

**Students Name:** \_\_\_\_\_

**BASIC ALGEBRA**  
**Year 8 Test**

**Calculators may be used.      Show all necessary working.**  
**Attempt ALL questions.      Time:1 hour.**

1. Write the next two numbers in each number pattern and also write in the strategy you use to obtain each number.

(a) 17, 13, 9, 5, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

(b) 4, 12, 36, 108, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

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2. Write in words what you do to the pronumeral to obtain each of the expressions below. Start with "take a number x, ....."

(a)  $2x + 5$       Take a number x \_\_\_\_\_

\_\_\_\_\_

(b)  $\frac{x}{2} - 3$       Take a number x \_\_\_\_\_

\_\_\_\_\_

(c)  $8 - 3x$       Take a number x \_\_\_\_\_

\_\_\_\_\_

(d)  $4(x + 8)$       Take a number x \_\_\_\_\_

\_\_\_\_\_

(e)  $\frac{x-3}{2}$       Take a number x \_\_\_\_\_

\_\_\_\_\_

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3. Write an expression for each of the following:

(a) The *product* of **x** and **y** \_\_\_\_\_

(b) The *difference* between **m** and **n** \_\_\_\_\_

(c) One *half* of the *sum* of **x** and **y** \_\_\_\_\_

(d) One more than *twice* **x** \_\_\_\_\_

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4. Simplify the following algebraic expressions:

(a)  $5a \times 4b =$

(b)  $-2x - 4y =$

(c)  $4a \times a =$

(d)  $p^4 \times p^3 \times p =$

(e)  $b^2 \times ab =$

(f)  $12b \div 4b =$

(g)  $-8ab \div 2b =$

(h)  $y^6 \div y^2 =$

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5. In the following sets, one term is NOT a **like** term.  
Circle the term that is **unlike** the other terms.

(a)  $\{5x^2, x^2, 5x, -5x^2\}$

(b)  $\{8b, ab, -ab, 8ab, ba\}$

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6. Simplify by collecting like terms:

(a)  $11x - 8x + 5x$  \_\_\_\_\_

(b)  $5p - 8p$  \_\_\_\_\_

(c)  $3a + 8b - 7a - 4b$  \_\_\_\_\_

(d)  $7x^2 - 4x + 9x - 5x^2$  \_\_\_\_\_

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7. Expand the following by removing parentheses:

(a)  $5(x + 4) =$  \_\_\_\_\_

(b)  $x(x + 2 - y) =$  \_\_\_\_\_

(c)  $-2(x + 3) =$  \_\_\_\_\_

(d)  $-4x(x - 5) =$  \_\_\_\_\_

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8. Remove parentheses and collect like terms:

(a)  $5(a + b) + 2(a + 3b)$

(b)  $3(x + y) + 2(x - y) + 5(2x + y)$

= \_\_\_\_\_

= \_\_\_\_\_

= \_\_\_\_\_

= \_\_\_\_\_

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9. (a) Jenny buys **20** books at **\$X** each. She has to pay **\$Y** for delivery. Write down a formula for **P**, the total amount she has to pay for delivery of the 20 books.

**P** = \_\_\_\_\_

- (b) The formula **V = 35 - 10T** gives the velocity **V** of an object thrown up into the air at 35 metres per second, where **T** is the time in seconds.

Find the velocity of the object after it has been in the air for 3 seconds.

**V** = \_\_\_\_\_

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10. When **a = 9** and **d = 2**, find the value of each of the following expressions:

(a)  $2a - 5$  \_\_\_\_\_

(b)  $a^2 + d$  \_\_\_\_\_

(c)  $\frac{2a}{d+4}$  \_\_\_\_\_

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11. If **a = 12** and **b = -3**, find the value of each of the following expressions:

(a)  $ab + 50$  \_\_\_\_\_

(b)  $5b^3$  \_\_\_\_\_

(c)  $\frac{a}{2b}$  \_\_\_\_\_

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Students Name: Zain Ahmed Thur, 7-8<sup>30</sup>

**BASIC ALGEBRA**  
**Year 8 Test**

*Good work.  
Check correction!*

Calculators may be used. Show all necessary working.  
Attempt ALL questions. Time: 1 hour.

1. Write the next two numbers in each number pattern and also write in the strategy you use to obtain each number.

(a) 17, 13, 9, 5, 1, -3, ~~(subtract 3)~~ N-3 ✓  
*2*  
*108*  
*13*  
*324*  
*3*  
*972*

(b) 4, 12, 36, 108, 324, 972, 3N ✓  
*12*  
*36*

2. Write in words what you do to the pronumeral to obtain each of the expressions below. Start with "take a number x, ....."

(a)  $2x + 5$  Take a number x times it by 2 and  
add 5 ✓

(b)  $\frac{x}{2} - 3$  Take a number x divides it by two  
and subtract three ✓

(c)  $8 - 3x$  Take a number x multiply it by three  
add subtract it <sup>from</sup> 8 ✓

(d)  $4(x + 8)$  Take a number x times it by four  
and add thirty-two ✓

(e)  $\frac{x-3}{2}$  Take a number x subtract it from 3  
and divide <sup>the result</sup> ~~that~~ by two ✓

3. Write an expression for each of the following:

(a) The *product* of  $x$  and  $y$   $xy$  ✓

(b) The *difference* between  $m$  and  $n$   $m-n$  ✓

(c) One *half* of the *sum* of  $x$  and  $y$   $\frac{x+y}{2}$  ✓

(d) One more than *twice*  $x$   $2x+1$  ✓

4. Simplify the following algebraic expressions:

(a)  $5a \times 4b = 20ab$  ✓

(b)  $-2x - 4y = -2xy$  ✓ *Add indices.*

(c)  $4a \times a = 4a^2$  ✓

(d)  $p^4 \times p^3 \times p = p^{12}$  ✓

(e)  $b^2 \times ab = ab^3$  ✓

(f)  $12b \div 4b = 3$  ✓

(g)  $-8ab \div 2b = -4a$  ✓

(h)  $y^6 \div y^2 = y^4$  ✓ *subtract indices.*

5. In the following sets, one term is NOT a **like** term. Circle the term that is **unlike** the other terms.

(a)  $\{5x^2, x^2, 5x, -5x^2\}$  ✓

(b)  $\{8b, ab, -ab, 8ab, ba\}$  ✓

6. Simplify by collecting like terms:

(a)  $11x - 8x + 5x = 8x$  ✓

(b)  $5p - 8p = -3p$  ✓

(c)  $3a + 8b - 7a - 4b = -4a + 4b$  ✓

(d)  $7x^2 - 4x + 9x - 5x^2 = 2x^2 + 5x$  ✓

7. Expand the following by removing parentheses:

(a)  $5(x+4) = 5x + 20$  ✓

(b)  $x(x+2-y) = x^2 + 2x - xy$  ✓

(c)  $-2(x+3) = -2x - 6$  ✓

(d)  $-4x(x-5) = -4x^2 + 20x$  ✓

8. Remove parentheses and collect like terms: 5

(a)  $5(a + b) + 2(a + 3b)$

$= 5a + 5b + 2a + 6b$  ✓  
 $= 7a + 11b$  ✓

(b)  $3(x + y) + 2(x - y) + 5(2x + y)$

$= 3x + 3y + 2x - 2y + 10x + 5y$   
 $= 15x + 6y$  ✓

9. (a) Jenny buys <sup>20</sup>20 books at \$X each. She has to pay \$Y for delivery. Write down a formula for P, the total amount she has to pay for delivery of the 20 books.

$P = 20X + Y$  ✓

(b) The formula  $V = 35 - 10T$  gives the velocity V of an object thrown up into the air at 35 metres per second, where T is the time in seconds.

Find the velocity of the object after it has been in the air for 3 seconds.

$V = 35 - 3T = 35 - 3 \times 3$   
 $= 32 \text{ m/s} = 32$

10. When  $a = 9$  and  $d = 2$ , find the value of each of the following expressions:

(a)  $2a - 5 = 2 \times 9 - 5 = 13$  ✓

(b)  $a^2 + d = 81 + 2 = 83$  ✓

(c)  $\frac{2a}{d+4} = \frac{18}{6} = 3$  ✓

11. If  $a = 12$  and  $b = -3$ , find the value of each of the following expressions:

(a)  $\frac{-36}{ab} + 50 = 14$  ✓

(b)  $5b^3 = -135$  ✓

(c)  $\frac{a}{2b} = -2$  ✓