Part (1)

I) Choose:

1) The multiplicative inverse of $\left(\frac{3}{4}\right)^2$ is .....

a) $\left(\frac{4}{3}\right)^2$ b) $-\left(\frac{4}{3}\right)^2$ c) $\left(\frac{3}{4}\right)^2$ d) $-\left(\frac{3}{4}\right)^2$

2) Third of 3^{20} is .....

a) 3^{10} b) 3^{19} c) 3^{18} d) 60

3) If 2x = 12 , then 3x = ...

a) 6 b) 4 c) 3 d) 18

4) If: $(0.0005)^2 = 25 \times 10^n$, then n = ...

a) 4 b) 8 c) -8 d) -6

5) If x = y , then $\left(\frac{4}{9}\right)^{x-y}$ equals .....

a) 1 b) 0 c) $\frac{4}{9}$ d) $\frac{9}{4}$

6) The additive inverse of $\left(\frac{-2}{5}\right)^0$ is .....

a) $\frac{2}{5}$ b) $\frac{-2}{5}$ c) -1 d) 1

7) Half of 2^{20} = ...

a) 2^{10} b) 2^{21} c) 2^{19} d) 40

8) Quarter of 4^{20} = ...

a) 4^5 b) 4^{10} c) 4^{19} d) 2^{10}

9) The multiplicative inverse of the number $\sqrt{\frac{4}{25}}$ is .....

a) $\frac{2}{25}$ b) $\frac{25}{2}$ c) $\frac{5}{2}$ d) $\frac{2}{5}$

10) $3^{10} + 3^{10} + 3^{10}$ = ……

a) 3^{10} b) 3^{30} c) 3^{11} d) 9^{10}

11) $\left(\frac{-3}{9}\right)^{7} \div \left(\frac{3}{7}\right)^{5}$ = ……

a) $\frac{9}{49}$ b) $-\frac{9}{49}$ c) $\pm\frac{9}{49}$ d) $\frac{3}{7}$

12) If $\left(\frac{4}{9}\right)^{x} = \left(\frac{4}{9}\right)^{4}$, then x = ……

a) zero b) 1 c) 9 d) – 4

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

a) $\frac{1}{9}$ b) – 9 c) $-\frac{1}{9}$ d) 9

14) If x = y , then 5^{y-x} = ……

a) zero b) 4 c) 5 d) 1

(2) Complete:

1) The additive inverse of $\left(\frac{-5}{7}\right)^{2}$ is ……

2) If $0.000035 = 3.5 \times 10^{k}$, then k = ……

3) 3 × 7 – 15 ÷ 3 = ……

4) $3x^{0}$ = ……

5) If x = $\frac{1}{4}$, y = $\frac{1}{8}$, then $(x - y)^{-1}$ = ……

6) $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{7}$, …… , …… "in the same pattern"

(3) Simplify:

1) $\frac{x^3 \times x^4}{x^5}$ then find the numerical value if x = -3

2) $\left(\frac{-1}{2}\right)^{3} \div [\, 8 \times \left(\frac{-1}{2}\right) \times \frac{3}{4}\,]$

(4) 1) If $x = \frac{-1}{2}$, $y = \frac{3}{4}$, find the numerical value of x^3y^2

2) If $x = \frac{-3}{2}$ and $y = \frac{3}{4}$, find the numerical value of $\left(\frac{x^3}{y^2}\right)^2$

(5) Simplify:

1) $\frac{a^5 \times a^7}{a^8}$

2) $\frac{(2)^5 \times (2)^4}{(2)^9}$

3) $2^3 + [\ 4 + (2^2 \div 2)\ ]$

4) $\frac{2^3 \times 2^{-4}}{2^{-2} \times 2^5}$

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

(6) 1) If $x = \frac{-3}{2}$, $y = \frac{-4}{2}$, then the numerical value of $\left(\frac{x}{y}\right)^2$

2) If $x = \frac{1}{2}$, $y = \frac{4}{5}$, $z = \frac{5}{2}$, then find x^2yz

(7)

1) Find the result of the expression $(5.4 \times 10^4) + (3.7 \times 10^5)$ in the form of $a \times 10^n$ where n is an integer.

2) If $x = -\frac{1}{2}$, $y = \frac{3}{4}$ find the value of $y \div x^2$

(8) Choose the correct answer:

a) $\frac{6\,a^2x^4}{2a^3x^3}$ = ... [3ax , $3a^5x^7$, $\frac{3x}{a}$, $\frac{3}{ax}$]

b) $\frac{(-2s^2t)^3}{(-4st^2)^2}$ = ... [$-\frac{s^3}{2t}$, $\frac{-s^4}{2t}$, $\frac{s^5}{2t^2}$, $\frac{s^4}{t}$]

c) Which of the following numbers is the greatest?

[6.3×10^5 , 9.8×10^4 , 5.2×10^5]

d) $\left(\frac{m^2}{n^{-3}}\right)^{-1}\left(\frac{3m^{-2}}{n^{-2}}\right)^{-2}$ = ... $\left[\frac{9m^2}{n^7}, \frac{m^2}{9n^7}, \frac{m^2}{9n}, \frac{9m^6}{n}\right]$

e) $\left(\frac{2ab^{-2}}{3^0a^{-2}b}\right)^0$ = ... $\left[\frac{a^3}{3b^3}, a^2, 1, \frac{a^2}{b}\right]$

f) 2.37×10^{-4} = ...

[0.00237 , 0.000237 , 23700 , 0.0000237]

(9) a) Put each of the following in the simplest form:

1) $\frac{s^2t}{s}\left(\frac{t^2}{2s}\right)^3$ 2) $\frac{s^{-1}}{b^2}\left(\frac{a^{-1}}{2b^2}\right)^{-2}$

b) 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) 9.1×10^{-4} ☐ 1.2×10^{-5}

7) 6.920×10^5 ☐ 96230

8) 3.69×10^{-4} ☐ 0.0000623

(10) Complete:

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

b) The multiplicative inverse of $\sqrt{\frac{10}{2.5}}$ is ……..

c) $\left(\frac{-3}{7}\right)^7 \div \left(\frac{3}{7}\right)^5$ = ……. in its simplest form.

d) $\left(\frac{-1}{2}\right)^3 - \left(-\frac{1}{2}\right)^2$ = ……..

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

(11) a) If $\frac{m}{n}$ is a rational number, $\frac{m^2}{n^2}$ = 0.16 evaluate $\left(\frac{m}{n}\right)^3$

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

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

Part (2)

(1) Choose the correct answer from the given:

1) If X > Y and Z > 0 then XZ …… YZ

a) < b) = c) >

2) The probability of certain event = ……..

a) zero b) 1 c) 2

3) If x + 9 = 11 then 7x = ……..

a) 16 b) 20 c) 2 d) 14

4) The s.s of the inequality -x >0 in $\mathbb{Z}$ is ……..

a) $\mathbb{Z}$ b) $\mathbb{N}$ c) $\mathbb{Z}_-$ d) $\mathbb{Z}_+$

5) If: x + 3 = 3, then x = ...

a) 6 b) -6 c) 3 d) zero

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

a) $\frac{1}{20}$ b) $\frac{1}{15}$ c) $\frac{3}{7}$ d) $\frac{4}{7}$

7) $\frac{s^2 t}{s}\left(\frac{t^2}{2\,s}\right)^3$ = ...

a) $\frac{t^5}{6\,s}$ b) $\frac{t^7}{8\,s^2}$ c) $\frac{s^2 t^6}{8}$

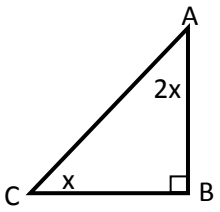
8) If the total weight of 500 grains of salt is $6\frac{1}{2}$ gm, then the weight of one grain = ... gm.

a) $\frac{78}{10000}$ b) $\frac{13}{1000}$ c) $\frac{78}{1000}$ d) $\frac{325}{1000}$

9) $\sqrt{8^2 + 6^2}$ = 8 + ...

a) 6 b) 2 c) -6 d) -2

10) In the opposite figure: m (∠ A) = ...



a) 30° b) 60°

c) 90° d) 180°

11) The S.S of the inequality -2 ≤ x < 2 in Z is .....

a) {-2, -1, 0} b) {-1, 0, 1, 2} c) {-2, -1, 0, 1} d) {-1, 0, 1}]

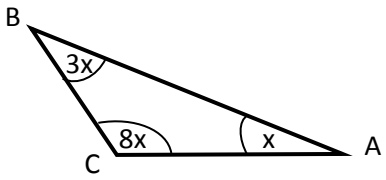
12) As throwing a die once, the probability of appearance of a number divisible by 4 on the upper face is .....

a) $\frac{1}{2}$ b) $\frac{1}{3}$ c) $\frac{1}{6}$ d) $\frac{5}{6}$

(2) Complete:

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

2) In the opposite figure:



m (∠ A) = ...°

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

4) As throwing a die once, the probability of getting a number divisible by 7 is .....

5) If the probability of success of a student = 0.8 , then the probability of his failure = ...

6) $\sqrt{16 + 9}$= .....

7) On tossing a fair coin once, the probability of appearance of tail = ...

8) If x + 1 > 0, then x > .....

(3) Simplify:

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

(4) a) Solve the equation: $8x + 4 = 20$, where $x \in Z$.

b) Solve the inequality: $2x + 3 \geq 3x - 1$, where $x \in Q$

c) Find the S.S of: $2x + 4 = 10$ in Q

d) Solve the inequality $7x - 2x + 1 \leq 16$ in Z

e) Solve the equation: $2(3x - 3) + 2x = 74$ where $x \in N$

f) Solve the inequality: $-3x - 1 \leq 5$ where $x \in Z$

(5)

a) 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

.....

.....

(b) The length of a rectangle is twice its width and its surface area is 24.5 cm^2, calculate each of its length and width.

.....

.....

(c) If three quarters of the surface area of a square is $1\frac{11}{64}$ m^2, calculate the side length of the square.

.....

.....

(6)

a) In an experiment of throwing a fair die and observing the apparent number on the upper face, find the probability that the number is:-

a) odd b) divisible by 5

b) 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:

1) Red 2) not blue 3) green

c) A card is drawn from a bag of 25 cards numbered from1 to 25. Calculate the probability that the drawn card carries.

a) number divisible by 5

b) number $\geq$ 20

c) a perfect square number

(7) A box contains 5 white balls and number of red balls if the probability of getting a red ball = $\frac{1}{2}$, what is the number of red balls?

(8) Two natural numbers one of them is twice o the other and their sum is 108, find the two numbers?

(9) XY is a line such that $(XY)^2 = 25$, and z is a midpoint of XY calculate the length of XZ

Model Answers

Part (1)

(1) Choose:

1) a	2) b	3) d	4) d	5) a
6) c	7) c	8) c	9) c	10) c
11) b	12) d	13) d	14) d	

(2) Complete:

1) $-\left(\frac{5}{7}\right)^2$ 2) 5 3) 16

4) 3 5) $\left(\frac{1}{4}-\frac{1}{8}\right)^{-1}=\left(\frac{1}{8}\right)^{-1}=8$

(3) Simplify:

1) $x^2=(-3)^2=9$ 2) $=\frac{1}{8}\div(-3)=\frac{1}{24}$

(4)

1) $=\left(-\frac{1}{2}\right)^3\times\left(\frac{3}{4}\right)^2=\frac{1}{8}\times\frac{9}{16}=\frac{9}{128}$

2) $\left[\left(\frac{-3}{2}\right)^3\div\left(\frac{3}{4}\right)^2\right]^2=\left(\frac{-27}{8}\div\frac{9}{10}\right)^2=(-3)^2=9$

(5) 1) $a^{(5+7-8)}=a^4$ 2) $2^{(5+4-9)}=2^0=1$

3) $8+[4+2]=14$ 4) $\frac{2^{-1}}{2^3}=2^2=4$

5) $\frac{(7)^3\times7^5}{7^2}=-(7)^6=-117649$

(6) 1) $\left(\frac{-3}{2}\div\frac{-4}{2}\right)^2=\left(\frac{-3}{2}\times\frac{-1}{2}\right)^2=\left(\frac{3}{4}\right)^2=\frac{9}{16}$

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

(7) 1) $= 4.24 \times 10^5$

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

(8) Choose:

a) 3ax b) $\frac{-s^4}{2t}$ c) 6.3×10^5 d) $\frac{m^2}{9n^7}$ e) 0.000237

(9) a)

1) $\frac{s^2 t}{s}\left(\frac{t^6}{8s^3}\right) = st\left(\frac{t^6}{8s^3}\right) = \frac{t^7}{8s^2}$

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

$\frac{1}{ab^2}\left(\frac{4b^4}{a^{-2}}\right) = \frac{4b^2}{a^{-1}} = 4ab^2$

b) Put the sign (< or >):

1) > 2) < 3) < 4) <

5) > 6) > 7) < 8) >

(10) Complete:

a) $-\left(\frac{2}{5}\right)^2$ b) $\frac{1}{2}$ c) $-\left(\frac{3}{7}\right)^2 = \frac{9}{49}$

d) $\frac{-1}{8} - \frac{1}{4} = -\frac{3}{8}$ e) $\frac{5}{6}$

(11) a) $\frac{m}{n} = 0.4$

$\left(\frac{m}{n}\right)^3 = (0.4)^3 = 0.064$

b) $\left[\left(\frac{-1}{2}\right)^3 \times 2^2\right] + \left[2^2 \times \frac{3}{4}\right] - \left[8 \times -\frac{1}{2} \times 2 \times \frac{3}{4}\right]$

$= -\frac{1}{2} + 3 + 6$

$= 8\frac{1}{2}$

Part (2)

(1) Choose the correct answer from the given:

1) >
2) 1
3) 14
4) $\mathbb{Z}_-$
5) zero
6) $\frac{4}{7}$
7)
8) $\frac{13}{1000}$
9) 2
10) 60
11) { -2 , -1 , 0 , 1 }
12) $\frac{1}{6}$

(2) Complete

1) $\left|\frac{-5}{6}\right| = \frac{5}{6}$
2) 15^o
3) $\{2 , 1 , 0 , -1\}$
4) zero
5) 1 – 0.8 = 0.2
6) 5
7) $\frac{1}{2}$
8) -1

(3) Simplify:

$\frac{5xy}{6}$

(4)

a) S.S = $\{2\}$

b) S.S = $\{x: x \in Q , x \leq 4\}$

c) S.S = $\{3\}$

d) S.S = $\{x: x \in Q , x \leq 3\}$

e) S.S = {20} in N

f) S.S = $\{x: x \in 0, x \geq -2\}$

(5)

a) Ahmed = 3x Hany = x

3x - x = 10

2x = 10 → x = 10 ÷ 2 = 5

Hany = 5 Ahmed = 15

b) w L = 2 w

A = L × w = 2w × w = 24.5

$2w^2 = 24.5$

$w^2 = 24.5 \div 2 = 12.25$

$w = \sqrt{12.25} = \sqrt{\frac{1225}{100}} = \frac{35}{10} = 3.5$ cm

L = 3.5 × 2 = 7 cm

c) $\frac{3}{4}A = 1\frac{11}{64}$ → $A = \frac{75}{64} \times \frac{4}{3} = \frac{25}{16}$

A = s. × s. = $\frac{25}{16}$

s. = $\sqrt{\frac{25}{16}} = \frac{5}{4} = 1\frac{1}{4}$ cm

(6)

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

b) 1) $\frac{4}{12} = \frac{1}{3}$ 2) $\frac{7}{12}$ 3) zero

c) 1) $\frac{5}{25} = \frac{1}{5}$ 2) $\frac{6}{25}$ 3) $\frac{5}{25} = \frac{1}{5}$

(7) p. of white balls = $1 - \frac{1}{2} = \frac{1}{2}$

n(s) = n (A) ÷ p = $5 \div \frac{1}{2}$ = 10 balls

red balls = 10 - 5 = 5 balls

(8)

$1^{st} = x$ $\qquad$ $2^{nd} = 2x$

$x + 2x = 108$

$3x = 108 \rightarrow x = 108 \div 3$

$x = 36$

$1^{st} = 36$ $\qquad$ $2^{nd} = 2 \times 36 = 72$

(9)

$XY = \sqrt{25} = 5$

$XZ = 5 \div 2 = 2.5$