High School Mathematics Test 2015

Year 9 **Basic Algebra Skills** Non Calculator

Skills and Knowledge Assessed:

- Simplify algebraic expressions involving the four operations (ACMNA192)
- Extend and apply the distributive law to the expansion of algebraic expressions (ACMNA190)
- Factorise algebraic expressions by identifying numerical factors (ACMNA191)

Name_____

Section 1 Short Answer Section

Write all working and answers in the spaces provided on this test paper.

1.	Simplify $5b \times 9m$. ……
2.	Simplify $8vr \times 3p$. ……
3.	Simplify $-8wq \times 6w$. ……
4.	Simplify $5s + 3d + 4s + 4d$. ……
5.	Simplify $8b - 11 - 9b + 12$. ……
6.	Simplify $7mn - 8n^2 + 7m^2 - 12nm$. ……
7.	Simplify $\frac{32a^2b}{8a}$. ……
8.	Given that $x = 5$ and $y = 8$, find the value of $x^2 - 3y$. ……
9.	Simplify $-12 \times 3d^2f + 2d \times 3df + 8fd \times 4d$. ……

10. Simplify $\frac{48ds^3}{-8sd}$.

……

11. Simplify $\frac{24a^2b^2}{18ab^3}$.

……

12. Given that $x = -3$, find the value of $5x + 2x^2 - x^3$.

……

13. Given that $y = 22$, $w = 6$ and $x = -5$, find the value of $\frac{3y}{w - x}$.

……

14. Simplify, $a^3 \times a^4$.

……

15. Expand $5(4x - 3z)$.

……

16. Expand $8a^2(3b - 7a)$.

……

17. Simplify completely $\frac{12ab \times 6a^2bc}{9abc \times 2b^2c^2}$

……

……

18. If $y = 12 - 3x$ complete the table of values for x and y.

x	-1	0	1	2
y				

19. Expand and simplify $15 - 6w + 5(2w - 7)$.

……

……

20. Expand and simplify $5e(2e - 3c) - 4c(3e + 2c)$.

……

……

21. Simplify, leaving your answer as an index: $\dfrac{29^7 \times 29^9}{29^{12}}$.

……

22. Simplify $\dfrac{8y^3r^2}{5r^7} \times \dfrac{15r^3}{4r^2y^2}$.

……

……

23. Factorise $3cd - 15c^2$.

……

24. Factorise $-24w^2e^2 - 36we^3$.

……

High School Mathematics Test 2015

Year 9

Basic Algebra Skills

Calculator Allowed

Name_____

Section 2 Multiple Choice Section

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

1. $d \times d \times d \times d = ?$

   A. $4d$ B. $5d$ C. d^3 D. d^4

2. $3a + 2b = ?$

   A. $a + a + a + b + b$ B. $a \times a \times a + b \times b$

   C. $a \times a \times a \times b \times b$ D. $a + a + a \times b + b$

3. Which of these algebraic expressions represents *"Double m and divide the result by n"*?

   A. $\frac{2}{mn}$ B. $\frac{mn}{2}$ C. $2mn$ D. $\frac{2m}{n}$

4. Simplify $6d + d + 5d$.

   A. $11d$ B. $11d^2$ C. $12d$ D. $12d^2$

5. Simplify $8p \times 5g$.

   A. $40p + g$ B. $40pg$ C. $58pg$ D. $85pg$

6. When $k = 7$ and $m = 5$; $k^2 + 2m = ?$

   A. 24 B. 39 C. 59 D. 74

7. Which of these is equal to $16p^3s^2$?

A. $8p^2 \times 2sp$ B. $4sp \times 4sp^2$ C. $16sp \times sp$ D. $\frac{32s^3p^3}{4sp}$

8. If $x = -2$, $y = 12$ and $z = 8$, find the value of $\frac{6z}{xy}$.

A. -2 B. -1 C. $-\frac{1}{2}$ D. 2

9. Which algebraic expression below represents :
"The product of p and the square of q."

A. $(p+q)^2$ B. pq^2 C. $(pq)^2$ D. $p+q^2$

10. $3s(4s+3r) =$

A. $7s^2 + 6rs$ B. $7s + 6rs$ C. $12s + 9rs$ D. $12s^2 + 9rs$

11. Which of the following is **not** a factor of $12kb - 24k^2b$?

A. $2k$ B. $6b$ C. $2k - 4k^2$ D. $1 - 2k^2$

12. Factorise $-10w^2 - 15w$.

A. $-5w(2w+3)$ B. $-5w(2w-3)$ C. $-5w^2(2w+3)$ D. $-10w(w+3)$

13. Expand and simplify $4x^2y + 2xy + 3xy(2x-1)$.

A. $10x^2y - 5xy$ B. $2x^2y - xy$ C. $10x^2y - xy$ D. $10x^2y + xy$

14. When $8a^2b - 12ab^2$ is fully factorised, the result is:

A. $4ab(2a-3b)$ B. $4a(2a-3)$ C. $4a^2b(2-3b)$ D. $8a^2(b-2b^2)$

15. Factorise $12x^2y^3 - 18x^2y^2$.

A. $6xy^2(2xy - 3)$ B. $6x^2y^2(2y - 3)$

C. $6x^2y^2(2y + 3)$ D. $12x^2y^2(y - 3)$

16. The table below is completed for one of the equations below.

x	-1	0	1	2
y	8	5	2	–1

Which equation was used?

A. $y = 3x + 5$ B. $y = 2x + 7$

C. $y = 5 - 3x$ D. $y = 7 - 2x$

High School
Mathematics Test 2015

Multiple Choice Answer Sheet

Basic Algebra Skills

Name _____

Completely fill the response oval representing the most correct answer.

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 ⬭
8.	A ⬭	B ⬭	C ⬭	D ⬭
9.	A ⬭	B ⬭	C ⬭	D ⬭
10.	A ⬭	B ⬭	C ⬭	D ⬭
11.	A ⬭	B ⬭	C ⬭	D ⬭
12.	A ⬭	B ⬭	C ⬭	D ⬭
13.	A ⬭	B ⬭	C ⬭	D ⬭
14.	A ⬭	B ⬭	C ⬭	D ⬭
15.	A ⬭	B ⬭	C ⬭	D ⬭
16.	A ⬭	B ⬭	C ⬭	D ⬭

High School Mathematics Test 2015

Year 9 — **Basic Algebra Skills** — Non Calculator

Section 1 Short Answer Section

ANSWERS

No.	WORKING	ANSWER
1.	$5b \times 9m = 45bm$	$45bm$
2.	$8vr \times 3p = 24pvr$	$24pvr$
3.	$-8wq \times 6w = -48w^2q$	$-48w^2q$
4.	$5s + 3d + 4s + 4d = 9s + 7d$	$9s + 7d$
5.	$8b - 11 - 9b + 12 = -b + 1 = 1 - b$	$1 - b$
6.	$7mn - 8n^2 + 7m^2 - 12nm = 7m^2 - 8n^2 - 5mn$	$7m^2 - 8n^2 - 5mn$
7.	$\frac{32a^2b}{8a} = 4ab$	$4ab$
8.	$x = 5$ and $y = 8$, $x^2 - 3y = 5^2 - 3 \times 8$ $= 25 - 24$ $= 1$	1
9.	$-12 \times 3d^2f + 2d \times 3df + 8fd \times 4d$ $= -36d^2f + 6d^2f + 32d^2f$ $= 2d^2f$	$2d^2f$
10.	$\frac{48ds^3}{-8sd} = -6s^2$	$-6s^2$
11.	$\frac{24a^2b^2}{18ab^3} = \frac{4a}{3b}$	$\frac{4a}{3b}$

12.	$x = -3$ $5x + 2x^2 - x^3 = 5(-3) + 2(-3)^2 - (-3)^3$ $= -15 + 18 - -27$ $= 30$	30
13.	$y = 22,\ w = 6$ and $x = -5$. $\frac{3y}{w-x} = \frac{3 \times 22}{6 - -5}$ $= \frac{66}{11}$ $= 6$	6
14.	$a^3 \times a^4 = a^7$.	a^7
15.	$5(4x - 3z) = 20x - 15z$	$20x - 15z$
16.	$8a^2(3b - 7a) = 24a^2b - 56a^3 24a^2b - 56a^3$	$24a^2b - 56a^3$
17.	$\frac{12ab \times 6a^2bc}{9abc \times 2b^2c^2} = \frac{72a^3b^2c}{18ab^3c^3}$ $= \frac{4a^2}{bc^2}$	$\frac{4a^2}{bc^2}$
18.	<table><tr><td>x</td><td>-1</td><td>0</td><td>1</td><td>2</td></tr><tr><td>$y = 12 - 3x$</td><td>15</td><td>12</td><td>9</td><td>6</td></tr></table>	
19.	$15 - 6w + 5(2w - 7) = 15 - 6w + 10w - 35$ $= 4w - 20$	$4w - 20$
20.	$5e(2e - 3c) - 4c(3e + 2c) = 10e^2 - 15ec - 12ec - 8c^2$ $= 10e^2 - 27ec - 8c^2$	$10e^2 - 27ec - 8c^2$
21.	$\frac{29^7 \times 29^9}{29^{12}} = \frac{29^{16}}{29^{12}} = 29^4$	29^4
22.	$\frac{8y^3r^2}{5r^7} \times \frac{15r^3}{4r^2y^2} = \frac{6y^3r^5}{r^9y^2} = \frac{6y}{r^4}$	$\frac{6y}{r^4}$
23.	$3cd - 15c^2 = 3c(d - 5c)$	$3c(d - 5c)$

24.	$-24w^2e^2 - 36we^3 = -12we^2(2w + 3e)$	$-12we^2(2w + 3e)$

High School Mathematics Test 2015

Year 9 **Basic Algebra Skills** Calculator Allowed

Section 2 Multiple Choice Section

ANSWERS

No.	WORKING	ANSWER
1.	$d \times d \times d \times d = d^4$	D
2.	$3a + 2b = a + a + a + b + b$	A
3.	*Double m and divide the result by n* $= \frac{2m}{n}$	**D**
4.	$6d + d + 5d = 12d$	**C**
5.	$8p \times 5g = 40pg$	**B**
6.	When $k = 7$ and $m = 5$; $k^2 + 2m = 7^2 + 2 \times 5$ $= 49 + 10$ $= 59$	**C**
7.	$4sp \times 4sp^2 = 16p^3s^2$	**B**
8.	If $x = -2$, $y = 12$ and $z = 8$, $\frac{6z}{xy} = \frac{6 \times 8}{-2 \times 12} = \frac{48}{-24} = -2$	**A**
9.	*The product of p and the square of q* $= pq^2$	**B**
10.	$3s(4s + 3r) = 12s^2 + 9rs$	**D**
11.	$2k(6b - 12kb) = 12kb - 24k^2b$ so $2k$ is a factor $6b(2k - 4k^2) = = 12kb - 24k^2b$ so $6b$ and $2k - 4k^2$ are factors $1 - 2k^2$ is not a factor,	**D**
12.	$-10w^2 - 15w = -5w(2w + 3)$	**A**

13.	$4x^2y + 2xy + 3xy(2x - 1) = 4x^2y + 2xy + \ + 6x^2y - 3xy$ $= 10x^2y - xy$	**C**
14.	$8a^2b - 12ab^2 = 4ab(2a - 3b)$	**A**
15.	$12x^2y^3 - 18x^2y^2 = 6x^2y^2(2y - 3)$	**B**
16.	Using $y = 5 - 3x$ gives the numbers in the table.	**C**

High School
Mathematics Test 2015

Multiple Choice Answer Sheet

Basic Algebra Skills

Name _____ANSWERS_____

Completely fill the response oval representing the most correct answer.

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 ○
8.	A ●	B ○	C ○	D ○
9.	A ○	B ●	C ○	D ○
10.	A ○	B ○	C ○	D ●
11.	A ○	B ○	C ○	D ●
12.	A ●	B ○	C ○	D ○
13.	A ○	B ○	C ●	D ○
14.	A ●	B ○	C ○	D ○
15.	A ○	B ●	C ○	D ○
16.	A ○	B ○	C ●	D ○