



# HOËRSKOOL JOHAN JURGENS

## MATHEMATICS

**GRADE 10: CYCLE TEST**

**FEB 2026 TERM 1**

**TIME: 1 HOUR**

**TOTAL MARKS: 50**

**EXAMINER: Z CRONJE**

**MODERATOR: M BOTHA**

### **Instructions to Learners:**

1. Please write your name, surname, grade, and date on the folio paper.
2. Read all questions carefully and think before your answer.
3. Clearly show ALL calculations, diagrams, graphs, et cetera that you have used in determining the answers.
4. An approved scientific calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
5. If necessary, answers should be rounded off to TWO decimal places, unless stated otherwise.
6. Diagrams are NOT necessarily drawn to scale.
7. Number the answers correctly according to the numbering system used in this question paper.
8. Write with a black or blue pen and cross it out with a pencil if you make a mistake.
9. Please write neatly and legibly.
10. Good luck!!!!

**This paper consists of 4 pages and 4 questions, including an information sheet.**

### QUESTION 1

1.1 Use the following symbols to classify the following numbers:  
 $N, Q, Q', Z$

1.1.1  $-0,35$  (1)

1.1.2  $\pi$  (1)

1.1.3  $-\sqrt{\frac{64}{4}}$  (1)

1.1.4  $\frac{128}{8}$  (1)

1.2 Determine between which two numbers do the following surd lie? (2)

$$\sqrt{65}$$

1.3 If  $\frac{a+b}{4} = 1$  and  $-b + a = 2$ , determine the value of  $a^2 - b^2$ . (4)

**[10]**

### QUESTION 2

2.1 Simplify the expressions below:

2.1.1  $(a + b)(a^2 - 2ab + b^2)$  (2)

2.1.2  $\left(n - \frac{1}{n}\right)\left(n^2 + 1 - \frac{1}{n^2}\right)$  (3)

2.2 Factorise the expressions below:

2.2.1  $6ab - 9ac - 14b + 21c$  (2)

2.2.2  $t^3 - 9t$  (2)

2.2.3  $x^2 - 5x - 24$  (2)

2.2.4  $(x^2 - x - 12)^2 - (x^2 + 7x + 12)^2$  (4)

**[15]**

### QUESTION 3

3.1 Simplify the exponential expressions below:

$$3.1.1 \quad \left( \frac{3a^2}{a^{-2}b^3} \right)^{-2} \quad (2)$$

$$3.1.2 \quad \frac{2^{2n} \cdot 3^{-n} \cdot 4^n}{27^{-n} \cdot 8^n} \quad (3)$$

$$3.1.3 \quad \frac{5^{x+1} - 5^x}{2 \cdot 5^x} \quad (2)$$

3.2 Solve the exponential equations below:

$$3.2.1 \quad 3^{2x-2} = 64 \quad (2)$$

$$3.2.2 \quad 5x^3 - 135 = 0 \quad (2)$$

$$3.2.3 \quad 2^{2x} - 4 \cdot 2^x + 3 = 0 \quad (4)$$

**[15]**

### QUESTION 4

Solve for  $x$ :

$$4.1 \quad (2x + 3)(x - 2) = 3x \quad (3)$$

$$4.2 \quad \sqrt{x+1} = 3 \quad (2)$$

$$4.3 \quad -6 \leq 2x + 3 < 2 \quad (2)$$

$$4.4 \quad \frac{2x - 4}{5} = \frac{x - 1}{3} \quad (3)$$

**[10]**

**TOTAL: [50]**

INFORMATION SHEET

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$A = P(1 + ni)$$

$$A = P(1 - ni)$$

$$A = P(1 + i)^n$$

$$A = P(1 - i)^n$$

$$T_n = a + (n - 1)d$$

$$S_n = \frac{n}{2} [2a + (n - 1)d]$$

$$T_n = ar^{n-1}$$

$$S_n = \frac{a(r^n - 1)}{r - 1};$$

$r \neq 1$

$$S_\infty = \frac{a}{1 - r}; -1 < r < 1$$

$$F = \frac{x[(1+i)^n - 1]}{i}$$

$$P = \frac{x[1 - (1+i)^{-n}]}{i}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$y = mx + c$$

$$y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \tan \theta$$

$$(x - a)^2 + (y - b)^2 = r^2$$

$$\text{In } \triangle ABC: \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\text{In } \triangle ABC: a^2 = b^2 + c^2 - 2bc \cdot \cos A$$

$$\text{Area } \triangle ABC = \frac{1}{2} ab \cdot \sin C$$

$$\sin(\alpha + \beta) = \sin \alpha \cdot \cos \beta + \cos \alpha \cdot \sin \beta$$

$$\sin(\alpha - \beta) = \sin \alpha \cdot \cos \beta - \cos \alpha \cdot \sin \beta$$

$$\cos(\alpha + \beta) = \cos \alpha \cdot \cos \beta - \sin \alpha \cdot \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cdot \cos \beta + \sin \alpha \cdot \sin \beta$$

$$\cos^2 \alpha - \sin^2 \alpha$$

$$\cos 2\alpha = 1 - 2\sin^2 \alpha$$

$$\sin 2\alpha = 2\sin \alpha \cdot \cos \alpha$$

$$2\cos^2 \alpha - 1$$

$$\bar{x} = \frac{\Sigma x}{n}$$

$$\sigma^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$\hat{y} = a + bx$$

$$b = \frac{\Sigma (x - \bar{x})(y - \bar{y})}{\Sigma (x - \bar{x})^2}$$