1. Adding and Subtracting Terms

Survivors of the Long Journey

The first known explorer from *Hawaiki,*[1] who reached *Aotearoa,*[2] was the legendary Kupe. However, he only stayed a short time in Aotearoa before sailing back to *Hawaiki* to tell his people that he had discovered *whenua*[3] that was so large, it had enough room for everyone. Many *waka*[4] then left *Hawaiki* with *whānau*[5] wanting to settle in Aotearoa. They brought with them, little Polynesian rats, pigs, dogs and fowl, as food supplies. Some of these animals survived the long journey, but some did not. Which of the animals survived the journey? **To find the answer to this question, simplify the expressions below by collecting like terms.** The answer to the problem and the letter next to it, will give the puzzle code.

A1.1 **A** $2x + 3x =$	A1.2 **Y** $x + 5 + 3x + 2 =$
A1.3 **E** $5a - a =$	A1.4 **O** $7x + 6 - 2x - 3 =$
A1.5 **T** $3ab + 2a + 4ab + a =$	A1.6 **D** $5x^2 + 4x^2 + 8 =$
A1.7 **S** $9x - 7 - 3x - 3 =$	A1.8 **P** $3 + 4x + 5 =$
A1.9 **L** $8xy + 5 - 3xy - 3 =$	A1.10 **I** $5x^2 - x + 2x^2 - 4x =$
A1.11 **R** $4x + xy - 2x - 4xy =$	A1.12 **G** $4a + 5b - 7a - 6b =$
A1.13 **S** $3 + 4m - 5 + 2m =$	A1.14 **N** $12n + n - 3n =$

$4x+8$	$5x+3$	$5xy+2$	$4x+7$	$10n$	$4a$	$6x-10$	$7x^2-5x$	$5x$	$10n$	
$2x-3xy$	$5x$	$7ab+3a$	$6m-2$	$5x$	$10n$	$9x^2+8$	$9x^2+8$	$5x+3$	$-3a-b$	$6x-10$

[1]*Hawaiki* – ancient homeland of Māori; [2]*Aotearoa* – New Zealand; [3]*whenua* – land; [4]*waka* – canoe; [5]*whānau* – extended family

2. Multiplying and Dividing Terms with Indices

The Largest Flightless Bird

The first known explorer from *Hawaiki,*[1] who reached *Aotearoa,*[2] was the legendary Kupe. His friend, Ngahue, accompanied him and his crew in their journey to and from Aotearoa. Some accounts say that Ngahue discovered a large flightless bird and called it a moa. He killed one of these moas and put it in a *calabash*[4] to carry it back to Hawaiki. Why did they call this large flightless bird a moa? **To find the answer to this question, simplify the expressions below**. The answer to the problem and the letter next to it, will give the puzzle code.

A2.1 **W** $x^2 \times x^5 =$	A2.2 **I** $2x^3 \times 4x^7 =$
A2.3 **O** $\frac{x^6}{x^4} =$	A2.4 **K** $\frac{6x^5}{2x^2} =$
A2.5 **E** $x \times x^4 =$	A2.6 **D** $7x^3 \times x =$
A2.7 **N** $\frac{x^7}{x} =$	A2.8 **T** $\frac{14x^7}{2x^4} =$
A2.9 **A** $xy \times x^2 =$	A2.10 **F** $3x^2y^5 \times 4xy^3 =$
A2.11 **S** $\frac{x^4y^7}{x^3y^5} =$	M2.12 **R** $\frac{25x^8y^5}{5x^2y^4} =$
A2.13 **A** $x^3 \times 3x^2y^4 \times 5xy =$	A2.14 **H** $x \times x^8 \times 9x^{11} =$
A2.15 **M** $\frac{x^{14}}{x^{13}} =$	M2.16 **L** $\frac{36x^9y^7}{4x^5y^6} =$

x	x^2	$15x^6y^5$		$8x^{10}$	xy^2		$7x^3$	$9x^{20}$	x^5		$9x^{20}$	x^3y	x^7	$15x^6y^5$	$8x^{10}$	$3x^3$	$8x^{10}$	x^3y	x^6

x^7	x^2	$5x^6y$	$7x^4$		$12x^3y^8$	x^2	$5x^6y$		$12x^3y^8$	x^2	x^7	$9x^4y$

[1]*Hawaiki* – ancient homeland of Māori; [2]*Aotearoa* – New Zealand; [3]*whenua* – land; [4]*calabash* - a container made from the dried bark of a tree

3. Powers of Powers

Unlucky Animals

The first known explorer from *Hawaiki,*[1] who reached *Aotearoa,*[2] was the legendary Kupe. However, he only stayed a short time in Aotearoa before sailing back to *Hawaiki* to tell his people that he had discovered *whenua*[3] that was so large, it had enough room for everyone. Many *waka*[4] then left *Hawaiki* with *whānau*[5] wanting to settle in Aotearoa. They brought with them, little Polynesian rats, pigs, dogs and fowl, which were good to eat. Some of these animals survived the long journey, but some did not. Which of the animals **did not survive** the journey? **To find the answer to this question, simplify the expressions below.** The answer to the problem and the letter next to it, will give the puzzle code.

A3.1 **N** $(x^3)^4 =$	A3.2 **G** $(2x^5)^2 =$
A3.3 **W** $(x^4y^2)^5 =$	A3.4 **F** $(4x^2y^3)^2 =$
A3.5 **D** $(3xy^3)^2 =$	A3.6 **S** $(5x^3y^6)^2 =$
M3.7 **O** $2x^2 \times (2x^3)^2 =$	M3.8 **I** $(2x^4)^3 \times x^3 =$
A3.9 **A** $(4x^5y)^3 =$	M3.10 **L** $(3x^2y^3z)^3 =$
M3.11 **P** $(2x^4yz^3)^4 =$	M3.12 **–** $5(2x^3)^2 =$

$16x^{16}y^4z^{12}$	$8x^{15}$	$4x^{10}$	$25x^6y^{12}$	$20x^6$	$64x^{15}y^3$	x^{12}	$9x^2y^6$	$20x^6$	$16x^4y^6$	$8x^8$	$x^{20}y^{10}$	$27x^6y^9z^3$

[1]*Hawaiki* – ancient homeland of Māori; [2]*Aotearoa* – New Zealand; [3]*whenua* – land; [4]*waka* – canoe; [5]*whānau* – extended family

4. Simplifying Expressions with Roots

The New Food Staple

The first known explorer from *Hawaiki,*[1] who reached *Aotearoa,*[2] was the legendary Kupe. However, he only stayed a short time in Aotearoa before sailing back to *Hawaiki* to tell his people that he had discovered *whenua*[3] that was so large, it had enough room for everyone. Many *waka*[4] then left *Hawaiki* with *whānau*[5] wanting to settle in Aotearoa, with their staples of sweet potato and taro surviving the long journey. In their new home, they discovered a new source of food, which was not very nutritious but widely available throughout the year. **To find out the name of the new food, simplify the expressions with roots below**. The answer to the problem and the letter next to it, will give the puzzle code.

A4.1 **F** $\sqrt{25x^6} =$	A4.2 **O** $\sqrt{81x^2} =$
A4.3 **H** $\sqrt{4x^{10}} =$	A4.4 **E** $\sqrt{36x^8y^{10}} =$
A4.5 **R** $\sqrt{9x^{20}y^6} =$	A4.6 **N** $\sqrt{100x^{18}} =$
A4.7 **O** $\sqrt{x^{12}} =$	A4.8 **E** $\sqrt{x^{14}y^{22}} =$
A4.9 **A** $\sqrt{49x^4y^2} =$	A4.10 **T** $\sqrt{144x^8y^{14}} =$
A4.11 **U** $\sqrt{25x^{120}} =$	A4.12 **R** $\sqrt{x^{80}y^{50}} =$
A4.13 **R** $\sqrt{64x^4y^8z^2} =$	A4.14 – $\sqrt{121x^{26}y^{30}z^{44}} =$

$7x^2y$	$8x^2y^4z$	$5x^{60}$	$2x^5$	$6x^4y^5$	$11x^{13}y^{15}z^{22}$	$5x^3$	x^7y^{11}	$3x^{10}y^3$	$10x^9$		$x^{40}y^{25}$	$9x$	x^6	$12x^4y^7$

[1]*Hawaiki* – ancient homeland of Māori; [2]*Aotearoa* – New Zealand; [3]*whenua* – land; [4]*waka* – canoe; [5]*whānau* – extended family

5. Order of Operations

The Plant from Hawaiki

The first known explorer from *Hawaiki,*[1] who reached *Aotearoa,*[2] was the legendary Kupe. However, he only stayed a short time in Aotearoa before sailing back to *Hawaiki* to tell his people that he had discovered *whenua*[3] that was so large, it had enough room for everyone. Many *waka*[4] then left *Hawaiki* with *whānau*[5] wanting to settle in Aotearoa. Bark cloth was mainly used for fine clothing among ancient *Polynesians*. The plant used for making bark cloth barely survived the long journey and Māori have had to use coarse local flax for garments. What is the name of the plant used by ancient *Polynesians* for making fine barkcloth? **To find the answer to this question, simplify the expressions below.** The answer to the problem and the letter next to it, will give the puzzle code.

A5.1 **L** $x \times x + x \times x =$	A5.2 **R** $x \times (x + x) + 1 =$
A5.3 **P** $x + x \div x + 1 =$	A5.4 **M** $x \times x \div x + x =$
A5.5 **E** $(x - x) \times x + 2 =$	A5.6 **E** $x + x \times x - x =$
A5.7 **B** $x \div (x + x) + 0.5 =$	A5.8 **Y** $2 \div x \times x + 3 =$
A5.9 **A** $\frac{6x \times x}{x + x} =$	A5.10 **U** $\frac{11x+x}{2x} =$
A5.11 **P** $\frac{4x\ (x+x)}{x^2+x^2} =$	A5.12 **R** $\frac{7x^2+3x^2}{6x-4x} =$

4	$3x$	$x+2$	x^2	5		$2x$	6	$2x^2$	1	2	$5x$	$2x^2+1$	5

[1]*Hawaiki* – ancient homeland of Māori; [2]*Aotearoa* – New Zealand; [3]*whenua* – land; [4]*waka* – canoe; [5]*whānau* – extended family

6. Simplifying Algebraic Expressions – Mixing Up

The Ancient Religion. Myth 1

The first known explorer from *Hawaiki,*[1] who reached *Aotearoa,*[2] was the legendary Kupe. However, he only stayed a short time in Aotearoa before sailing back to *Hawaiki* to tell his people that he had discovered *whenua*[3] that was so large, it had enough room for everyone. Many *waka*[4] then left *Hawaiki* with *whānau*[5] wanting to settle in Aotearoa. They brought their *pantheon*[6] of gods and ancient myths with them, which were creatively adopted or recreated according to their challenges on the new land. **To find out what one of the Māori myths is about, simplify the expressions below**. The answer to the problem and the letter next to it, will give the puzzle code.

A6.1 **N** $x^2 + x \times x + 3x^2 =$	A6.2 **A** $4x + 3 + x \div x =$
M6.3 **R** $3xy + \sqrt{4x^2y^2} =$	M6.4 **H** $(2xy)^3 + \sqrt{25x^6y^6} =$
M6.5 **V** $\frac{6x^2+2x^2}{4x} + 3x =$	M6.6 **I** $7x^2y - \frac{6x^5y^3}{3x^3y^2} =$
A6.7 **O** $(2x^3)^2 + 5x^6 =$	A6.8 **S** $3x^2 \times x^4 + 2x \times x^5 =$
A6.9 **U** $x^3 \times 3x^2y^4 \times 5xy =$	A6.10 **C** $2xy \times 5x^3y^4 \times y =$
A6.11 **E** $\frac{4x^5}{2x^2} \times 3xy^4 =$	M6.12 **F** $\sqrt{9x^4y^6} \div 3xy =$
M6.13 **T** $(x^2y^3)^2 \times (2xy^2)^3 =$	M6.14 **T** $\sqrt{16x^{10}y^8} \times 3xy^2 =$

$8x^7y^{12}$	$13x^3y^3$	$6x^4y^4$	$3xy$	$10x^4y^6$	$5xy$	$6x^4y^4$	$4x+4$	$12x^6y^6$	$5x^2y$	$9x^6$	$5x^2$
$9x^6$	xy^2	$3xy$	$4x+4$	$3xy$	$15x^6y^5$	$5x^2$	$5x^2y$	$5x$	$6x^4y^4$	$5xy$	$5x^6$	$6x^4y^4$

[1]*Hawaiki* – ancient homeland of Māori; [2]*Aotearoa* – New Zealand; [3]*whenua* – land; [4]*waka* – canoe; [5]*whānau* – extended family; [6]*pantheon* - all the gods of a people or religion collectively