Tutorial Letter 201/1/2018

Basic Numeracy

BNU1501

Semester 1

Department of Decision Sciences

Important information:
Solutions to Assignment 01

Bar code

ASSIGNMENT 01: Solutions

Answers

1.	[4]	6.	[3]	11.	[1]	16.	[3]	21.	[3]	26.	[2]
2.	[2]	7.	[4]	12.	[2]	17.	[1]	22.	[4]	27.	[3]
3.	[3]	8.	[3]	13.	[4]	18.	[4]	23.	[1]	28.	[1]
4.	[1]	9.	[2]	14.	[3]	19.	[3]	24.	[1]	29.	[4]
5.	[2]	10.	[1]	15.	[2]	20.	[2]	25.	[2]	30.	[3]

Explanations

Question 1

To round 10,99458 off to three decimal digits, we look at the fourth decimal digit. In this case the fourth decimal digit is the number 5, which is **not less than 5**. Therefore, the digit in front of it, namely 4, will increase by one in the rounding.

Thus 10,99458 = 10,995 rounded to three decimal digits.

The correct option is [4].

Question 2

To round 10,99458 off to two decimal digits, we look at the third decimal digit. In this case it is the number 4, which is **less than 5**. The digit in front of it, namely 9, will therefore not be influenced in the rounding.

Thus 10,99458 = 10,99 rounded to two decimal digits.

The correct option is [2].

Question 3

To round 10,99458 off to the first decimal digit, we look at the second decimal digit. In this case it is the number 9, which **is not less than 5**. Therefore the decimal digit in front of it, namely 9, will increase by one in the rounding.

Thus 10,99458 = 11,0 rounded to one decimal digit.

The correct option is [3].

Question 4

The ice cream costs x rand, therefore, the chocolate costs half of x rand, that is $\frac{x}{2}$ rand.

The correct option is [1].

Question 5

From the information given and deduced in question 4 above, we know that John will have to pay

$$\left(x + \frac{x}{2}\right)$$

rand for the chocolate and ice cream.

The correct option is [2].

Question 6

John will get (50 − the cost of the chocolate and ice cream) rand change.

That is

$$50 - \left(x + \frac{x}{2}\right) = \left(50 - x - \frac{x}{2}\right)$$

rand change.

The correct option is [3].

Question 7

The longer piece is p metres. Therefore, the shorter piece should be $(p - 8)$ metres.

The correct option is [4].

Question 8

John travels x km in 3 hours (given).

Therefore he travels

$\frac{x}{3}$ km in **one** hour and

$\frac{x}{3} \times \frac{5}{1} = \frac{5x}{3}$ km in 5 hours.

The correct option is [3].

Question 9

For 1 packet he needs 100 g of butter, therefore

for 2 packets he needs (2×100) g of butter, and

for x packets he needs $(x \times 100)$ g of butter.

That is $100x$ gram, which is

$$\frac{100x}{1\,000} \text{ kg} = 0{,}1x \text{ kg of butter.}$$

The correct option is [2].

Question 10

$$\begin{aligned} & xy + 3x^2y + 1 + 2xy^2 + yx^2 + 2 + yx \\ = \; & (xy + yx) + \left(3x^2y + yx^2\right) + 2xy^2 + (1 + 2) \\ = \; & (xy + xy) + \left(3x^2y + x^2y\right) + 2xy^2 + 3 \\ = \; & 2xy + 4x^2y + 2xy^2 + 3 \end{aligned}$$

The correct option is [1].

Question 11

$$\begin{aligned} & \sqrt{36a^{16}b^{36}} \\ = & \sqrt{(6a^8b^{18}) \times (6a^8b^{18})} \\ = & 6a^8b^{18} \end{aligned}$$

The correct option is [1].

Question 12

$$\begin{aligned} & 2y^2(x-1) - 8x(y^2+1) \\ = & 2y^2x - 2y^2 - 8xy^2 - 8x \\ = & 2xy^2 - 2y^2 - 8xy^2 - 8x \\ = & 2xy^2 - 8xy^2 - 2y^2 - 8x \\ = & -6xy^2 - 2y^2 - 8x \end{aligned}$$

The correct option is [2].

Question 13

$$\begin{aligned} & (3ab^2c^3)^2 \div (ab) \times (2a^3b^4) \\ = & \frac{9a^2b^4c^6}{ab} \times \frac{2a^3b^4}{1} \\ = & 9ab^3c^6 \times 2a^3b^4 \\ = & 18a^4b^7c^6 \end{aligned}$$

The correct option is [4].

Question 14

To write an improper fraction like $\frac{101}{10}$ as an ordinary fraction or a mixed fraction, we do long division to find the integer and remainder.

$$\begin{array}{r} 10 \\ 10\overline{)101} \\ \underline{10} \\ 01 \\ \underline{0} \\ 1 \end{array}$$

Thus, $\frac{101}{10} = 10\frac{1}{10}$.

The correct option is [3].

Question 15

$$\begin{aligned} 8\frac{2}{3} &= \frac{8}{1}+\frac{2}{3} \\ &= \frac{8\times 3}{1\times 3}+\frac{2}{3} \\ &= \frac{24}{3}+\frac{2}{3} \\ &= \frac{26}{3} \end{aligned}$$

Alternative method:

$$\begin{aligned} 8\frac{2}{3} &= \frac{8\times 3+2}{3} \\ &= \frac{24+2}{3} \\ &= \frac{26}{3} \end{aligned}$$

The correct option is [2].

Question 16

Note that the LCM (lowest common multiple) must contain **all** the prime/smallest factors **of each** of the three numbers:

$$\begin{aligned} 4 &= 2\times 2 \\ 16 &= 2\times 2\times 2\times 2 \\ 14 &= 2\times 7 \end{aligned}$$

Thus, the LCM (lowest common multiple) is

$$\begin{aligned} & (2\times 2)\times 2\times 2\times 7 \\ = \ & 112 \end{aligned}$$

Note: To get the LCM, you first write down the factors of 4, which is 2×2. Then you take the next number, which is 16. 16 has two extra 2s as factors. Therefore you add them as factors to get $2\times 2\times 2\times 2$ as the LCM of 2 and 16. Next, you look at the factors of 14, which is 2×7. The only factor which is not yet in the LCM is 7, therefore you add it as a factor of the LCM to get $2\times 2\times 2\times 2\times 7$ as the LCM of the numbers 4, 16 and 14. The LCM of 4, 16 and 14 is thus 112.

(Please turn over for an alternative method.)

Alternative method:

The multiples of 4 are: 4; 8; 12; 16; 20; 24; 28; 32; 36; 40; 44; 48; 52; 56; 60; 64; 68; 72; 76; 80; 84; 88; 92; 96; 100; 104; 108; (112); 116 ...

The multiples of 16 are: 16; 32; 48; 64; 80; 96; (112); 128; 144 ...

The multiples of 14 are: 14; 28; 42; 56; 70; 84; 98; (112); 126; 140 ...

Thus, the **lowest common multiple** of the numbers 4, 16 and 14 is 112.

The correct option is [3].

Question 17

Note again that the LCM must contain all the factors of each algebraic term. Now,

$$\begin{aligned} x^2y^2 &= x \times x \times y \times y \\ x^2y^3 &= x \times x \times y \times y \times y \text{ and} \\ x^3y^2 &= x \times x \times x \times y \times y \end{aligned}$$

Therefore, the LCM is

$$\begin{aligned} & (x \times x \times y \times y) \times y \times x \\ = \; & x \times x \times x \times y \times y \times y \qquad \text{(Rearranged)} \\ = \; & x^3y^3 \end{aligned}$$

The correct option is [1].

Question 18

$$\begin{aligned} 8ab &= 2 \times 2 \times 2 \times a \times b \\ 14a^3b^2 &= 2 \times 7 \times a \times a \times a \times b \times b \\ 12a^2b^3 &= 2 \times 2 \times 3 \times a \times a \times b \times b \times b \end{aligned}$$

The LCM of the three terms is thus

$$\begin{aligned} = \; & 2 \times 2 \times 2 \times 7 \times 3 \times a \times b \times a \times a \times b \times b \qquad \text{(Rearranged)} \\ = \; & 168a^3b^3 \end{aligned}$$

The correct option is [4].

Question 19

Note that we can only add or subtract fractions if they have the same denominators. To get the fractions in question all on the same denominators, we need the LCM of the fraction's denominators. In this question, the three denominators are 3, 7 and 2. The LCM of 3, 7 and 2 is 42. Therefore, we have to multiply the

denominator 3 of the fraction $\frac{2}{3}$ by 14 to get it 42. But we must keep the fraction's value $\frac{2}{3}$, therefore we should also multiply the numerator 2 of the fraction $\frac{2}{3}$ by 14 to keep the fraction's simplified value $\frac{2}{3}$.

To get the denominator 7 of the fraction $\frac{3}{7}$ to 42, we have to multiply it by 6, and therefore we must also multiply the numerator 3 by 6.

Do the same with the fraction $\frac{1}{2}$.

$$\begin{aligned}
& \frac{2}{3} - \frac{3}{7} - \frac{1}{2} \\
= \; & \frac{2 \times 14}{3 \times 14} + \frac{3 \times 6}{7 \times 6} - \frac{1 \times 21}{2 \times 21} \ldots \text{(The LCM of 3, 7 and 2 is 42)} \\
= \; & \frac{28}{42} + \frac{18}{42} - \frac{21}{42} \\
= \; & \frac{28 + 18 - 21}{42} \\
= \; & \frac{25}{42}
\end{aligned}$$

The correct option is [3].

Question 20

$$\begin{aligned}
& \frac{3}{4} \div \frac{1}{6} \times \frac{5}{4} \\
= \; & \frac{3}{\cancel{4}^{2}} \times \frac{\cancel{6}^{3}}{1} \times \frac{5}{4} \\
= \; & \frac{3 \times 3 \times 5}{2 \times 1 \times 4} \\
= \; & \frac{45}{8} \\
= \; & 5\frac{5}{8}
\end{aligned}$$

The correct option is [2].

Question 21

$$\begin{aligned}
& \frac{3}{4}+\frac{8}{9}\div\frac{4}{3} \\
= \; & \frac{3}{4}+\frac{\cancel{8}^{2}}{\cancel{9}^{3}}\times\frac{\cancel{3}^{1}}{\cancel{4}^{1}} \\
= \; & \frac{3}{4}+\frac{2\times 1}{3\times 1} \\
= \; & \frac{3}{4}+\frac{2}{3} \quad \text{(The LCM of 4 and 3 is 12.)} \\
= \; & \frac{3\times 3}{4\times 3}+\frac{2\times 4}{3\times 4} \\
= \; & \frac{9}{12}+\frac{8}{12} \\
= \; & \frac{17}{12} \\
= \; & 1\frac{5}{12}
\end{aligned}$$

The correct option is [3].

Question 22

$$\begin{aligned}
& \frac{2}{a}+\frac{3}{ab} \quad \text{(The LCM of } a \text{ and } ab \text{ is } ab.\text{)} \\
= \; & \frac{2\times b}{ab}+\frac{3}{ab} \\
= \; & \frac{2b+3}{ab}
\end{aligned}$$

The correct option is [4].

Question 23

To write $\frac{3}{8}$ as decimal number, rounded to three decimal digits, we have to know the fourth decimal digit. We do it with long division as follows:

$$\begin{array}{r}
0{,}375 \\
8\overline{)\,3{,}0000} \\
\underline{2\,4} \\
60 \\
\underline{56} \\
40 \\
\underline{40} \\
\cdot\cdot
\end{array}$$

Thus, $3\frac{3}{8} = 0{,}375$.

The correct option is [1].

Question 24

To write 0,725 as an ordinary fraction, we write it as

$$\begin{aligned} 0{,}725 &= \tfrac{725}{1\,000} && \text{(Divide the numerator and denominator by 5 to simplify the fraction.)} \\ &= \tfrac{145}{200} && \text{(Divide with 5 in numerator and denominator again.)} \\ &= \tfrac{29}{40} && \text{(Simplest form.)} \end{aligned}$$

The correct option is [1].

Question 25

To write $3\frac{5}{9}$ as a decimal number, rounded to the third decimal digit, we do the following:

$$\begin{array}{r} 0{,}5555 \\ 9\overline{)\,5{,}0000} \\ \underline{4\,5} \\ 50 \\ \underline{45} \\ 50 \\ \underline{45} \\ 45 \\ \underline{50} \\ 50\ldots \end{array}$$

Thus, $3\frac{5}{9} = 3{,}556$ rounded to three decimal digits.

The correct option is [2].

Question 26

To write 2,752 as an ordinary mixed fraction, we write it as

$$\begin{aligned} 2{,}752 &= 2\tfrac{752}{1\,000} \\ &= 2\tfrac{376}{500} && \text{(Numerator and denominator are divided by 2 to simplify the fraction.)} \\ &= 2\tfrac{188}{250} && \text{(Numerator and denominator are divided by 2 again to simplify the fraction.)} \\ &= 2\tfrac{94}{125} && \text{(Numerator and denominator are divided by 2 again to simplify the fraction.)} \end{aligned}$$

The correct option is [2].

Question 27

$$\begin{aligned} & 2 \cdot 3^2 \cdot 2^3 + 3^3 \\ = \ & 2(9)(8) + 27 && \text{(Correct order of operations applied.)} \\ = \ & 144 + 27 \\ = \ & 171 \end{aligned}$$

The correct option is [3].

Question 28

$$\begin{array}{ccccc} & \text{The number of female teachers} & : & \text{the number of male teachers} \\ = & 4 & : & 3 \end{array}$$

Therefore, 3 out of every 7 teachers are male.

That means $\frac{3}{7}$ of the teachers are 12 teachers.

Therefore, $\frac{1}{7}$ of the teachers are $\frac{12}{3} = 4$ teachers, and

$\frac{7}{7}$ of the teachers are $4 \times 7 = 28$ teachers.

The correct option is [1].

Question 29

The R250 000 should be shared proportionally as follows:

Anna : Linda : Sophia : Mary = 4 : 1 : 3 : 2

If we divide the R250 000 into (4 + 1 + 3 + 2) = 10 parts,

Anna should get $\frac{4}{10}$ of R250 000,

Linda should get $\frac{1}{10}$ of R250 000,

Sophia should get $\frac{3}{10}$ of R250 000, and

Mary should get $\frac{2}{10}$ of R250 000.

So, Sophia will get

$$\begin{aligned} & \text{R}\left(\frac{3}{10} \times \frac{250\,000}{1}\right) \\ = \ & \text{R}75\,000 \end{aligned}$$

The correct option is [4].

Question 30

Domestic supply / Usage in kWh	Rand per kWh (kilowatt hour)
0 - 100 kWh	1,3032
101 - 400 kWh	1,5250
401 - 650 kWh	1,6610
More than 650 kWh	1,79

The first 100 kWh will cost	R(100 × 1,3032)	=	R130,32
The next 300 kWh will cost	R(300 × 1,5250)	=	R457,50
The next 200 kWh will cost	R(200 × 1,6610)	=	R332,20
The total electricity bill will be			R920,02

The correct option is [3].

END OF SOLUTIONS OF ASSIGNMENT 01, SEMESTER 1