Student's Name: .....

Teacher's Name: .....

Barker College

(GPF) Mr Fitzmaurice *
(ESP) Mrs Pratt
(ARP) Mr Perkins
(AYG) Mrs Henry
(DXC) Mr Chua
(LAK) Mrs Kalnins
(RAS) Mr Smith

Thursday 5th March 2020
Period 1 or 2
Time Allowed: 55 minutes

YEAR 9
MATHEMATICS

5.3

ASSESSMENT 1

170 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: [55 marks]

* * * *

1. Simplify fully:

(a) $7m - 15m + 3m$ 1

(b) $9ab - 4a^2 + 2ba + a^2$ 2

(c) $-2y \times 6y^2$ 2

2. Expand and simplify if possible:

(a) $-(x - 5)$ 1

(b) $(c + 8)^2$ 2

(c) $(2x - 1)(x + 10)$ 2

(d) $11 - 3(x + 1)$ 2

3. Fully factorise:

(a) $3x^2 - 9x$ 2

(b) $2ab + 10ad - bc - 5cd$ 3

(c) $36 - h^2$ 2

(d) $x^2 + 8x + 15$ 2

4. Find two numbers that multiply to -272 and add to $+1$. 1

5. Fully factorise:

(a) $x^2 - 11x + 24$ 2

(b) $8 - 72f^2$ 2

(c) $6x^2 - 7x - 10$ 3

6. Simplify:

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

(b) $\frac{9m}{14} \times \frac{7n}{18m}$ 2

(c) $\frac{2y}{x^3} \div 4xy$ 2

7. Simplify: $\sqrt{x^2 + 4x + 4}$ 2

8. The recurring decimal $2.1\dot{0}5\dot{7}$ equals $\frac{3506}{1665}$.
Demonstrate via algebraic methods why this is the correct answer. 3

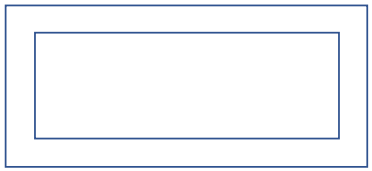
9. Simplify:

(a) $\frac{2x-8}{x^2-16} \times \frac{x+4}{3}$ 3

(b) $\frac{3}{x^2-5x} + \frac{1}{x-5}$ 3

(c) $\frac{x-1}{x^2+10x+21} - \frac{x-3}{x^2-9}$ 4

10. Sally has a photo which is 20*cm* tall and 32*cm* wide.
She wants to put a frame around the photo which is the **same** width all around.
Write a simplied (expanded) expression for the **area** of the framed photo. 2



11. Factorise $x^3 - x^2 - x + 1$ 4

END OF PAPER

Year 9 5.3 Assessment Task 1 Solutions

1.

a) $-5m$

b) $-3a^2 + 11ab$

c) $-12y^3$

2.

a) $-x+5$

b) $(c+8)^2 = (c+8)(c+8)$

$= c^2+8c+8c+64$

$= c^2+16c+64$

c) $(2x-1)(x+10)$

$= 2x^2+20x-x-10$

$= 2x^2+19x-10$

d) $11-3(x+1)$

$= 11-3x-3$

$= -3x+8$

3.

a) $3x^2-9x = 3x(x-3)$

b) $2ab+10ad-bc-5cd$

$= 2a(b+5d)-c(b+5d)$

$= (b+5d)(2a-c)$

3.

c) $36-h^2 = 6^2-h^2$

$= (6-h)(6+h)$

d) $x^2+8x+15$

$P=15$, $S=8$, $F=3,5$

$= x^2+3x+5x+15$

$= x(x+3)+5(x+3)$

$= (x+3)(x+5)$

x $+3$; x $+5$

$\therefore = (x+3)(x+5)$

4. -16 & 17

$-16\times17 = -272$.

$-16+17 = +1$

5.

a) $x^2-11x+24$

$P=24$, $S=-11$, $F=-3,-8$

$= x^2-3x-8x+24$

$= x(x-3)-8(x-3)$

$= (x-3)(x-8)$

x -3; x -8

$= (x-3)(x-8)$

b) $8-72f^2 = 8(1-9f^2)$

$= 8(1+3f)(1-3f)$

Year 9 5.3 Assessment Task 1 Solutions

5.

c) $6x^2-7x-10$

$P=-60$, $S=-7$, $F=-12,+5$

$= 6x^2-12x+5x-10$

$= 6x(x-2)+5(x-2)$

$= (x-2)(6x+5)$

$6x$ $+5$; x -2

$= (6x+5)(x-2)$

6.

a) $\frac{1}{2a}+\frac{5}{a} = \frac{1}{2a}+\frac{10}{2a} = \frac{11}{2a}$

b) $\frac{9m}{14}\times\frac{7n}{18m} = \frac{\cancel{9m}^{1}}{\cancel{14}^{2}}\times\frac{\cancel{7n}^{1}}{\cancel{18m}^{2}}$

$= \frac{n}{4}$

c) $\frac{2y}{x^3}\div 4xy = \frac{\cancel{2y}^{1}}{x^3}\times\frac{1}{\cancel{4xy}^{2}}$

$= \frac{1}{2x^4}$

7. $\sqrt{x^2+4x+4}$

$= \sqrt{(x+2)^2}$

$= x+2$

8. Let $x = 2.1\dot{0}5\dot{7}05\dot{7}\ldots$

$\therefore 1000x = 2105.7\dot{0}5\dot{7}05\dot{7}\ldots$

$\therefore 1000x-x = 2103.6$

$999x = 2103.6$

$x = \frac{2103.6}{999}$

$x = \frac{21036}{9990}$

$\therefore x = \frac{3506}{1665}$

9.

a) $\frac{2x-8}{x^2-16}\times\frac{x+4}{3}$

$= \frac{2\cancel{(x-4)}}{\cancel{(x+4)(x-4)}}\times\frac{x+4}{3}$

$= \frac{2}{3}$

b) $\frac{3}{x^2-5x}+\frac{1}{x-5}$

$= \frac{3}{x(x-5)}+\frac{1}{x-5}$

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

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

9.

c) $\frac{x-1}{x^2+10x+21} - \frac{x-3}{x^2-9}$

$= \frac{x-1}{(x+3)(x+7)} - \frac{(x-3)}{(x+3)(x-3)}$

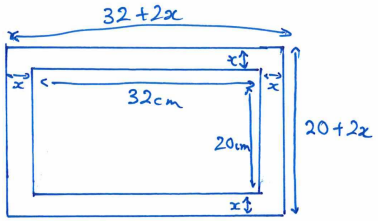
$= \frac{x-1}{(x+3)(x+7)} - \frac{1}{(x+3)}$

$= \frac{(x-1)-(x+7)}{(x+3)(x+7)}$

$= \frac{x-1-x-7}{(x+3)(x+7)}$

$= \frac{-8}{(x+3)(x+7)}$

10.



$\therefore$ Area $= (20+2x)(32+2x)$

$= 640 + 40x + 64x + 4x^2$

$= (4x^2 + 104x + 640)\,cm^2$

11. $x^3 - x^2 - x + 1$

$= x^2(x-1) - 1(x-1)$

$= (x-1)(x^2-1)$

$= (x-1)(x+1)(x-1)$

$= (x-1)^2(x+1)$

12. $\left(\frac{1}{a+1} - \frac{2a}{a^2-1}\right) \times \left(\frac{1}{a} - 1\right)$

$= \left(\frac{1}{a+1} - \frac{2a}{(a+1)(a-1)}\right) \times \left(\frac{1-a}{a}\right)$

$= \left(\frac{a-1-2a}{(a+1)(a-1)}\right) \times \left(\frac{1-a}{a}\right)$

$= \left(\frac{-a-1}{(a+1)(a-1)}\right) \times \left(\frac{1-a}{a}\right)$

$= \frac{-(a+1)}{(a+1)(a-1)} \times \frac{-(a-1)}{a}$

$= \frac{-1}{1} \times \frac{-1}{a}$

$= \frac{1}{a}$