- 2) The appearance of a prime even number
- 3) The appearance of a number does not divide by 3

[50] a) A box contains 4 red balls, 5 black balls and 6 white balls one ball is drawn at random from the box. Find the probability that the drawn ball is

- 1) Red
- 2) Not black

[51] A box contains 30 similar balls. 4 of them are yellow 7 are red and the rest are black. One ball is drawn randomly from the box. Find the probability that the drawn ball is:

- 1) Black
- 2) yellow or black
- 3) not yellow

[52] A box contain 15 identical cards numbered from 1 to 15 one card is drawn randomly. Find the probability that the number on the drawn card is:

- 1) An even number.
- 2) A prime number

[53] Complete:

1) The S.S. of the inequality $-4 \leq 2x < 4$, in \mathbb{N} is.....

2) The S.S. of the inequality $x \leq 1$ in \mathbb{Z} is.....

3) The S.S. of the inequality $3 < 3x < 6$ in \mathbb{N} is.....

4) If $7x \leq -14$, then $x \leq \dots$

5) If $2x - 1 = 3$ then $x - 1 = \dots$

- 6) If the S.S. of $-2 < x < a$ in \mathbb{N} is $\{0, 1, 2\}$ then $a = \dots\dots\dots$
- 7) The S.S. of the inequality $-1 < -x \leq 2$ in \mathbb{Z} is.....
- 8) If $x \in \{5, -4, -3\}$, then the S.S. of $3x > 12$ is
- 9) The S.S. of $1 < x \leq 2$ in \mathbb{N} is.....
- 10) If $-3x < 9$ then S.S. in \mathbb{Z} is.....
- 11) If $(x - 1)$ is an odd number then its consecutive odd Number is
- 12) The S.S. of the inequality $x + 3 < 1$ in \mathbb{N} is.....
- 13) If $x \in \{0, 1, 2\}$ then the S.S. of the equation $2x = 6$ is....
- 14) The S.S. of the inequality $-1 < -x < 2$ in \mathbb{Z} is.....
- 15) The S.S. of the inequality $x > 0$ in \mathbb{Z} is.....
- 16) The S.S. of the equation $1 - x = 2$ in \mathbb{Z} is.....
- 17) The S.S. of the equation $x = -3$ in \mathbb{N} is.....
- 18) If $2x = x - 1$ then $x = \dots\dots\dots$
- 19) If $2(x + 1) = 6$ then $x = \dots\dots\dots$
- 20) The S.S. of the equation $x + 5 = 3$ in \mathbb{N} is.....
- 21) The S.S. in \mathbb{Z} of the equation $x - 1 = 1$ is
- 22) If $5x = 10$ then $x + 3 = \dots\dots\dots$
- 23) If $a > b$ then $-3a \dots\dots\dots - 3b$
- 24) If $x > -2$ then $x + 1 > \dots\dots\dots$
- 25) If $x \in \{-2, -1, 0, 1, 2\}$ then the S.S. of $x + 2 < 3$ is.....
- 26) If $-x > 1$ then the S.S. =..... in \mathbb{N} .
- 27) If $x \in \{-1, 0, 1\}$ then the S.S. of the equation $2(x + 1) = 6$ is.....
- 28) If the S.S. of the equation $x + a = 3$, in \mathbb{Z} is $\{4\}$ then $a = \dots\dots\dots$
- 29) If $5x = 4x$, then $x = \dots\dots\dots$
- 30) The S.S. of the inequality $x > -x$ in \mathbb{Z} is.....

31) The S.S. of the inequality $-2 < -x \leq 3$ in Z is.....

[54] The sum of three consecutive numbers is 21 Find the three numbers.

[55] One of two integers exceeds the other by 3 if the sum of these integers is 27, then find these integers

[56] The length of a rectangle is twice its width and its perimeter is 42 cm find its area.

[57] The length of a rectangle is 5 cm more than twice its width. What are its dimensions given that its perimeter is 46 cm?

[58] The price of one kilogram of bananas exceeds the price of one kilogram of grapes by one pound. If the price of 2 kg of bananas and 4 kg of grapes is 14 pounds. Find the price of one kilogram of each.

[59] What is the number which if added 5 to its double the result will be 74.

[60] Find in Z the S.S. of each of the following:

a) $5x + 2(2x + 3) = 24$

b) $-1 \leq 3x + 5 < 11$ And represent the S.S. on the number line.

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Class

Name:

Task

Answer the following questions

[1] Complete:

1) The image of the point $(3, -2)$ by reflection in X - axis is

2) $(5^3)^2 = 5^{\dots}$

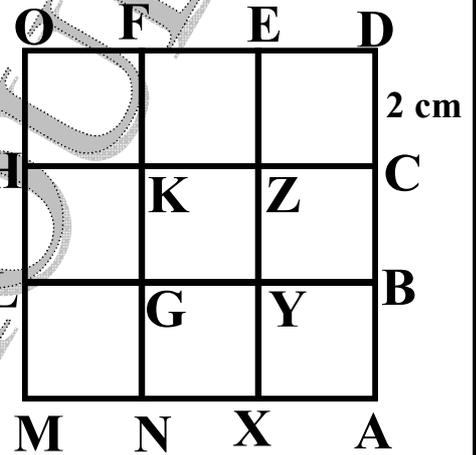
3) $\left(\frac{3}{4}\right)^{-2} = (\dots\dots)^2$

[2] Simplify:

$$\frac{(y^3)^{-2} \times (y^{-2})^2}{y^{-4} \times y^{-3}}$$

[3] In the following figure:

AMOD is a square, and all the interior squares are congruent, complete:



1) The image of \overline{DC} by reflection in

\overleftrightarrow{ZY} is

2) The image of the square OHKF by a translation of magnitude 4 cm in the

direction \overrightarrow{EY} is

3) The square FKZE is the image of the square GNX Y by a translation of magnitude in the direction of

[4] Find the image of the point A (2 , 3) and B (1 , 4) by the

translation of LM in the direction of \overrightarrow{LM} where L (2 , 1) and M (2 , 3)

[5]

If $x = -\frac{4}{3}$, $y = \frac{1}{2}$ and $z = -\frac{3}{2}$, find the numerical value of :

$x^2 - y z^2$

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Class

Name:

Task

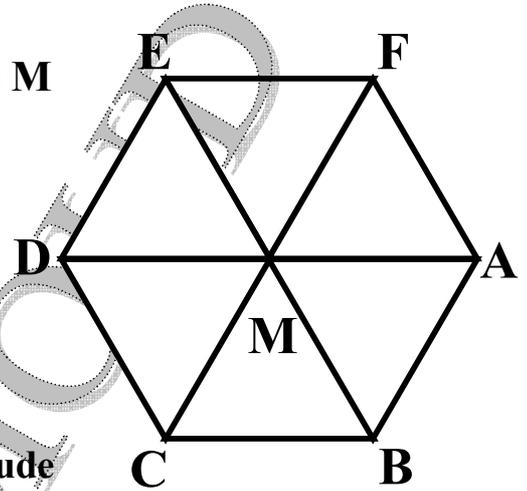
Answer the following questions

[1] In the following figure:

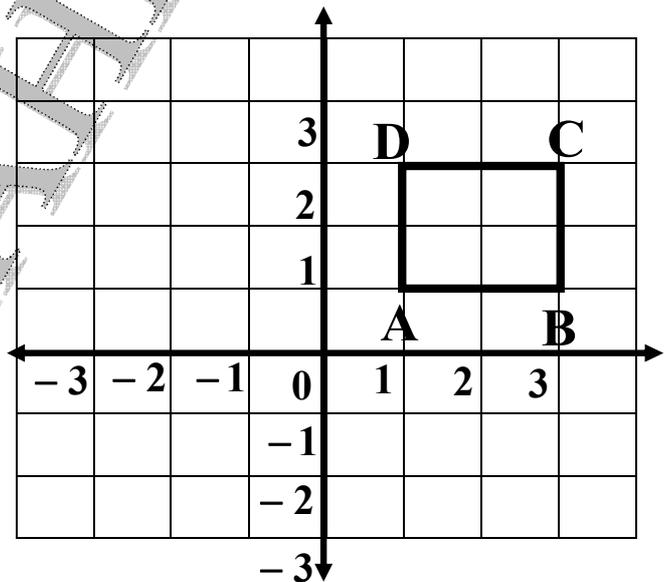
ABCDEF is a regular hexagon whose centre is M

Complete the following:

- 1) The image of \overline{AF} by rotation about M with an angle of measure 120° is
- 2) ΔABM is the image of of ΔCDM by rotation about with an angle of measure
- 3) The image of ΔDMC by translation of magnitude \overline{CB} in the direction of \overrightarrow{CB} is



[2] Draw the image of the square ABCD by rotation about The origin with 90°



[3] Complete:

- 1) $0.54 \times 10^5 = 5.4 \times 10^{\dots\dots}$
- 2) If $x = \sqrt{\frac{1}{4}}$ then $x^3 = \dots\dots$
- 3) The rotation with an angle of measure 180° about the origin maps the point $(-x, y)$ to the point

[4]

- 1) If ABC is a triangle in which $m(\angle B) = 90^\circ$, $AB = 1.5$ cm and $AC = 2.5$ cm then $(BC)^2 = \dots\dots\dots$, $BC = \dots\dots\dots$ cm
- 2) Write the result in the standard form : $(3.8 \times 10^5) + (4.6 \times 10^4)$

Answer the following questions

[1] Choose:

1) $x = 2$ is the solution to the equation in Q

- a) $3x = 5$ b) $x + 3 = 6$ c) $x + 2 = 2x$ d) $2x + 3 = x + 4$

2) $\sqrt{10^2 - 6^2} = \dots\dots\dots$ (4 or ± 4 or 8 or ± 8)

[2] Complete the table for the given linear relationship:

$y = 4x + 1$

X	0	1	2
Y			

[3] Find the S.S. of the following equation

$5x + 3 = 7, x \in Q$

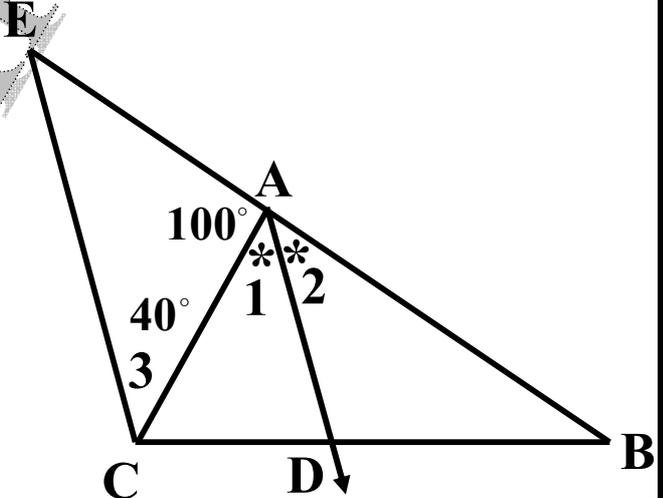
[4] From the opposite figure complete:

$m(\angle 1) = m(\angle 2) = \dots\dots\dots$

$m(\angle 1) = m(\angle \dots) = \dots\dots^\circ$

(Alternate angles)

then //



[5] From the opposite figure complete:

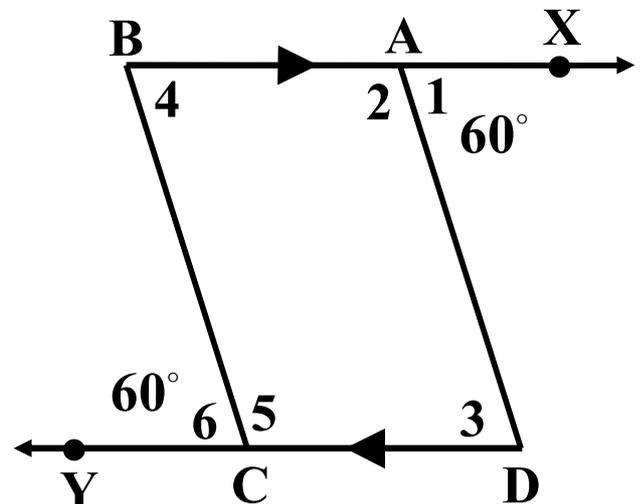
$m(\angle 1) = m(\angle \dots) = \dots\dots^\circ$

(Alternate angles)

$m(\angle 6) = m(\angle \dots) = \dots\dots^\circ$

(Corresponding angles)

then //



Prep 1

Task

Name:

[1] Complete:

- 1) The multiplicative inverse of $-\sqrt{\frac{4}{9}}$ is
- 2) The two diagonal of a rectangle are and
- 3) $0.0028 \times 10^5 = 2.8 \times 10^{\dots\dots}$
- 4) $2^{-4} \div 2^{-6} = 2^{\dots\dots}$
- 5) ABCD is a parallelogram in which,
 $m(\angle A) + m(\angle C) = 160^\circ$, then $m(\angle B) = \dots\dots\dots$
- 6) If the measure of the exterior angle of a regular polygon is 30°
then the number of sides =

[2] In the opposite figure

ABCD is a trapezium,
 $\overline{AB} \parallel \overline{CD}$, $H \in \overline{CD}$ Such that

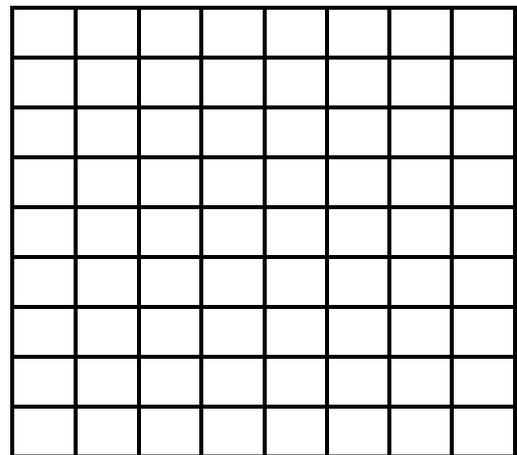
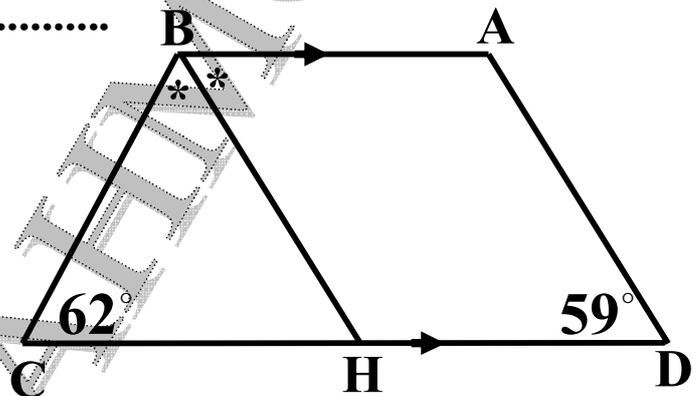
\overrightarrow{BH} bisects $\angle ABC$

$m(\angle BCD) = 62^\circ$ and

$m(\angle ADC) = 59^\circ$

Prove that:

ABHD is a parallelogram



[3] Simplify:

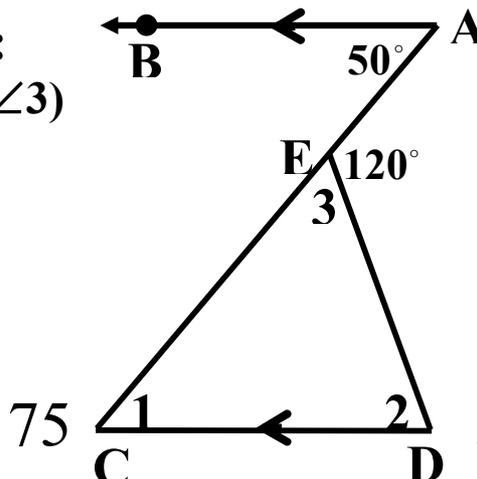
$$\frac{(2xy)^0 \times (3x^{-2}y)^3}{7^0 \times (2x^2y)^{-2}}$$

[4] Graph the following relation:

$$y = 2x + 1$$

[5] In the opposite figure:

Find : $m(\angle 1)$, $m(\angle 2)$, $m(\angle 3)$



Prep 1

Task

Name:

[1] Complete:

- 1) If $x \in \mathbb{N}$ then S.S. of $2x + 3 = 1$ is
- 2) The ordered pair $(\dots, 4)$ satisfies the relation $y = 3x + 1$
- 3) $a + 4 > 0$, then $a > \dots$
- 4) The fourth term in the sequence $n^2 + 3$ is

[2] The sum of two natural numbers is 15 if one of them exceeds the other by 3. Find the two numbers.

[3] Find the S.S. of the following in Q:

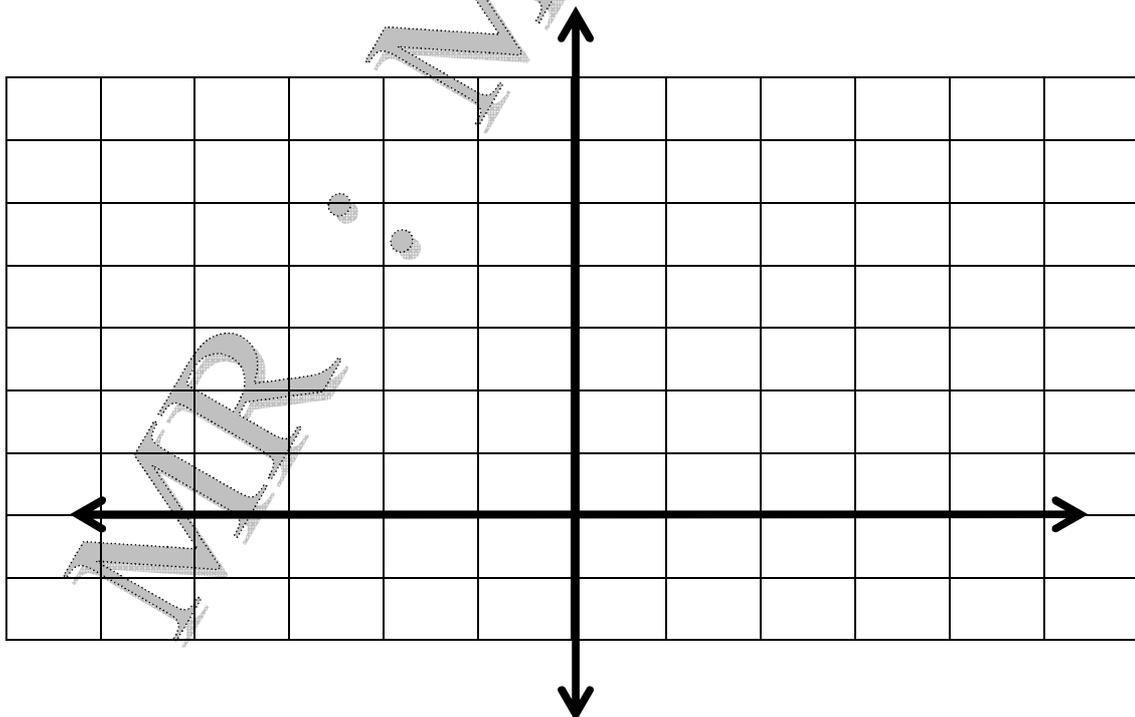
a) $3x + 2 = 14$

b) $-2x + 1 > 5$

[4] Complete:

- 1) The parallelogram which has a right angle is
- 2) The sum of measures of the interior angles of the quadrilateral equals
- 3) The image of the point $(0, 3)$ by reflection in the y-axis is

[5] ABCD is a rectangle where A $(0, 1)$, B $(4, 1)$, C $(0, 3)$, D $(4, 3)$. Draw the figure and its images by translation $(x, y) \longrightarrow (x + 1, y + 1)$



Prep 1

Test

Name:

[1] Complete:

1) $3^5 + 3^5 + 3^5 = 3^{\dots\dots}$

2) If $x y^{-1} = \frac{2}{5}$ then $y x^{-1} = \dots\dots$

3) The multiplicative inverse of $\left(-\frac{2}{5}\right)^2$ is.....

4) $0.00036 \times 10^{-4} = 3.6 \times 10^{\dots\dots\dots}$

5) If $x = \sqrt{\frac{1}{4}}$, then $x^3 = \dots\dots\dots$

6) The S.S. of $-x > 0$ in Q is

7) If the measure of an interior angle of a regular polygon is 108° then the number of its sides is

8) ABCD is a parallelogram in which, $m(\angle A) + m(\angle C) = 160^\circ$, then $m(\angle B) = \dots\dots\dots$

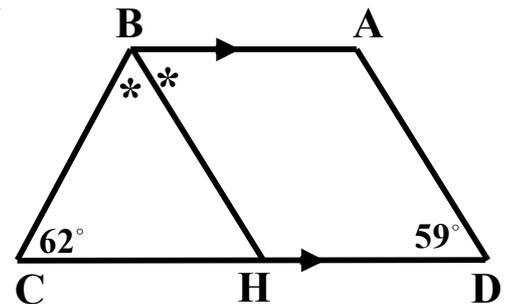
[2] In the opposite figure

ABCD is a trapezium, $\overline{AB} \parallel \overline{CD}$, $H \in \overline{CD}$

Such that \overrightarrow{BH} bisects $\angle ABC$

$m(\angle BCD) = 62^\circ$ and $m(\angle ADC) = 59^\circ$

Prove that: ABHD is a parallelogram



[3] Find the S.S. of the following in Q:

a) $3x + 1 = 14$

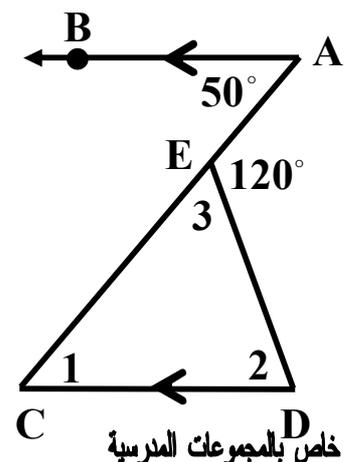
b) $-2x + 1 > 5$

[4] Simplify:

$$\frac{(2xy)^0 \times (3x^{-2}y)^3}{7^0 \times (2x^2y)^{-2}}$$

[5] In the opposite figure:

Find: $m(\angle 1)$, $m(\angle 2)$, $m(\angle 3)$



Prep 1

Task

Name:

[1] Complete:

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- 2) The ordered pair $(\dots, 4)$ satisfies the relation $y = 3x + 1$
- 3) $a + 4 > 0$, then $a > \dots$
- 4) The fourth term in the sequence $n^2 + 3$ is

[2] The sum of two natural numbers is 15 if one of them exceeds the other by 3. Find the two numbers.

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[4] Complete:

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- 3) The image of the point $(0, 3)$ by reflection in the y-axis is

[5] ABCD is a rectangle where A $(0, 1)$, B $(4, 1)$, C $(0, 3)$, D $(4, 3)$. Draw the figure and its images by translation $(x, y) \longrightarrow (x + 1, y + 1)$

