norWEST CHRISTIAN COLLEGE
STRENGTH OF PURPOSE

Name: _____

Teacher's name: _____

Year 10 2024

MATHEMATICS STANDARD

TASK 1

General Instructions

- No reading time given
- Working time – 55 minutes
- Show all necessary working / units
- Answer Multiple Choice questions on the Answer Sheet provided
- Board approved calculators are allowed
- Exam guidelines
  - ✓ Use black pen for your working
  - ✓ Use a pencil and ruler for diagrams
  - ✓ Marks may be lost for poorly organised written work.

Total Marks – 50

Section 1 CORE – 25 marks

Allow 25 mins

Section 2 STANDARD – 25 marks

Allow 30 mins

Questions	Algebraic Expressions and Indices	Equations, Formulas and Inequalities	Total
Section I CORE			/25
Qs 1-5, 8-10	/15		
Qs 6-7, 11-13		/10	
Section II STANDARD			/25
Qs 1-5, 8-12	/16		
Qs 6-7, 13-15		/9	
Total	/31	/19	/50

Section I – CORE (25 marks)

Attempt Questions 1 to 11. Allow approximately 25 minutes for this section.
Multiple Choice Questions – ANSWER ON THE MULTIPLE CHOICE ANSWER SHEET

1. The expression $5x + 3y + 2x - y$ simplifies to
   a) $5xy$ b) $6xy$ c) $7x - 2y$ d) $7x + 2y$

2. The expression $(3x)^0 + 2y^0$ is equal to:
   a) 0 b) 2 c) 3 d) 5

3. The expression $(2x^3)^2$ is equal to:
   a) $4x^5$ b) $4x^6$ c) $64x^5$ d) $64x^6$

4. The expression $-4x(2 - 3y)$ can be expanded into:
   a) $-4x - 12xy$
   b) $-8x + 12xy$
   c) $-8x - 12xy$
   d) $-2x + 12xy$

5. When $\frac{3(x+4)}{9(x+4)}$ is simplified by cancelling common factors, the answer is:
   a) 3
   b) $\frac{1}{3}$
   c) $\frac{(x+4)}{3}$
   d) $\frac{1}{3(x+4)}$

6. Solve: $\frac{x+5}{3} = -4$
   a) $x = -12$
   b) $x = 12$
   c) $x = -17$
   d) $x = 17$

7. When $2(a + 3) = 10$, the value of a is:
   a) 2 b) 5 c) 7 d) 8

Short Answer Questions

Answer the questions in the spaces provided. Your responses should include relevant mathematical reasoning and/or calculations. Marks **CANNOT** be awarded for poorly organised written work.

8. By using index laws, simplify the following algebraic expressions.

(a) $m^6 \div m^3$ (1 mark)

m^3

(b) $3m^4 \times 7m^5$ (1 mark)

$21m^9$

(c) $(c^2d^3)^5$ (2 marks)

$c^{10}d^{15}$

(d) $(5x^3)^0$ (1 mark)

1

9. Complete the following:

a) Expand: $-4(x+3)$ (1 mark)

$-4x-12$

b) Expand and simplify: $5(x-3)-4(x+3)$ (2 marks)

$5x-15-4x-12$ (1)

$= x-27$ (1)

10. Factorise $10y - 40y^2$ (2 marks)

$10y(1 - 4y)$ fully factorised (2)
partially (1)

11. Solve the following equations for x.

(a) $\frac{x}{4} - 3 = 2$ (2 marks)

$\frac{x}{4} - 3 = 2$

$\frac{x}{4} = 5$

$x = 20$

(b) $6x = 2x + 12$ (2 marks)

$6x = 2x + 12$

$4x = 12$

$x = 3$

12. Given that $A = \frac{1}{2}xy$, find the value of A if $x = 7.5$ and $y = 24$ (2 marks)

$A = \frac{1}{2} \times 7.5 \times 24$

$= 90$

13. **Indicate which Line** of Working Out below is **incorrect** and **explain why** it's wrong. Then, solve the equation correctly.

Solve the equation: $2x - 5 = 16$

Working Out (Some steps are shown, but one is incorrect):

Line 1. $2x - 5 = 16$

$+5 \quad +5$ (Adding 5 to both sides)

Line 2. $7x = 21$

Line 3. $\frac{7x}{7} = \frac{21}{7}$ (Dividing both sides by 7)

Line 4. $x = 3$

(2 marks)

Line 2 is incorrect because when you add 5 to $2x - 5$ you get $2x$ not $7x$.

The student has incorrectly added 5 to the 2.

1 mark for choosing incorrect line

1 mark for valid reason

Section II - STANDARD (25 marks)
Attempt Questions 1 to 10. Allow approximately 25 minutes for this section.
Multiple Choice Questions – ANSWER ON THE MULTIPLE CHOICE ANSWER SHEET

1. The expression $\frac{6x^4 \times x^6}{2x^2}$ is equal to:

   a) $3x^5$ b) $3x^8$ c) $3x^{12}$ d) $3x^{22}$

2. $\frac{12c^2d}{24cd^2}$ simplifies to:

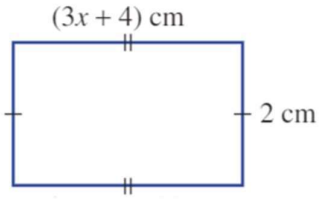
   a) $2cd$ b) $\frac{2c}{d}$ c) $\frac{2d}{c}$ d) $\frac{c}{2d}$

3. Given $y = mx + c$, find y when $m = 3$, $x = -2$ and $c = 5$

   a) $y = 11$ b) $y = 1$ c) $y = -1$ d) $y = -11$

4. An expression for the **area** of this shape could be:

   a) $6x + 12$
   b) $(3x + 4) \div 2$
   c) $2 + 3x + 4$
   d) $2(3x + 4)$



5. Expand $(k + 3)(k + 5)$.

   a) $k^2 + 15$
   b) $k^2 + 3k + 5$
   c) $k^2 + 8k + 15$
   d) $k^2 + 15k + 8$

6. To solve the equation $3(x + 4) - 5(x + 2) = 6$ you would first:

   a) divide both sides by 15
   b) subtract 6 from both sides
   c) expand the brackets
   d) multiply both sides by 6

7. The solution of $x + 5 < 4$ is:

   a) $x < 1$ b) $x > 1$ c) $x < -1$ d) $x > -1$

Short Answer Questions

Answer the questions in the spaces provided. Your responses should include relevant mathematical reasoning and/or calculations. Marks **CANNOT** be awarded for poorly organised written work.

8. Simplify:

a) $3x^0 - (2x)^0 + 5$ (1 mark)

$3 - 1 + 5 = 7$

b) $\left(\frac{3x}{y^3}\right)^2$ (2 marks)

$\frac{9x^2}{y^6}$

9. Simplify the following: $\frac{2x^2 \times 3x^4 y}{4 \times 24xy}$ (2 marks)

$\frac{x^5}{4}$

10. Explain why 245×10^7 is not written correctly in scientific notation and then correctly write it in scientific notation. (2 marks)

The number multiplying by the power of 10 has to be a number ≥ 1 and < 10. ① for Reason

2.45×10^9 ① for correct scientific notation

11. Expand and simplify: $5t(2t + 3) - 2(t - 2t)$ (2 marks)

$5t(2t+3) - 2(t-2t)$

$= 10t^2 + 15t - 2t + 4t$

$= 10t^2 + 17t$

12. Simplify: $\frac{3(b+3)}{420b} \times \frac{5}{b+3}$ (2 marks)

$\frac{3}{4b}$

13. Given the formula $V = \frac{1}{3}Ah$:

a) Find V when $A = 30$ and $h = 5$ (1 mark)

$V = \frac{1}{3} \times 30 \times 5$

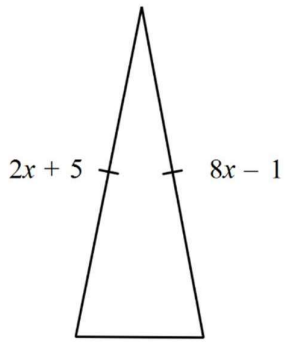
$= 50$

b) Find A when $V = 650$ and $h = 25$ (1 marks)

$650 = \frac{1}{3} \times A \times 25$

$A = 78$

14. Given the isosceles triangle, find the value of x: (2 marks)



$2x + 5 = 8x - 1$

$6x = 6$

$x = 1$

15. a) Solve the inequality: $2x - 5 < 3$ (2 marks)

$2x - 5 < 3$

$2x < 8$

$x < 4$

b) Graph the solution on the number line: (1 mark)

END OF EXAM

NAME: _____

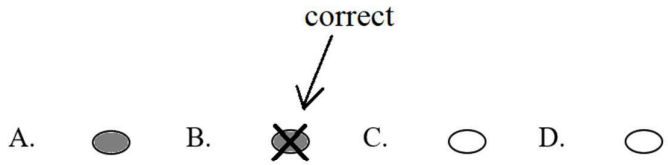
Multiple Choice Answer Sheet

Select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.

Sample: $2+4=$ A. 2 B. 6 C. 8 D. 9

- If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

- If you change your mind and have crossed out what you consider to be the correct answer, then indicate the correct answer by writing the word correct and drawing an arrow as follows.



SECTION I

1.	A.	⬭	B.	⬭	C.	⬭	D. ⬭
2.	A.	⬭	B.	⬭	C.	⬭	D. ⬭
3.	A.	⬭	B.	⬭	C.	⬭	D. ⬭
4.	A.	⬭	B.	⬭	C.	⬭	D. ⬭
5.	A.	⬭	B.	⬭	C.	⬭	D. ⬭
6.	A.	⬭	B.	⬭	C.	⬭	D. ⬭
7.	A.	⬭	B.	⬭	C.	⬭	D. ⬭

SECTION II

1.	A.	⬭	B.	⬭	C.	⬭	D. ⬭
2.	A.	⬭	B.	⬭	C.	⬭	D. ⬭
3.	A.	⬭	B.	⬭	C.	⬭	D. ⬭
4.	A.	⬭	B.	⬭	C.	⬭	D. ⬭
5.	A.	⬭	B.	⬭	C.	⬭	D. ⬭
6.	A.	⬭	B.	⬭	C.	⬭	D. ⬭
7.	A.	⬭	B.	⬭	C.	⬭	D. ⬭

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MATHEMATICS – Stage 5 (Standard)
REFERENCE SHEET

Indices

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$(a^m)^n = a^{m \times n}$$

$$a^{-m} = \frac{1}{a^m}$$

$$a^0 = 1$$

$$a^{\frac{1}{m}} = \sqrt[m]{a}$$