



## **Education and Sport Development**

Department of Education and Sport Development  
Departement van Onderwys en Sportontwikkeling  
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**NORTH WEST PROVINCE**

### **PROVINCIAL ASSESSMEN**

**GRADE 10**

**TECHNICAL MATHEMATICS P1**

**JUNE 2019**

**MARKS: 75**

**TIME: 1 hour 30 min**

**This question paper consists of 4 pages.**

**INSTRUCTIONS AND INFORMATION**

1. Answer all the questions.
2. Number your answers as on the question paper.
3. Show ALL calculations, diagrams, graphs et cetera that were used to determine answers.
4. Full marks will not necessarily be awarded for answers only.
5. You are allowed an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off all answers to TWO decimal places, unless stated otherwise.
7. Write neatly and legibly.

**QUESTION 1**

1.1 Given:  $\sqrt{27}; \sqrt[3]{-27}; \sqrt{-27}$

From the list above, without the use of a calculator, write down:

1.1.1 An irrational number (1)

1.1.2 A non-real number (1)

1.1.3 An integers (1)

1.2 Convert  $0,2\dot{3}$  to a common fraction. Show all your calculations. (3)1.3 Between which two Integers does  $\sqrt{27}$  lie? (2)

1.4 Convert 55 to a binary number. Show all calculations. (2)

1.5 Given:  $10110 \times 101$ .

1.5.1 Determine the binary value of the above. Show all your calculations. (3)

1.5.2 Hence, write 1101110 in decimal form. (2)

1.6 If  $a = 2$  and  $b = 3$ , then  $A = b^{a-1} + a^{b+1}$ , determine the value of A. (3)1.7 A micro second is  $1 \times 10^{-6}$  of a second. Write this number as an ordinary number. (1)**[19]****QUESTION 2**

2.1 Simplify the following:

2.1.1  $(5x-1)(x+2)-2$  (2)

2.1.2  $-7x(x-4)^2$  (3)

2.2 What must be added to  $x^2 - x + 9$  to get  $(x+3)^2$ ? (3)

2.3 Factorise the following fully:

2.3.1  $4x^3 - 12x^2 + 16x$  (3)

2.3.2  $a^3 - 3a^2 - 4a + 12$  (4)

2.4 Factorise  $\frac{x^2 - x - 12}{x^2 - 9} \div \frac{2x - 8}{3x - 9}$  and then simplify. (5)

2.5 Simplify  $\sqrt{(x^2 - 2xy + y^2)}$  by factorisation. (2)

[22]

**QUESTION 3**

Simplify the following fully. Leave your answers in positive exponents where applicable:

3.1  $2(a^2b^3)^{-2}$  (3)

3.2  $\frac{5a(2a^3)^2}{-25a^4 + 5a^4}$  (3)

3.3  $\sqrt[3]{216x^3} - 16x$  (2)

3.4  $\frac{8^{x+1}}{4^{2x-2}}$  (4)

[12]

**QUESTION 4**

4.1 Solve for  $x$  in each of the following:

4.1.1  $5 \cdot 2^x = 160$  (3)

4.1.2  $x^2 - 4x = 0$  (2)

4.1.3  $\frac{x+7}{4} = \frac{1}{2}$  (2)

4.1.4  $(x+2)(x-3) = 6$  (4)

4.2 Given the inequality:  $-3 < 2x + 5 \leq 7$ .

4.2.1 Solve the inequality above. (4)

4.2.2 Hence, if  $x \in (-4; 1]$ , represent the solution on a number line. (2)

4.3 If  $V = u + at$ , change the subject of the formula to  $a$ . (2)

4.4 Solve for  $x$  and  $y$  simultaneously in the following two equations.

$x + y = 7$  and  $2x + y = 11$  (3)

[22]

**TOTAL: 75**