

J.M.J.  
MARCELLIN COLLEGE RANDWICK



YEAR 10  
MATHEMATICS  
Stage 5.3  
ASSESSMENT TASK # 1

2010

Weighting: 15% of Report Mark.

STUDENT NAME: \_\_\_\_\_ MARK: \_\_\_\_\_ / 70

Time Allowed: 45 minutes

Directions:

- Answer all questions on the paper.
- Show all necessary working. Where more than one mark is allocated to a question, full marks may not be awarded for answers only.
- Marks may not be awarded for careless or badly arranged work.

1. Simplify the following

13 marks

a)  $6a + 4b + 3a - 5b$  (1)

b)  $6y \times 4y^3$  (1)

c)  $\frac{2p}{3} \times \frac{5p}{6}$  (2)

d)  $\frac{2x}{3y} \times \frac{15y^2}{6x}$  (2)

e)  $\frac{8x^3}{8y} \times \frac{2y^2}{15} \div \frac{y^2}{4}$  (2)

f)  $24y \div (8y - 2y)$  (2)

g)  $3\sqrt{5} - \sqrt{5}$  (1)

h)  $7\sqrt{24} + 3\sqrt{54}$  (2)

2. Expand and simplify where possible

12 marks

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

b)  $3k - 7(2k - 1)$  (2)

c)  $(3y + 4)(2y + 3)$  (2)

d)  $(p + 5y)(p - 5y)$  (2)

e)  $(2\sqrt{3} + 5)^2$  (2)

f)  $(5y - 2)^2 - (3y + 1)(3y - 1)$  (3)

3. Factorise fully

6 marks

a)  $a^2 - 25 + ab - 5b$  (2)

b)  $x^2 - 14x + 48$  (1)

c)  $14y^2 + y - 4$  (2)

d)  $9x^2 - 1$  (1)

4. Factorise and simplify where possible

6 marks

a)  $\frac{m^2 - 3m}{m^2 - 4} \div \frac{m^2 - 4m}{m^2 - 6m + 8}$  (3)

b)  $\frac{x + 5}{x^2 + x} + \frac{x + 4}{x^2 - x}$  (3)

5. Solve the following

4 marks

a)  $\frac{2x}{7} + 9 = 5 - 2x$  (2)

b)  $11 - 3x \leq -1$  (2)

6. Solve simultaneously:  $2x + 3y - 10 = 0$  and  $5x - y + 26 = 0$

2 marks

7. Solve 4 marks
- a)  $x^2 - 9x = -20$  (2)      b)  $2x^2 - 13x + 15 = 0$  (2)

8. Solve  $x^2 - 12x - 5 = 0$  by completing the square 3 marks

9. Solve  $x^2 - 6x - 4 = 0$ , leaving answers in simplest surd form. 3 marks

10. Rationalise the denominator in the following 5 marks

a)  $\frac{8}{\sqrt{2}}$  (2)      b)  $\frac{6}{2\sqrt{2} + \sqrt{5}}$  (3)

11. Write the following correct to 2 significant figures 3 marks
- a) 973 210 (1)      b) 0.003 185 (1)      c) 4049 (1)

12. Write 0.17 as a fraction in its simplest form 2 marks

13. Evaluate  $64^{\frac{2}{3}}$  without using a calculator 2 marks

14. At a sale which offered a discount of 15%, John bought a camera for \$640. What was the original price of the camera? 2 marks

15. Increase 36kg by 20%. 1 mark

16. Write 540 000 000 in scientific notation. 1 mark

17. Write  $2.33 \times 10^{-4}$  as a basic numeral. 1 mark

1. Simplify the following

13 marks

a)  $\frac{6a+4b+3a-5b}{9a-b}$  (1)

✓ 1

b)  $\frac{6y \times 4y^3}{24y^4}$  (1)

✓ 1

c)  $\frac{\frac{2p}{3} - \frac{5p}{6}}{-\frac{p}{6}}$  (2)

✓ 2

d)  $\frac{\frac{2x}{3} \times \frac{15y^3}{6x} \div \frac{y^2}{3}}{\frac{5y^2}{3}}$  (2)

✓ 2

e)  $\frac{\frac{1}{8x^3} \times \frac{14}{2y} \div \frac{y^2}{15s} \div \frac{y^2}{4}}{+\frac{8y}{15s}}$  (2)

✓ 2

f)  $24y \div (8y - 2y)$  (2)

✓ 2

g)  $\frac{3\sqrt{5}-\sqrt{5}}{2\sqrt{5}}$  (1)

✓ 1

h)  $7\sqrt{24}+3\sqrt{54}$  (2)

✓ 2

13

2. Expand and simplify where possible

12 marks

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

✓ 1

b)  $3k-7(2k-1)$  (2)

✓ 2

c)  $(3y+4)(2y+3)$  (2)

✓ 2

d)  $(p+5y)(p-5y)$  (2)

✓ 2

e)  $(2\sqrt{3}+5)^2$  (2)

✓ 2

f)  $(5y-2)^2 - (3y+1)(3y-1)$  (3)

✓ 3

3. Factorise fully

6 marks

a)  $a^2-25+ab-5b$  (2)

✓ 2

b)  $x^2-14x+48$  (1)

✓ 1

c)  $14y^2+y-4$  (2)

✓ 2

d)  $9x^2-1$  (1)

✓ 1

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4. Factorise and simplify where possible

6 marks

$$\begin{aligned}
 \text{a) } & \frac{m^2-3m}{m^2-4} + \frac{m^2-4m}{m^2-6m+8} \quad (3) \\
 & = \frac{m(m-3)}{(m+2)(m-2)} + \frac{(m-4)(m-2)}{x(m-2)} \\
 & = \frac{m-3}{m+2} \quad \checkmark \quad 3
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } & \frac{x+5}{x^2+x} + \frac{x+4}{x^2-x} \quad (3) \\
 & = \frac{x+5}{x(x+1)} + \frac{x+4}{x(x-1)} \\
 & = \frac{(x+5)(x-1) + (x+4)(x+1)}{x(x+1)(x-1)} \quad 3
 \end{aligned}$$

5. Solve the following

4 marks

$$\begin{aligned}
 \text{a) } & \frac{2x}{7} + 9 = 5 - 2x \quad (2) \\
 & \frac{2x}{7} = -4 - 2x \\
 & 2x = -28 - 14x \\
 & 16x = -28 \\
 & x = -\frac{13}{4} \quad \checkmark
 \end{aligned}$$

$$\begin{aligned}
 & \frac{x^2+4x-5}{x(x+1)(x-1)} + \frac{2x^2+5x+4}{x(x+1)(x-1)} \quad (2) \\
 & \frac{2x^2+9x-1}{x(x+1)(x-1)} \\
 & \text{b) } 11-3x \leq -1 \\
 & -3x \leq -12 \\
 & x \geq 4 \quad \checkmark \quad 2
 \end{aligned}$$

6. Solve simultaneously:  $2x+3y-10=0$  and  $5x-y+26=0$

2 marks

$$\begin{aligned}
 2x+3y-10 &= 0 \quad (1) \\
 5x-y+26 &= 0 \quad (2) \\
 2x+3y &= 10 \quad (3) \\
 5x-y &= -26 \quad (4) \\
 5x+26 &= y \quad (5)
 \end{aligned}$$

sub (5) into (3)

$$\begin{aligned}
 2x+3(5x+26) &= 10 \\
 2x+15x+78 &= 10
 \end{aligned}$$

$$\begin{aligned}
 17x &= -68 \\
 x &= -4 \\
 y &= 6 \quad \checkmark
 \end{aligned}$$

7. Solve

4 marks

$$\begin{aligned}
 \text{a) } & x^2-9x=-20 \quad (2) \\
 & x^2-9x+20=0 \\
 & (x-5)(x-4)=0 \\
 & x=5/4 \quad \checkmark \quad 2
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } & 2x^2-13x+15=0 \quad (2) \\
 & (2x-5)(x+3)=0 \\
 & (2x-5)(x+1)=0 \\
 & x=\frac{5}{2}, -1 \quad \checkmark \quad 2
 \end{aligned}$$

8. Solve  $x^2-12x-5=0$  by completing the square

3 marks

$$\begin{aligned}
 x^2-12x+6^2 &= 5+36 \\
 (x-6)^2 &= 41 \\
 x-6 &= \sqrt{41} \\
 x &= 6 \pm \sqrt{41} \quad \checkmark \quad 3
 \end{aligned}$$

9. Solve  $x^2-6x-4=0$ , leaving answers in simplest surd form.

3 marks

$$\begin{aligned}
 x^2-6x+3^2 &= 4+9 \\
 (x-3)^2 &= 13 \\
 x-3 &= \sqrt{13} \\
 x &= 3 \pm \sqrt{13} \quad \checkmark \quad 3
 \end{aligned}$$

10. Rationalise the denominator in the following

5 marks

$$\begin{aligned}
 \text{a) } & \frac{8}{\sqrt{2}} \quad (2) \\
 & \frac{8\sqrt{2}}{2} = 4\sqrt{2} \quad \checkmark \quad 2
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } & \frac{6}{2\sqrt{2}+\sqrt{5}} \quad (3) \\
 & = \frac{6 \times (2\sqrt{2}-\sqrt{5})}{2\sqrt{2}+\sqrt{5} \times (2\sqrt{2}-\sqrt{5})} \\
 & = \frac{12\sqrt{2}-6\sqrt{5}}{8-5} \quad 3 \\
 & = \frac{12\sqrt{2}-6\sqrt{5}}{3} \\
 & = 4\sqrt{2}-2\sqrt{5} \quad \checkmark
 \end{aligned}$$

12

13

11. Write the following correct to 2 significant figures 3 marks

a)  $973\ 210$  (1)  $\frac{970000}{\checkmark}$  | b)  $0.003\ 185$  (1)  $\frac{0.0032}{\checkmark}$  | c)  $4049$  (1)  $\frac{4000}{\checkmark}$

12. Write 0.17 as a fraction in its simplest form 2 marks

$x = 0.1777...$   
 $100x = 17.7777$   
 $100x - x = 17.6$  ✓  
 $99x = 17.6$   
 $x = \frac{17.6}{99}$  ✓  
 $= \frac{176}{990} = \frac{8}{45}$  ✓

13. Evaluate  $64^{\frac{2}{3}}$  without using a calculator 2 marks

$(\sqrt[3]{64})^2$   
 $= (4)^2$   
 $= 16$  X

14. At a sale which offered a discount of 15%, John bought a camera for \$640. What was the original price of the camera? 2 marks

$640 \div 0.85 = 752.94$  ✓  
\$ 752.94 ✓

15. Increase 36kg by 20%. 1 mark

$36 \times 1.2 = 43.2$  kg ✓

16. Write 540 000 000 in scientific notation. 1 mark

$5.4 \times 10^8$  ✓

17. Write  $2.33 \times 10^{-4}$  as a basic numeral. 1 mark

0.000233 ✓

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