

SHARP

Worksheet 26 Memorandum: Revision Term 1

Grade 9 Mathematics

1. Complete the table by ticking the correct columns for each number

Number	R	R'	Q	Q'	Z	N	N ₀
0	✓		✓		✓		✓
π	✓			✓			
0.56	✓		✓				
8	✓		✓		✓	✓	✓
$\sqrt{-2}$		✓					
$\sqrt[3]{-8}$	✓		✓		✓		
$\sqrt{3}$	✓			✓			
$\frac{14}{0}$		✓					
-3	✓		✓		✓		
4.8	✓		✓				

2. a)

$$\begin{array}{r} 804 \\ 402 \\ 201 \\ 67 \\ 1 \end{array} \begin{array}{l} 2 \\ 2 \\ 3 \\ 67 \\ \end{array}$$

b)

$$\begin{array}{r} 312 \\ 156 \\ 78 \\ 39 \\ 13 \\ 1 \end{array} \begin{array}{l} 2 \\ 2 \\ 2 \\ 3 \\ 13 \\ \end{array}$$

c)

$$\begin{array}{r} 378 \\ 189 \\ 63 \\ 21 \\ 7 \\ 1 \end{array} \begin{array}{l} 2 \\ 3 \\ 3 \\ 3 \\ 7 \\ \end{array}$$

d)

$$\begin{array}{r} 846 \\ 423 \\ 141 \\ 47 \\ 1 \end{array} \begin{array}{l} 2 \\ 3 \\ 3 \\ 47 \\ \end{array}$$



$$3. \quad a) \quad -4 \times (8 - (-3)) + 7$$

$$= -4 \times (8 + 3) + 7$$

$$= -4 \times 11 + 7$$

$$= -44 + 7$$

$$= -37$$

$$c) \quad 0.03 \div \frac{9}{5}$$

$$= \frac{3}{100} \times \frac{5}{9}$$

$$= \frac{1}{20} \times \frac{1}{3}$$

$$= \frac{1}{60}$$

$$e) \quad \sqrt{\frac{9}{25}} + \left(\frac{7}{10}\right)^2 - \left(\frac{1}{5}\right)^3$$

$$= \frac{3}{5} + \frac{49}{100} - \frac{1}{125}$$

$$= \frac{300}{500} + \frac{245}{500} - \frac{4}{500}$$

$$= \frac{541}{500} = 1 \frac{41}{500}$$

$$h) \quad \frac{200}{87} \div 2\frac{2}{9} - 1\frac{3}{7} \times 0.42$$

$$= \frac{200}{87} \div \frac{20}{9} - \frac{10}{7} \times \frac{42}{100}$$

$$= \frac{200}{87} \times \frac{9}{20} - \frac{1}{1} \times \frac{6}{10}$$

$$= \frac{10}{29} \times \frac{3}{1} - \frac{6}{10}$$

$$= \frac{30}{29} - \frac{6}{10}$$

$$= \frac{300}{290} - \frac{174}{290}$$

$$= \frac{126}{290} = \frac{63}{145}$$

$$b) \quad \frac{3}{4} + 5\frac{2}{7} - \frac{28}{36} \div 4\frac{2}{9}$$

$$= \frac{3}{4} + \frac{37}{7} - \frac{28}{36} \div \frac{38}{9}$$

$$= \frac{21}{28} + \frac{148}{28} - \frac{28}{36} \times \frac{9}{38}$$

$$= \frac{169}{28} - \frac{7}{2} \times \frac{1}{19}$$

$$= \frac{169}{28} - \frac{7}{38}$$

$$= \frac{3211}{532} - \frac{98}{532}$$

$$= \frac{3113}{532} = 5\frac{453}{532}$$

$$d) \quad 7^2 + (-8)^2 - \sqrt[3]{-\frac{64}{27}}$$

$$= 49 + 64 - \left(-\frac{4}{3}\right)$$

$$= 113 + \frac{4}{3}$$

$$= 114\frac{1}{3}$$

$$f) \quad \frac{-42}{7} + 8 \times (5 + (-7))$$

$$= -6 + 8 \times (-2)$$

$$= -6 - 16$$

$$= -22$$

$$g) \quad \sqrt{0.25} - (0.3)^3$$

$$= \sqrt{\frac{25}{100}} - \left(\frac{3}{10}\right)^3$$

$$= \frac{5}{10} - \frac{27}{1000}$$

$$= \frac{500}{1000} - \frac{27}{1000}$$

$$= \frac{473}{1000} = 0.473$$



$$\text{i)} \quad (-1)^3 \times (-1)^2 + 1$$

$$= -1 \times 1 + 1$$

$$= -1 + 1$$

$$= 0$$

$$\text{j)} \quad 0.54 \div 0.0009$$

$$= \frac{54}{100} \div \frac{9}{10000}$$

$$= \frac{54}{100} \times \frac{10\,000}{9}$$

$$= \frac{6}{1} \times \frac{100}{1}$$

$$= 600$$

4.

Common Fraction	Decimal Fraction	Percentage
$\frac{7}{10}$	0.7	70%
$\frac{74}{100} = \frac{37}{50}$	0.74	74%
$\frac{31}{100}$	0.31	31%
$\frac{3}{2}$	1.5	150%
$\frac{929}{1000}$	0.929	92.9%
$\frac{136}{1000} = \frac{17}{125}$	0.136	13.6%
$\frac{2}{7}$	0.285714...	28.57%
$\frac{1}{4}$	0.25	25%
$\frac{98}{100} = \frac{49}{50}$	0.98	98%
$\frac{9}{11}$	0.81	81.82%

$$5. \quad \text{a)} \quad \frac{(a^2b^3)^2}{a^4b^3} \times \left(\frac{a^2}{b^3}\right)^{-1}$$

$$= \frac{a^4b^6}{a^4b^3} \times \frac{b^3}{a^2}$$

$$= \frac{b^3}{1} \times \frac{b^3}{a^2}$$

$$= \frac{b^6}{a^2}$$

$$\text{b)} \quad \frac{27^a + 9^a}{3^{3a}}$$

$$= \frac{27^a}{3^{3a}} + \frac{9^a}{3^{3a}}$$

$$= \frac{(3^3)^a}{3^{3a}} + \frac{(3^2)^a}{3^{3a}}$$

$$= \frac{3^{3a}}{3^{3a}} + \frac{3^{2a}}{3^{3a}}$$

$$= 1 + \frac{1}{3^a}$$



$$\begin{aligned}
 \text{c) } \quad & \frac{8m^2 n^3}{(3mn^2)^3} \div \frac{(4m^2)^2}{9m^5 n^0} \\
 &= \frac{8m^2 n^3}{27m^3 n^6} \times \frac{9m^5}{16m^4} \\
 &= \frac{1}{3mn^3} \times \frac{m}{2} \\
 &= \frac{1}{6n^3}
 \end{aligned}$$

$$\begin{aligned}
 \text{e) } \quad & \frac{80^p + 96^p}{48^p} \\
 &= \frac{80^p}{48^p} + \frac{96^p}{48^p} \\
 &= \frac{(2^4 \times 5)^p}{(2^4 \times 3)^p} + \frac{(2^5 \times 3)^p}{(2^4 \times 3)^p} \\
 &= \frac{2^{4p} \times 5^p}{2^{4p} \times 3^p} + \frac{2^{5p} \times 3^p}{2^{4p} \times 3^p} \\
 &= \frac{5^p}{3^p} + 2^p
 \end{aligned}$$

$$\begin{aligned}
 \text{d) } \quad & \left(\frac{x}{y} + \frac{1}{x}\right)^{-2} \\
 &= \left(\frac{x^2}{xy} + \frac{y}{xy}\right)^{-2} \\
 &= \left(\frac{x^2+y}{xy}\right)^{-2} \\
 &= \left(\frac{xy}{x^2+y}\right)^2 \\
 &= \left(\frac{xy}{x^2+y}\right)\left(\frac{xy}{x^2+y}\right) \\
 &= \frac{x^2 y^2}{x^4 + x^2 y + x^2 y + y^2} \\
 &= \frac{x^2 y^2}{x^4 + 2x^2 y + y^2}
 \end{aligned}$$

$$\begin{aligned}
 6. \quad \text{a) } \quad & 0.00096 = 9.6 \times 10^{-4} \\
 \text{c) } \quad & 0.0000067 = 6.7 \times 10^{-6} \\
 \text{e) } \quad & 0.00004588 = 4.588 \times 10^{-5}
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } \quad & 32\,760\,000 = 3.276 \times 10^7 \\
 \text{d) } \quad & 3\,699\,100 = 3.6991 \times 10^6 \\
 \text{f) } \quad & 51\,272 = 5.1272 \times 10^4
 \end{aligned}$$

$$\begin{aligned}
 7. \quad \text{a) } \quad & 1, \quad 4, \quad 9, \quad 16 \dots \\
 \text{i) } \quad & 25, \quad 36, \quad 49 \\
 \text{ii) } \quad & \text{the position of the term squared} \\
 \text{iii) } \quad & 100 \\
 \text{iv) } \quad & T = n^2
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } \quad & 2, \quad 8, \quad 18, \quad 32 \dots \\
 \text{i) } \quad & 50, \quad 72, \quad 98 \\
 \text{ii) } \quad & \text{the position of the term squared} \\
 & \text{and then doubled.} \\
 \text{iii) } \quad & 200 \\
 \text{iv) } \quad & T = 2n^2
 \end{aligned}$$



- c) 7 11 15 19...
- i) 23, 27, 31
- ii) add 4 to the previous term
- iii) $4(10) + 3 = 43$
- iv) $T = 4n + 3$

- d) 1 2 4 8...
- i) 16, 32, 64
- ii) double the previous term
- iii) 128, 256, **512**
- iv) $T = 2^n \div 2$

- e) 8 15 22 29
- i) 36, 43, 50
- ii) add 7 to the previous term
- iii) $7(10) + 1 = 71$
- iv) $T = 7n + 1$

8. a)

x	-4	-2	-1	0	1	2	7	10	m
y	23	13	8	3	-2	-7	-32	-47	$-5m+3$

b)

x	-4	-2	-1	0	1	2	6	14	m
y	-23	-15	-11	-7	-3	1	17	49	$4m - 7$

c)

x	-3	-2	-1	0	1	3	5	10	m
y	$\frac{1}{27}$	$\frac{1}{9}$	$\frac{1}{3}$	1	3	27	243	59 049	3^m

d)

x	-6	-2	-1	0	1	4	8	15	m
y	-56	-20	-11	-2	7	34	70	133	$9m - 2$

e)

x	-9	-2	-1	0	1	5	12	18	m
y	-27	1	5	9	13	29	57	81	$4m + 9$



9. If $a = 3, b = -5, c = 10$ and $d = -2$, find the value of the following expressions:

a) $\left(\frac{c}{bd} + a^2\right) \div (-c)$

$$= \left(\frac{10}{(-5)(-2)} + (3)^2\right) \div (-10)$$

$$= \left(\frac{10}{10} + 9\right) \div (-10)$$

$$= (1 + 9) \div (-10)$$

$$= 10 \div -10$$

$$= -1$$

b) $c^2d^2 - a^2b^2 + (cd - ab)$

$$= (10)^2(-2)^2 - (3)^2(-5)^2 + (10(-2) - 3(-5))$$

$$= 100(4) - 9(25) + (-20 + 15)$$

$$= 400 - 225 + (-5)$$

$$= 175 - 5$$

$$= 170$$

c) $abc + bcd - acd$

$$= (3)(-5)(10) + (-5)(10)(-2) - (3)(10)(-2)$$

$$= -150 + 100 + 60$$

$$= 10$$

d) $\frac{ac}{b} - \frac{a^2d}{c-d^2}$

$$= \frac{3(10)}{-5} - \frac{(3)^2(-2)}{10 - (-2)^2}$$

$$= \frac{30}{-5} - \frac{9(-2)}{10 - 4}$$

$$= -6 - \frac{-18}{6}$$

e) $7c - 3a^2 + 5b^3 - 8d^4$

$$= 7(10) - 3(3)^2 + 5(-5)^3 - 8(-2)^4$$

$$= 70 - 3(9) + 5(-125) - 8(16)$$

$$= 70 - 27 - 625 - 128$$

$$= -710$$

$$= -6 + 3$$

$$= -3$$

10. a) 5 terms

b) 5th degree

c) -14

d) 11

e) $10x - 14x^5 + 2x^3 - 8x^2 + 11$ if $x = -3$

$$= 10(-3) - 14(-3)^5 + 2(-3)^3 - 8(-3)^2 + 11$$

$$= -30 - 14(-243) + 2(-27) - 8(9) + 11$$

$$= -30 + 3402 - 54 - 72 + 11 = 3257$$



11. a) $a^2(3ab - 7b) - 4b(2a^3 - 4a^2)$
 $= 3a^3b - 7a^2b - 8a^3b + 16a^2b$
 $= -5a^3b + 9a^2b$

b) $(x + 2y)^2 - (x + 2y)(x - 2y)$
 $= (x + 2y)(x + 2y) - (x^2 - 2xy + 2xy - 4y^2)$
 $= x^2 + 2xy + 2xy + 4y^2 - x^2 + 4y^2$
 $= 4xy + 8y^2$

c) $4m(8m^2 - m + 6) - 6m(2m^2 + 9m)$
 $= 32m^3 - 4m^2 + 24m - 12m^3 - 54m^2$
 $= 20m^3 - 58m^2 + 24m$

d) $\frac{40x^4 - 48x^3 + 32x^2}{8x^2} - 3x(9x + 1)$
 $= \frac{40x^4}{8x^2} - \frac{48x^3}{8x^2} + \frac{32x^2}{8x^2} - 27x^2 - 3x$
 $= 5x^2 - 6x + 4 - 27x^2 - 3x$
 $= -22x^2 - 9x + 4$

e) $\sqrt{100x^4 - 64x^4}$
 $= \sqrt{36x^4}$
 $= 6x^2$

f) $9p^2(5p^2 + 8p - 4) - (7p^2 - 5)^2$
 $= 45p^4 + 72p^3 - 36p^2 - (7p^2 - 5)(7p^2 - 5)$
 $= 45p^4 + 72p^3 - 36p^2 - (49p^4 - 35p^2 - 35p^2 + 25)$
 $= 45p^4 + 72p^3 - 36p^2 - 49p^4 + 70p^2 - 25$
 $= -4p^4 + 72p^3 + 34p^2 - 25$

g) $4pq^2(7p^2q - 6pq + 5q^2) - (3pq)^3$
 $= 28p^3q^3 - 24p^2q^3 + 20pq^4 - 27p^3q^3$
 $= p^3q^3 - 24p^2q^3 + 20pq^4$

h) $(4p - 5q)(2q - 7p) + (6p - 7q)(-8p)$
 $= 8pq - 28p^2 - 10q^2 + 35pq - 48p^2 + 56pq$
 $= -76p^2 + 99pq - 10q^2$

i) $\frac{1}{9x^3}(63x^5 - 45x^4 - 72x^3) + 14x^2$
 $= \frac{63x^5}{9x^3} - \frac{45x^4}{9x^3} - \frac{72x^3}{9x^3} + 14x^2$
 $= 7x^2 - 5x - 8 + 14x^2$
 $= 21x^2 - 5x - 8$

j) $\sqrt[3]{(5x^3)^2 + (10x^3)^2}$
 $= \sqrt[3]{25x^6 + 100x^6}$
 $= \sqrt[3]{125x^6}$
 $= 5x^2$



12. a) $3x + 7 = -2$

$$3x = -2 - 7$$

$$3x = -9$$

$$x = -\frac{9}{3}$$

$$x = -3$$

b) $4(x + 9) = 3(2x - 7)$

$$4x + 36 = 6x - 21$$

$$4x - 6x = -21 - 36$$

$$-2x = -57$$

$$x = -\frac{57}{-2}$$

$$x = -28\frac{1}{2}$$

c) $\frac{x}{7} + 3 = 9$

$$\frac{x}{7} = 9 - 3$$

$$\frac{x}{7} = 6$$

$$x = 6 \times 7$$

$$x = 42$$

d) $-\frac{48}{x} + 7 = 1$

$$-\frac{48}{x} = 1 - 7$$

$$-\frac{48}{x} = -6$$

$$-48 = -6 \times x$$

$$-\frac{48}{-6} = x$$

$$x = 8$$

e) $7x - 8 = 2(5x + 10)$

$$7x - 8 = 10x + 20$$

$$7x - 10x = 20 + 8$$

$$-3x = 28$$

$$x = \frac{28}{-3}$$

$$x = -9\frac{1}{3}$$

f) $8x + 12 = -4$

$$8x = -4 - 12$$

$$8x = -16$$

$$x = -\frac{16}{8}$$

$$x = -2$$

i) $\frac{5x}{15} + 3 = 2$

$$\frac{5x}{15} = 2 - 3$$

$$\frac{5x}{15} = -1$$

$$5x = -15$$

$$x = \frac{-15}{5}$$

$$x = -3$$

g) $\frac{27}{x} + 12 = 3$

$$\frac{27}{x} = 3 - 12$$

$$\frac{27}{x} = -9$$

$$27 = -9x$$

$$\frac{27}{-9} = x$$

$$x = -3$$

h) $\frac{x}{9} - 5 = 3(x + 4)$

$$\frac{x}{9} - 5 = 3x + 12$$

$$\frac{x}{9} - 3x = 12 + 5$$

$$-\frac{26}{9}x = 17$$

$$-26x = 153$$

$$x = \frac{153}{-26}$$

$$x = -5\frac{23}{26}$$

j) $\frac{3x+2}{7} - 9 = 3$

$$\frac{3x+2}{7} = 12$$

$$3x + 2 = 84$$

$$3x = 82$$

$$x = 27\frac{1}{3}$$

