**Student's Name:** .....

**Teacher's Initials:** .....

Barker College

Thursday 8th March 2018
Period 4 or 6
Time Allowed: 50 minutes

GPF AYG
TE RMH
DZP* ARP

# YEAR 9 MATHEMATICS

# 5.3

# ASSESSMENT 1

**160 copies**

**Algebra**
**Products and Factors**

**INSTRUCTIONS TO STUDENTS**

* **Write ALL answers in the space provided.**
* **ALL NECESSARY working for each question must be shown to gain full marks.**
* **Marks may not be awarded for careless or badly arranged working.**
* **DIAGRAMS ARE NOT TO SCALE**
* **Write in blue or black pen**
* **Board-approved, non-programmable calculators may be used.**

**TOTAL: [68 marks]**

* * * *

## Question 1 (11 marks)

Simplify fully

**(a)** $\frac{m}{5} + \frac{2m}{5}$ **1**

**(b)** $\frac{3y}{4} - \frac{2y}{3}$ **2**

**(c)** $\frac{2a}{3} \times \frac{a}{4}$ **2**

**(d)** $\frac{3h}{14} \div \frac{2h}{21}$ **2**

**(e)** $\frac{2c}{3} + \frac{5c-4}{7}$ **2**

**(f)** $\frac{2x}{5} - \frac{3x+4}{10}$ **2**

## Question 2 (7 marks)

Simplify fully

**(a)** $\dfrac{15xy^3}{3xy}$ **1**

**(b)** $\dfrac{4ab}{6} \times \dfrac{9}{2a^2b}$ **2**

**(c)** $\dfrac{15m^2}{8n} \div \dfrac{5m^4}{12n^3}$ **2**

**(d)** $\dfrac{2}{d} - \dfrac{1}{2d}$ **2**

## Question 3 (6 marks)

Expand and simplify where possible

**(a)** $x(4+y)$ **1**

**(b)** $-5k^2(2-3k)$ **1**

**(c)** $7(2g+3)+3g(4+g)$ **2**

**(d)** $3w(2+w)-(w-3)$ **2**

## Question 4 (7 marks)

Expand and simplify

**(a)** $(y-5)(y+2)$ **2**

**(b)** $(r+4)^2$ **1**

**(c)** $(2f+3)(2f-3)$ **2**

**(d)** $-2(x-7)(x-1)$ **2**

## Question 5 (5 marks)

Factorise fully

**(a)** $24x+6$ **1**

**(b)** $15x^2y-3xy^2$ **2**

**(c)** $x(a+3)-(a+3)$ **2**

## Question 6 (7 marks)

Factorise fully

**(a)** $x^2 - 64$ **1**

**(b)** $x^2 - 5x - 6$ **2**

**(c)** $ab + ac^2 + 7b + 7c^2$ **2**

**(d)** $2x^2 + 15x + 28$ **2**

## Question 7 (14 marks)

Simplify each expression

**(a)** $\dfrac{5a+25b}{5}$ **2**

**(b)** $\dfrac{9y^2-16}{6y+8}$ **3**

**(c)** $\dfrac{3m-6}{4} \times \dfrac{8m}{m^2-2m}$ **3**

**(d)** $\dfrac{14}{x^2-1} \div \dfrac{7x+49}{x^2+8x+7}$ **3**

**(e)** $\dfrac{4}{x^2+x} - \dfrac{2}{x^2-1}$ **3**

## Question 8 (11 marks)

**(a)** Complete this perfect square expansion $(x-4)^2 = x^2 - \ldots\ldots\ldots + 16$ **1**

**(b)** Factorise fully

(α) $\dfrac{mn-n^2}{mn-m^2}$ **2**

(β) $3a + a^2 + 3b - b^2$ **3**

(γ) $x^4 - \dfrac{1}{16}$ **3**

**(c)** ***By first factorising***, calculate the value of $158^2 - 142^2$ **1**

**(d)** ***By factorising*** (therefore without using a calculator and showing working) evaluate; **1**

$$10^2 - 9^2 + 8^2 - 7^2 + 6^2 - 5^2 + 4^2 - 3^2 + 2^2 - 1^2$$

**END OF PAPER**

# Year 9 5.3 Assessment 1 Student Solutions

1. a) $\frac{3m}{5}$

b) $\frac{9y-8y}{12} = \frac{y}{12}$

c) $\frac{2a^2}{12} = \frac{a^2}{6}$

d) $\frac{63h}{28h} = \frac{9}{4}$

e) $\frac{14c+15c-12}{21} = \frac{29c-12}{21}$

f) $\frac{4x-3x-4}{10} = \frac{x-4}{10}$

2. a) $5y^2$

b) $\frac{36ab}{12a^2b} = \frac{3}{a}$

c) $\frac{15m^2}{8n} \times \frac{12n^3}{5m^4} = \frac{9n^2}{2m^2}$

d) $\frac{4-1}{2d} = \frac{3}{2d}$

3. a) $4x + xy$

b) $-10k^2 + 15k^3$

c) $= 14g + 21 + 12g + 3g^2$

$= 26g + 21 + 3g^2$

d) $= 6w + 3w^2 - w + 3$

$= 3w^2 + 5w + 3$

4. a) $y^2 - 3y - 10$

b) $r^2 + 8r + 16$

c) $4f^2 - 9$

d) $= (-2x + 14)(x - 1)$

$= -2x^2 + 16x - 14$

5. a) $6(4x + 1)$

b) $3xy(5x - y)$

c) $(a + 3)(x - 1)$

6. a) $(x + 8)(x - 8)$

b) $(x - 6)(x + 1)$

c) $= a(b + c^2) + 7(b + c^2)$

$= (b + c^2)(a + 7)$

d) $= 2x^2 + 8x + 7x + 28$

$= 2x(x + 4) + 7(x + 4)$

$= (x + 4)(2x + 7)$

7. a) $\frac{5(a+5b)}{5} = a+5b$

b) $\frac{(3y+4)(3y-4)}{2(3y+4)} = \frac{3y-4}{2}$

c) $\frac{3(m-2)}{4} \times \frac{8m}{m(m-2)}$

$= 6$

d) $\frac{14}{(x+1)(x-1)} \times \frac{(x+7)(x+1)}{7(x+7)}$

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

e) $\frac{4}{x(x+1)} - \frac{2}{(x+1)(x-1)}$

$= \frac{2x-4}{x(x+1)(x-1)}$

8. a) $8x$

b)(a) $= \frac{n(m-n)}{-m(m-n)}$

$= -\frac{n}{m}$

(b) $= 3(a+b) + (a+b)(a-b)$

$= (a+b)(3+a-b)$

(c) $= (x^2+\frac{1}{4})(x^2-\frac{1}{4})$

$= (x^2+\frac{1}{4})(x+\frac{1}{2})(x-\frac{1}{2})$

c) $= (158+142)(158-142)$

$= 300 \times 16$

$= 4800$

d) $= (10+9)(10-9) + (8+7)(8-7)$
$+ \ldots + (2+1)(2-1)$

$= 19+15+11+7+3$

$= 55$