High School
Mathematics Test 2014

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 $5k \times 7m$.

   .....

2. Simplify $-6ef \times -2g$.

   .....

3. Simplify $8pq \times 3pr$.

   .....

4. Simplify $7a + 5 + 5a + 8$.

   .....

5. Simplify $5x - 8 - 9x - 12$.

   .....

6. Simplify $6s^2 - 5st - 7s^2 + 9st$.

   .....

7. Simplify $\frac{18pr}{6p}$.

   .....

8. Given that $x = 6$ and $y = 10$, find the value of $5x - 2y$.

   .....

9. Simplify $-6s \times 3st + 2s \times 5t - 8s^2 \times 3t$.

   .....

10. Simplify $\frac{36g^2t}{-4gt}$.

……

11. Simplify $\frac{18p^2q}{15pq^2}$.

……

12. Given that $a = 8$, $b = -3$ and $c = 12$, find the value of $2a + \frac{c}{b}$.

……

13. Given that $p = 4$, $q = -2$ and $r = -8$, find the value of $\frac{p + r}{2q}$.

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14. Simplify, leaving your answer as an index : $5^2 \times 5^3$.

……

15. Expand $4(3m + 8)$.

……

16. Expand $9k(6k - 4b)$.

……

17. Simplify completely $3a^2 \times 4b - 6a \times 4b + 5a \times 3ab - 4b \times 7a$.

……

……

18. If $y = 4x - 6$ complete the table of values for x and y.

x	-1	0	1	2
y				

19. Expand and simplify $8p - 12 + 4(p - 11)$.

……

……

20. Expand and simplify $2k(k - 4p) - 5p(k + 7p)$.

……

……

21. Simplify, leaving your answer as an index: $\dfrac{15^3 \times 15^8}{15^6}$.

……

22. Simplify $\dfrac{5x^2}{6s^2} \times \dfrac{12s^2}{15xs}$.

……

……

23. Factorise $15x^2 - 10x$.

……

24. Factorise $-30xy - 36xy^2$.

……

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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. $a + a + a + a + a = ?$

   A. $5a$ B. $6a$ C. a^5 D. a^6

2. $6p^3 = ?$

   A. $6 + p + p + p$ B. $6 \times (p + p + p)$

   C. $6 \times p \times p \times p$ D. $6 + (p \times p \times p)$

3. Richard says to Amber: *"I doubled x and added y."*
   Which of these algebraic expressions could represent this?

   A. $2(y + x)$ B. $2x + y$ C. $2y + x$ D. $x^2 + y$

4. Simplify $8a + 7a - 4a$.

   A. $5a$ B. $7a$ C. $9a$ D. $11a$

5. Simplify $5m \times -6k$.

   A. $-mk$ B. $-11mk$ C. $-30mk$ D. $-30m^2k$

6. When $x = 4$ and $y = 2$, $4xy - 3x =$

   A. 4 B. 20 C. 26 D. 44

7. Which of these is equal to $12a^2b$?

   A. $6a \times 2b$ B. $3ab \times 4ab$ C. $12a \times ab$ D. $24a^2b \div 2ab$

8. If $r = -2$, $z = 12$ and $x = 8$, find the value of $\frac{4z}{xr}$.

A. -3 B. -2 C. 2 D. 3

9. Which algebraic expression below represents :
"The square of the product of m and n."

A. $(m+n)^2$ B. mn^2 C. $\sqrt{mn}$ D. $(mn)^2$

10. $8a(2a+4w) =$

A. $10a+12w$ B. $16a+32w$ C. $16a+32aw$ D. $16a^2+32aw$

11. Which of the following is **not** a factor of $20bh^2 - 15bhp$?

A. $5b$ B. $15b$ C. bh D. $4h-3p$

12. When $6p^2w - 15py$ is fully factorised, the result is:

A. $3(2p^2w - 5py)$ B. $p(6pw - 15y)$ C. $3p(2pw - 5y)$ D. $3pw(2p - 5)$

13. Expand and simplify $2ab - a^2 + 3a(2a - 4b)$.

A. $-7a^2 - 14ab$ B. $-7a^2 - 10ab$

C. $5a^2 - 14ab$ D. $5a^2 - 10ab$

14. Factorise $18m^2n - 36mn + 24mn^2$.

A. $6mn(3m - 6 + 4n)$

B. $6m(3mn - 6n + 4n)$

C. $6m^2(3n - 6 + 4n)$

D. $6(3m^2n - 6 + 4n)$

15. The table below is completed for $y = 12 - 4x$. What values should go at K and M?

x	-1	0	1	2
y	K	12	M	4

A. K = 16 and M = 8. B. K = 8 and M = 16.

C. K = 20 and M = 10. D. K = 20 and M = 18.

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Basic Algebra Skills

Multiple Choice Answer Sheet

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 ⬭

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ANSWERS

Section 1 (1 mark each)	
	Working and Answers
1.	$5k \times 7m = 35mk.$
2.	$-6ef \times -2g = 12efg$
3.	$8pq \times 3pr = 24p^2qr$
4.	$7a + 5 + 5a + 8 = 12a + 13$
5.	$5x - 8 - 9x - 12 = -4x - 20$
6.	$6s^2 - 5st - 7s^2 + 9st = -s^2 + 4st$
7.	$\frac{18pr}{6p} = 3r$
8.	When $x = 6$ and $y = 10$, $5x - 2y = 5 \times 6 - 2 \times 10 = 30 - 20 = 10$
9.	$-6s \times 3st + 2s \times 5t - 8s^2 \times 3t = -18s^2t + 10st - 24s^2t$ $= -6s^2t + 10st$
10.	$\frac{36g^2t}{-4gt} = -9g$
11.	$\frac{18p^2q}{15pq^2} = \frac{6p}{5q}$
12.	When $a = 8$, $b = -3$ and $c = 12$, $2a + \frac{c}{b} = 2 \times 8 + \frac{12}{-3}$ $= 16 - 4$ $= 12$
13.	When $p = 4$, $q = -2$ and $r = -8$, $\frac{p+r}{2q} = \frac{4-8}{2 \times -2}$ $= \frac{-4}{-4}$ $= 1$
14.	$5^2 \times 5^3 = 5^5$
15.	$4(3m + 8) = 12m + 32$
16.	$9k(6k - 4b) = 54k^2 - 36kb$
17.	$3a^2 \times 4b - 6a \times 4b + 5a \times 3ab - 4b \times 7a = 12a^2b - 24ab + 15a^2b - 28ab$ $= 27a^2b - 52ab$

18.

x	-1	0	1	2
y	-10	-6	-2	2

19. $8p - 12 + 4(p - 11) = 8p - 12 + 4p - 44$
$= 12p - 56$

20. $2k(k - 4p) - 5p(k + 7p) = 2k^2 - 8kp - 5pk - 35p^2$
$= 2k^2 - 13kp - 35p^2$

21. $\frac{15^3 \times 15^8}{15^6} = \frac{15^{11}}{15^6}$

$= 15^5$

22. $\frac{\cancel{5}x^{\cancel{2}}}{\cancel{6}s^{\cancel{2}}} \times \frac{\cancel{12}\ 2s^{\cancel{2}}}{\cancel{15}\ 3\cancel{x}\cancel{s}} = \frac{2x}{3s}$

23. $15x^2 - 10x = 5x(3x - 2)$

24. $-30xy - 36xy^2 = -6xy(5 + 6y)$

Section 2 (1 mark each)		
	Working	Answers
1.	$a + a + a + a + a = 5a$	A
2.	$6p^3 = 6 \times p \times p \times p$	C
3.	*I doubled x and added y becomes* $2x + y$	B
4.	$8a + 7a - 4a = 11a$	D
5.	$5m \times -6k = -30mk$	C
6.	$4xy - 3x = 4 \times 4 \times 2 - 3 \times 4$ $= 32 - 12$ $= 20$	B
7.	$12a \times ab = 12a^2b$	C
8.	If $r = -2$, $z = 12$ and $x = 8$, then $\frac{4z}{xr} = \frac{4 \times 12}{8 \times -2}$ $= \frac{48}{-16}$ $= -3$	A
9.	The square of the product of m and n becomes $(mn)^2$	D
10.	$8a(2a + 4w) = 16a^2 + 32aw$	D
11.	$15b$ is not a factor of $20bh^2 - 15bhp$?	B
12.	$6p^2w - 15py = 3p(2pw - 5y)$	C
13.	$2ab - a^2 + 3a(2a - 4b) = 2ab - a^2 + 6a^2 - 12ab$ $= 5a^2 - 10ab$	D
14.	$18m^2n - 36mn + 24mn^2 = 6mn(3m - 6 + 4n)$	A
15.	$y = 12 - 4x$ When $x = -1$ $K = 12 - 4 \times (-1) = 12 + 4 = 16$ When $x = 1$ $M = 12 - 4 \times (1) = 12 - 4 = 8$	A

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Multiple Choice Answer Sheet

Name ___Marking Sheet

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 ○