

A.2 Assignment 02

ASSIGNMENT 02
Study material: Book 2
Fixed closing date: 24 April 2017
Unique Assignment Number: 594739

Important:

- This is a multiple choice assignment which may be answered on a **MARK READING SHEET** and then posted to the university, or may be completed and submitted online using myUnisa. Before answering the assignment please read the instructions in the Unisa brochure: *my STUDIES @Unisa*, especially the section on completing and submitting mark-reading sheets and the section on submitting multiple-choice assignments via myUnisa.
- Always keep your rough detailed working so that you can compare your solutions with those that will be sent to you. **Also keep a copy of your answers/options. You may need it later.**
- 5 marks will be given for every correct answer.

In each of the following questions small letters of the alphabet (i.e. a , b , x , etc.) represent real numbers.

Question 1

Assume $x \in \mathbb{R}$ and $-1 < x < 0$.

Which of the following is/are true?

A. $-2(x - 1) = 2 - 2x$

B. $-\frac{1}{x} < 0$

C. $\frac{1}{x} < -1$

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|-----------------|---------------|-----------|
| 1. Only A | 2. Only B | 3. Only C |
| 4. Only A and C | 5. A, B and C | |

Question 2

Which of the following is/are true?

A. If $x = a - 1$ and $y = 2b$ then $x^2 - 1 + xy = a^2 - 2a - 2b + 2ab$.

B. $\sqrt{a + b}$ is defined for $-b \leq a$.

C. $\frac{a^2 - b^2}{a + b} = a - b$

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Question 3

If the expression

$$\frac{3(a+2)}{a^2-1} \div \frac{a^2-4}{2a^2+2a}$$

is simplified, we obtain

1. $\frac{6a}{(a-1)(a-2)}$
2. $\frac{3(a-2)(a+2)^2}{2a(a-1)(a+1)^2}$
3. $6a(a+1)(a+2)$
4. $\frac{(a-1)(a-2)}{6a}$
5. $\frac{2a(a-1)(a+1)^2}{3(a-2)(a+2)^2}$

Question 4

Which of the following is/are true?

- A. In the expression $a^2 - 2ab - 3ab^2 + 4b^3$ there are four terms.
- B. x and $\frac{1}{x}$ are like terms.
- C. $\frac{2p^2 - 2p + 1}{2p - p^{\frac{1}{2}}}$ is a rational expression.
1. Only A 2. Only B 3. Only C
4. Only A and B 5. None of them

Question 5

Which of the following statements is/are true?

- A. $\frac{a^3 + 8b^3}{3a - b} \div \frac{a + 2b}{3a^2 + 5ab - 2b^2} = (a + 2b)(a - 2b)^2$
- B. $\frac{a}{a+b} + \frac{b}{b+c} + \frac{c}{c+d} = \frac{1}{b} + \frac{1}{c} + \frac{1}{d}$
- C. By completing the square the expression $\frac{1}{3}x^2 + 2x - 1$ can be written as $\frac{1}{3}(x+3)^2 - 4$.
1. Only A 2. Only B 3. Only C
4. Only B and C 5. A, B and C

Question 6

The solution set of $x + 2 < 2x - 3 \leq x + 1$ is

1. $\{x \in \mathbb{R} : x \leq 4\}$
2. ϕ
3. $\{x \in \mathbb{R} : x \leq 4\} \cup \{x \in \mathbb{R} : x > 5\}$
4. $\{x \in \mathbb{R} : x > 5\}$
5. $\{x \in \mathbb{R} : 4 \leq x < 5\}$

Question 7

Which of the following is/are true?

- A. The solution of $(2x + 1)(x + 1) = 1$ is $x = -\frac{1}{2}$ or $x = -1$.
 B. The solution set of $\sqrt{(x - 1)^2} + 2x = 0$ is $\{-1, \frac{1}{3}\}$.
 C. The equation $6x^2 - 5x + 5 = 0$ has no real roots.

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Question 8

Which of the following is/are true?

- A. $x^2 < a \Leftrightarrow x \in (-\sqrt{a}, \sqrt{a})$
 B. $x^2 \geq a \Leftrightarrow x \leq -\sqrt{a}$ or $x \geq \sqrt{a}$
 C. $x \in (-\infty, -\sqrt{a}) \cup (\sqrt{a}, \infty) \Leftrightarrow x^2 \geq a$

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Question 9

Suppose $\frac{1}{v} - \frac{1}{u} = \frac{m-1}{r}$.

Which of the following is/are true?

- A. The equation is defined provided $v \neq 0$, $u \neq 0$ and $r \neq 0$.

B. $v = \frac{r}{m-1} + u$

- C. If $u < v$ then $\frac{m-1}{r} > 0$.

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|-----------------|-----------------|-----------|
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Question 10

Suppose it takes Pete x hours to paint a room. It takes Gerry 10 minutes longer than Pete to paint the room. If Thabo paints twice as fast as Gerry he will take 3 hours to paint the room. Which of the following equations describe how long it will take Pete to paint the room?

1. $\frac{1}{2}(x + 10) = 3$
2. $2\left(x + \frac{1}{6}\right) = 3$
3. $x + \frac{x}{6} = 6$
4. $\frac{1}{2}\left(x + \frac{1}{6}\right) = 3$
5. $2(x + 10) = 3$

Question 11

A plumber charges a call-out fee of R90, plus R120 per hour to do a job. How many hours did he work if the spares needed cost R200 and the total bill was R840?

1. 7 hours
2. 4 hours and 35 minutes
3. $6\frac{1}{4}$ hours
4. 9 hours and 25 minutes
5. There is insufficient information to answer the question.

Question 12

Which of the following is/are true?

- A. Suppose the difference between two numbers a and b is 10, and $a > b$. If the product of the numbers is 24, then numbers a and b can be found by solving

$$\left. \begin{array}{l} a - b = 10 \\ ab = 24 \end{array} \right\}.$$

- B. The solution of the system

$$\left. \begin{array}{l} 2x - y = -1 \\ y^2 - x^2 = \frac{7}{4} \end{array} \right\}$$

is $x = \frac{1}{6}$ and $y = \frac{4}{3}$, **or** $x = -\frac{3}{2}$ and $y = -2$.

- C. The solution of the system

$$\left. \begin{array}{l} 2a - 3b = 2 \\ 2a + b = 3 \end{array} \right\}$$

is $a = \frac{13}{8}$, $b = -\frac{1}{4}$.

1. Only A
2. Only B
3. Only C
4. Only A and B
5. Only A and C

Question 13

Which of the following is/are true?

- A. $1, -1, 1, -1, \dots$ is a geometric sequence.
- B. The first six elements in the set of consecutive triangular numbers form an arithmetic sequence.
- C. The elements in any set of consecutive natural numbers form an arithmetic sequence.

- 1. Only A
- 2. Only B
- 3. Only C
- 4. Only A and B
- 5. Only A and C

Question 14

The first three terms of an arithmetic sequence are 3, 8 and 13. Which of the following is/are true?

- A. The 10th term of the sequence is 53.
- B. There are four prime numbers in the first 8 terms of the sequence.
- C. The first term that will exceed 148 is the 31st term.

- 1. Only A
- 2. Only B
- 3. Only C
- 4. Only A and B
- 5. Only B and C

Question 15

Which of the following is/are true?

- A. The sixth term of the geometric sequence
 $-0,3; \quad 0,09; \quad -0,0027; \quad \dots$
is $-0,00729$.
- B. If the fourth term of a geometric sequence is $\frac{2}{3}$ and the ninth term is $\frac{64}{729}$, the first term is $\frac{9}{4}$.
- C. Suppose x , $x - 1$ and $x - 4$ are consecutive terms in a geometric sequence. To find x , and hence the other given terms in the sequence, we solve the equation

$$x(x - 1) = x - 4.$$

- 1. Only A
- 2. Only B
- 3. Only C
- 4. Only A and B
- 5. A, B and C

Question 16

Which of the following is/are true?

- A. Suppose $a \in \mathbb{R}$, $n \in \mathbb{N}$ and $n \geq 2$. If $\sqrt[n]{a}$ exists, then $a^{\frac{1}{n}} = \sqrt[n]{a}$.
- B. If $a \in \mathbb{R}$, $n \in \mathbb{N}$, $n \geq 2$ and n is even, then $\sqrt[n]{a}$ only exists if $a \geq 0$.
- C. If $a \in \mathbb{R}$, $n \in \mathbb{Z}$, $n > 2$ and n is odd, then $\sqrt[n]{a}$ exists for all a .

- 1. Only A
- 2. Only B
- 3. Only C
- 4. Only A and B
- 5. A, B and C

Question 17

Which of the following statements is/are true?

A. $(2x + 3y)^2 = (2x)^2 + (3y)^2$

B. $(-a)^{-x} = a^x$

C. $a^{-\frac{1}{2}} + b^{-\frac{1}{2}} = \frac{\sqrt{a} + \sqrt{b}}{\sqrt{ab}}$

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Question 18

The solution of $2^{2x} - 3 \cdot 2^x - 4 = 0$ is

1. $x = 2$
2. $x = -1$ or $x = 4$
3. $x = 0$ or $x = 2$
4. $x = 1$ or $x = -4$
5. $x = 0$

Question 19

Which of the following is/are true?

A. $(0, 01)^{-x} = 10^{2x}$

B. The 5th term of a geometric sequence is 36 and the 10th term is 1 152. The common ratio r is thus 2 and the first term is $\frac{9}{4}$.

C. The solution of

$$\log_2(x - 3) + \log_2(x - 4) - 1 = 0$$

is $x = 2$ or $x = 5$.

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|-----------------|-----------------|-----------|
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Question 20

Which of the following is/are true?

- A. Suppose a factory has machinery which depreciates at 10% per year. The machinery was worth R50 000 at the beginning of 2004. By the end of 2007 it will be worth R36 450.
- B. A population's growth/decay is described by means of the formula

$$N = N_0 e^{kt}$$

where $k = -0,54$. The population is thus decreasing.

- C. Suppose an initial sum of R20 000 is invested at an annual rate of 6%, and interest is compounded twice per year. If the investor wants to save until the amount has increased to R24 000, she will need to save the money for $3\frac{1}{2}$ years.

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|-----------------|-----------------|-----------|
| 1. Only A | 2. Only B | 3. Only C |
| 4. Only A and B | 5. Only B and C | |

TOTAL: [100]