High School Mathematics Test 2013

Year 7

Introductory Algebra

Non Calculator Section

Name_____

Skills and Knowledge Assessed:

- Introduce the concept of variables as a way of representing numbers using letters (ACMNA175)
- Extend and apply the laws and properties of arithmetic to algebraic terms and expressions (ACMNA177)
- Simplify algebraic expressions involving the four operations (ACMNA192)

Answer all questions in the spaces provided on this test paper by:

Writing the answer in the box provided.

or

Shading in the bubble for the correct answer from the four choices provided.

Show any working out on the test paper.

1. $2ab = ?$

☐ $2 \times a \times b$ ☐ $2 + a + b$ ☐ $a + a + b + b$ ☐ $a \times a \times b \times b$

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2. $p^3 = ?$

☐ $p + 3$ ☐ $p \times 3$ ☐ $p + p + p$ ☐ $p \times p \times p$

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3. Karens teacher says *"The square of a is subtracted from b."*
Which of these algebraic expressions could represent this?

☐ $2a - b$ ☐ $b - 2a$

☐ $a^2 - b$ ☐ $b - a^2$

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4. Which of these is always true:

☐ $\frac{a}{b} = \frac{b}{a}$ ☐ $a \times b = b \times a$

☐ $a - b = b - a$ ☐ $a \div b = b \div a$

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5. Simplify the expression $2m + 5m + 7m$.

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6. Which of these is the same as $2s + 9d$?

- ☐ $5s + 3s + 4d + 5d$
- ☐ $s + s + 9d - d$
- ☐ $5s - 3s + 4d + 5d$
- ☐ $s - s + 10d - d$

7. Simplify: $2xy - xy + 8xy$.

8. Which of the following is **not** equivalent to $12ab$?

- ☐ $5ab + 7ab$
- ☐ $20ab - 8ab$
- ☐ $12 \times a \times b$
- ☐ $12a + b$

9. Simplify $2a \times 5ah$.

10. Express $2x + 5y - 7x + 3y$ in simplest form.

11. Which of these is equivalent to $\frac{12x^2y}{5}$?

- ☐ $\frac{24x^2y}{10y}$
- ☐ $\frac{24x^2y}{10x}$
- ☐ $\frac{24x^2y}{10xy}$
- ☐ $\frac{24x^2y^2}{10y}$

12. Simplify $20mn \div 4m$

13. When $c = 12$ and $d = 3$, calculate the value of $3c + d^2$.

14. Mrs Brown asks her class to evaluate $\frac{2xy}{5}$, when $x = 10$ and $y = 7$.

Four of the student's answers are given below.
Which is correct?

- ☐ 15
- ☐ 28
- ☐ 54
- ☐ 294

15. If $x = 3,\ y = -4$ and $z = -5,$ what is the value of $\dfrac{x^2 + y^2}{z}$?

16. Petrol costs C cents per litre. Which expression would give the cost in dollars of N litres of petrol?

☐ $C + \dfrac{N}{100}$ ☐ $\dfrac{C + N}{100}$ ☐ $\dfrac{100N}{C}$ ☐ $\dfrac{CN}{100}$

17. Brad buys Q packets of biscuits which cost \$B each and 4 packets of sweets which cost \$J each.
Write an expression for the cost of the biscuits and sweets.

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Introductory Algebra

Calculator Allowed Short Answer Section

Name_____

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. $\frac{a}{b}$ means the same as :

☐ $a \times b$ ☐ $a - b$ ☐ $a \div b$ ☐ b^a

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2. Write $k + k + k + k + k + k$ in simplest form.

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3. Write "*the sum of twice x and three times y"* in simplest form, using algebra.

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4. Which of these is the same as $\frac{m}{pq}$?

☐ $m \div (p \times q)$ ☐ $(m \div p) \times q$

☐ $m \div p \times q$ ☐ $\frac{m}{p} \times q$

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5. Simplify $3ab + 9a + ab - 4a$.

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6. Which of these is not the same as $2s + 8w$?

☐ $2s + 7w + w + s$ ☐ $6s + 8w - 4s$

☐ $s + s - 2w + 10w$ ☐ $5s - 3s + 4w + 4w$

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7. Simplify $17pr - 6y^2 + 8y^2 - 11pr$.

8. Which of the following is **not** equivalent to $9ab + 11a^2$?

- ☐ $5ab + 8a^2 + 4ab + 3a^2$
- ☐ $10ab + 12a^2 - a^2 + ab$
- ☐ $6ab + 15a^2 + 3ab - 4a^2$
- ☐ $14ab + 18a^2 - 5ab - 7a^2$

9. Which of these simplifies to $mn - 20$?

- ☐ $m + n - 10 - 10$
- ☐ $10mn + 30 - 9mn - 50$
- ☐ $m \times n + 10 - 10$
- ☐ $10mn - 30 + 9mn + 50$

10. Simplify $a^2b - 3ab^2 + 7ab^2 - 6a^2b$

11. Simplify $\dfrac{40a^2b^2}{8ab^2}$

12. $\dfrac{18p^2m}{30pmn} = ?$

- ☐ $\dfrac{3p}{5n}$
- ☐ $\dfrac{3}{5pn}$
- ☐ $\dfrac{3pn}{5}$
- ☐ $\dfrac{3p}{5m^2n}$

13. When $g = 360$, $k = 45$ and $m = 9$, what is the value of $\dfrac{g}{k} + \dfrac{k}{m}$?

14. What is the value of $3p^2 - 12pq$ when $p = 5$ and $q = -3$.

- ☐ 45
- ☐ 105
- ☐ 255
- ☐ 405

15. Which expression does not have a value of 0 when $f = -2$?

- ☐ $f^2 + 2f$
- ☐ $4f + 2f^2$
- ☐ $f^2 - 2f$
- ☐ $3f^2 + 6f$

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ANSWERS

Non Calculator Section

1.	$2 \times a \times b$
2.	$p \times p \times p$
3.	$b - a^2$
4.	$a \times b = b \times a$
5.	$14m$
6.	$5s - 3s + 4d + 5d$
7.	$9xy$
8.	$12a + b$
9.	$10a^2h$
10.	$8y - 5x$

11.	$\frac{24x^2y^2}{10y}$
12.	$5n$
13.	45
14.	28
15.	-5
16.	$\frac{CN}{100}$
17.	$BQ + 4J$

Calculator Allowed Section

1.	$a \div b$
2.	$6k$
3.	$2x + 3y$
4.	$m \div (p \times q)$
5.	$4ab + 5a$
6.	$2s + 7w + w + s$
7.	$6pr + 2y^2$
8.	$10ab + 12a^2 - a^2 + ab$

9.	$10mn + 30 - 9mn - 50$
10.	$4ab^2 - 5a^2b$
11.	$5a$
12.	$\frac{3p}{5n}$
13.	13
14.	255
15.	$f^2 - 2f$