

OUR LADY OF THE SACRED HEART COLLEGE
KENSINGTON



STUDENT – NAME / NUMBER _____

MATHEMATICS TEACHER _____

2005

Year 9

Mathematics


Time allowed : 45 minutes

Assessed Outcomes

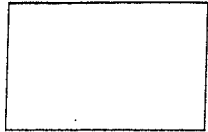
- PAS5.3.1 Uses algebraic techniques to simplify expressions, expand binomial products and factorise quadratic expressions
- PAS5.3.2 Solves linear, quadratic and simultaneous equations, solves and graphs inequalities, and rearranges literal equation
- NS5.1.2 Solves consumer arithmetic problems involving earning and spending money
- NS5.2.2 Solves consumer arithmetic problems involving compound interest, depreciation and successive discounts


Directions to Candidates

- There are 4 sections
 - Section 1: PAS5.3.1 (12 marks)
 - Section 2: PAS5.3.2 (13 marks)
 - Section 3: NS5.1.2 (17 marks)
 - Section 4: NS5.2.2 (3 marks)
- Show all working on the paper.
- Good Luck!!

	Outcome	Question	Answer including working	Mark
1	PAS 5.3.1	Expand these binomial products. a) $(x+3)(x+4)$ b) $(5a-6)(b-3)$		2 2
2	PAS 5.3.1	Find the area of the following rectangle in simplest form. $(2x+3)$  $(x-4)$		2
3	PAS 5.3.1	Complete the following perfect square. a) $(a+b)^2$		1
4	PAS 5.3.1	Expand the perfect square a) $(9-2v)^2$		2
5	PAS 5.3.1	Expand $(2a+3)(2a-3)$		1

6.	PAS 5.3.1	State whether the expression $4x^2 + 6x + 9$ is a perfect square. Include a reason for your answer.	2
TOTAL FOR PAS5.3.1			12 / 12
7	PAS 5.3.2	Write an algebraic expression for each of the following: a) the sum of p , x and 7. b) 9 times the number that is 5 less than p .	1 1
8	PAS 5.3.2	Solve the following: a) $-6 < \frac{t}{2}$	1
		b) $\frac{x}{8} + \frac{x}{6} = 3$	2
		c) $\frac{3y}{4} + 5 = 11$	2

		d) $\frac{3(x-2)}{5} = 1$	2
9	PAS 5.3.2	If the perimeter of this rectangular block of land is 46m, find the length and width of the block. $(x+3)$ m  x m	2
10	PAS 5.3.2	Tim is twice as old as Sally. What are their present ages if in 10 years' time their ages will add to 89?	2
TOTAL FOR OUTCOME 5.3.2			8 / 13
11	PAS 5.1.2	Jane is paid \$450 per week. a) What is her annual salary? b) Calculate her fortnightly salary?	1 1
12	PAS 5.1.2	Gaynor is a process worker who is paid \$12.35 for each toy she makes. How many toys did she make if she earned \$469.30	1

13	PAS 5.1.2	John is paid a weekly retainer of \$250 plus a commission of 3% on the value of his sales. How much would John earn in a week where he sold \$15 500 worth of goods.	2
14	PAS 5.1.2	Greg earns a salary of \$ 29 000 per annum and he receives a pay rise of 4%. What will his salary be after the pay rise.	2
15	PAS 5.1.2	<p>Read the following quote by Louise Dodson (Sydney Morning Herald, May 11, 2005) about the recent budget.</p> <p>“From July 1 the top tax rate of 47 per cent will not kick in until a person earns \$95,000 a year – up from \$70,000.”</p> <p>“For the lowest income earners the marginal tax rate drops from 17 to 15 per cent.”</p> <p>(page 1)</p> <p>Explain what this statement means, perhaps including an example to substantiate your words.</p>	2
16	PAS 5.1.2	<p>Helen has applied for the following job advertisement.</p>  <p>a. After reading the advertisement what would be her annual salary?</p>	1

		<p>b. Helen would be allowed tax deductions of \$654 per annum and union fees of \$134 per annum.</p> <p>i) Calculate her taxable income.</p> <p>ii) Using the tax table below calculate the tax payable.</p>	2												
		<table border="1"> <thead> <tr> <th>Taxable income</th> <th>Tax payable</th> </tr> </thead> <tbody> <tr> <td>\$1–\$6000</td> <td>Nil</td> </tr> <tr> <td>\$6001–\$20 000</td> <td>17 cents for each \$1 over \$6000</td> </tr> <tr> <td>\$20 001–\$50 000</td> <td>\$2380 + 30 cents for each \$1 over \$20 000</td> </tr> <tr> <td>\$50 001–\$60 000</td> <td>\$11 380 + 42 cents for each \$1 over \$50 000</td> </tr> <tr> <td>\$60 001 and over</td> <td>\$15 580 + 47 cents for each \$1 over \$60 000</td> </tr> </tbody> </table>	Taxable income	Tax payable	\$1–\$6000	Nil	\$6001–\$20 000	17 cents for each \$1 over \$6000	\$20 001–\$50 000	\$2380 + 30 cents for each \$1 over \$20 000	\$50 001–\$60 000	\$11 380 + 42 cents for each \$1 over \$50 000	\$60 001 and over	\$15 580 + 47 cents for each \$1 over \$60 000	3
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		<p>ii) Calculate the Medicare levy using the table below.</p>	2												
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		TOTAL FOR OUTCOME NS5.1.2	9 / 17												

17	PAS 5.2.2	Supre are having a 25% sale on all stock. You see a dress you like for \$40. a) Calculate what you pay for the dress with the discount? b) If you pay by cash you receive a further 5% discount. What price would you pay for the dress with this further discount?	2 1
OUTCOME FOR NS5.2.2			3 / 3

REDO ANY QUESTIONS HERE. CLEARLY MARK THE QUESTION.

CHALLENGE

ONLY ATTEMPT THIS QUESTION IF YOU ARE FINISHED. It is not counted in your marks but more to encourage thinking.

Expand and simplify

$$2x(9x - 2y)^2$$

ANSWERS

OUR LADY OF THE SACRED HEART COLLEGE
KENSINGTON



STUDENT – NAME / NUMBER..... Jenny Lee.....

MATHEMATICS TEACHER ..Mrs..... Jourdain.....

2005

Year 9

Mathematics

Time allowed : 45 minutes

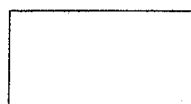
32
45

Assessed Outcomes


- PAS5.3.1 Uses algebraic techniques to simplify expressions, expand binomial products and factorise quadratic expressions
- PAS5.3.2 Solves linear, quadratic and simultaneous equations, solves and graphs inequalities, and rearranges literal equation
- NS5.1.2 Solves consumer arithmetic problems involving earning and spending money
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Directions to Candidates

- There are 4 sections
 - Section 1: PAS5.3.1 (12 marks) 12
 - Section 2: PAS5.3.2 (13 marks) 8
 - Section 3: NS5.1.2(17 marks) 7
 - Section 4: NS5.2.2 (3 marks) 3
- Show all working on the paper.
- Good Luck!!

	Outcome	Question	Answer including working	Mark
1	PAS 5.3.1	Expand these binomial products. a) $(x+3)(x+4)$	$(x+3)(x+4)$ $x^2 + 4x + 3x + 12$ $x^2 + 7x + 12$ ✓✓	2
		b) $(5a-6)(b-3)$	$(5a-6)(b-3)$ $5ab - 15a - 6b + 18$ ✓✓ $5ab - 15$	2
2	PAS 5.3.1	Find the area of the following rectangle in simplest form. $(2x+3)$  $(x-4)$	$(2x+3)(x-4)$ $= 2x^2 - 8x + 3x - 12$ $= 2x^2 - 5x - 12$ ✓✓	2
3	PAS 5.3.1	Complete the following perfect square. a) $(a+b)^2$	$(a+b)^2$ $a^2 + 2ab + b^2$ ✓	1
4	PAS 5.3.1	Expand the perfect square a) $(9-2v)^2$	$(9-2v)^2$ $81 - 36v + 4v^2$ ✓✓	2
5	PAS 5.3.1	Expand $(2a+3)(2a-3)$	$(2a+3)(2a-3)$ $4a^2 - 9$ ✓	1

6.	PAS 5.3.1	State whether the expression $4x^2 + 6x + 9$ is a perfect square. Include a reason for your answer.	Yes No it is not a perfect square due for if so the expression would be $4x^2 + 12x + 9$ which is $(2x+3)^2$	2
		TOTAL FOR PAS5.3.1		12 / 12
7	PAS 5.3.2	Write an algebraic expression for each of the following:		
		a) the sum of p , x and 7.	$p+x+7$ ✓	1
		b) 9 times the number that is 5 less than p .	$9p-5$ $9(p-5)$ ✓	1
8	PAS 5.3.2	Solve the following:		
		a) $-6 < \frac{t}{2}$	$-6 < \frac{t}{2}$ $-6 \times 2 < t$ $-12 < t$ $t > -12$ ✓	1
		b) $\frac{x}{8} + \frac{x}{6} = 3$	$\frac{3x}{8} + \frac{2x}{6} = 3 \times 24$ $3x + 4x = 72$ $7x = 72$ $x = \frac{72}{7}$ $x = 10 \frac{2}{7}$ ✓	2
		c) $\frac{3y}{4} + 5 = 11$	$\frac{3y}{4} + 5 = 11$ $\frac{3y}{4} = 6$ $3y = 24$ $y = 8$ ✓	2

		d) $\frac{3(x-2)}{5} = 1$	$\frac{3x-6}{5} = 1$ $3x-6 = 1 \times 5$ $= 5$ $3x = 5 + 6$ $= 11$ $x = 3 \frac{2}{3}$ ✓	2
9	PAS 5.3.2	If the perimeter of this rectangular block of land is 46m, find the length and width of the block.	 $2(x+3) + 2x = 46$ $2x+6+2x=46$ $4x=46-6$ $=40$ $x=10$ ✓ width = 10m length = 13m	2
10	PAS 5.3.2	Tim is twice as old as Sally. What are their present ages if in 10 years' time their ages will add to 89?	Tim = 2x Sally = x $3x+20=89$ $3x=69$ $x=23$ Tim = 46 $(x+10) + (2x+10) = 89$ $3x+20=89$ $3x=69$ $x=23$ Tim = 46 Sally = 23 $\frac{29.67}{89} \times 100 = 33.34\%$	2
		TOTAL FOR OUTCOME 5.3.2		8 / 13
11	PAS 5.1.2	Jane is paid \$450 per week.		
		a) What is her annual salary?	$450 \times 52 = \$23400$ annual salary ✓	1
		b) Calculate her fortnightly salary?	$450 \times 2 = \$900$ fortnightly ✓	1
12	PAS 5.1.2	Gaynor is a process worker who is paid \$12.35 for each toy she makes. How many toys did she make if she earned \$469.30	$\frac{469.30}{12.35} = 38$ toys ✓	1

13	PAS 5.1.2	John is paid a weekly retainer of \$250 plus a commission of 3% on the value of his sales. How much would John earn in a week where he sold \$15 500 worth of goods.	$0.03 \times 15500 = 465$ $465 + 250 = \$715$ ✓✓	2
14	PAS 5.1.2	Greg earns a salary of \$29 000 per annum and he receives a pay rise of 4%. What will his salary be after the pay rise.	$29000 \times 0.04 = 1160$ ✓ $1160 + 29000 = 30160$ ✓ 30000	2
15	PAS 5.1.2	<p>Read the following quote by Louise Dodson (Sydney Morning Herald, May 11, 2005) about the recent budget.</p> <p>From July 1 the top tax rate of 47 per cent will not kick in until a person earns \$95,000 a year - up from \$70,000...</p> <p>For the lowest income earners the marginal tax rate drops from 17 to 15 per cent.</p>	<p>It is saying that from the 1st of July people's tax rate of 47% will not be allowed until the a person earns \$95 000, from \$70 000.</p> <p>For people who earn less, their tax rate will become 15% & not 17%.</p>	2
		<p>(*) People under \$70,000 only pay 15% tax on earnings above \$6000</p> <p>(*) Salaries between 70,000 + 95,000 remain on 42% tax.</p>		
16	PAS 5.1.2	<p>Helen has applied for the following job advertisement.</p>  <p>Top tax bracket will change from \$70 000 to \$95 000. This means income earners > 70 000 will pay less tax & therefore have more net income. Low income earners will pay less tax as the rate changes from .17 to .15 & have more net income.</p>		
		a. After reading the advertisement what would be her annual salary?	\$44 132 ✓	1

		b. Helen would be allowed tax deductions of \$654 per annum and union fees of \$134 per annum.	$i) 44\ 132 - (654 + 134) = 43\ 344$ ✓✓ ii) $43\ 344 - 20\ 000 = 23\ 344$ $23\ 344 \times 0.3 = 7003.2$ $23\ 344 + 7003.2 = 30347.2$	2												
		i) Calculate her taxable income.	$23\ 344 + 23\ 800 + 0.3 = 47144$ $23\ 800 + 0.3 \times (43\ 344 - 20\ 000)$ $= 23\ 800 + 7003.2 = 30803.2$ ✓✓	3												
		ii) Using the tax table below calculate the tax payable.	<table border="1"> <thead> <tr> <th>Taxable income</th> <th>Tax payable</th> </tr> </thead> <tbody> <tr> <td>\$1-\$6000</td> <td>Nil</td> </tr> <tr> <td>\$6001-\$20 000</td> <td>17 cents for each \$1 over \$6000</td> </tr> <tr> <td>\$20 001-\$50 000</td> <td>\$2380 + 30 cents for each \$1 over \$20 000</td> </tr> <tr> <td>\$50 001-\$60 000</td> <td>\$11 380 + 42 cents for each \$1 over \$50 000</td> </tr> <tr> <td>\$60 001 and over</td> <td>\$15 580 + 47 cents for each \$1 over \$60 000</td> </tr> </tbody> </table>	Taxable income	Tax payable	\$1-\$6000	Nil	\$6001-\$20 000	17 cents for each \$1 over \$6000	\$20 001-\$50 000	\$2380 + 30 cents for each \$1 over \$20 000	\$50 001-\$60 000	\$11 380 + 42 cents for each \$1 over \$50 000	\$60 001 and over	\$15 580 + 47 cents for each \$1 over \$60 000	
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			$ii) 43\ 344 \times 0.015 = 650.16$ $43\ 344 \times 0.015 = 650.16$ $43\ 344 \times 0.015 = 650.16$													
		TOTAL FOR OUTCOME NS5.1.2	\$649.16	9/17												

17	PAS 5.2.2	Supre are having a 25% sale on all stock. You see a dress you like for \$40. a) Calculate what you pay for the dress with the discount? b) If you pay by cash you receive a further 5% discount. What price would you pay for the dress with this further discount?	a) $0.25 \times 40 = 10$ $40 - 10 = \$30$ You will pay \$30 ✓ b) $\frac{5\%}{100} \times 30 = 1.50$ $30 - 1.50 = \$28.50$ You will pay \$28.50 ✓	2 1
OUTCOME FOR NS5.2.2				3/3

REDO ANY QUESTIONS HERE. CLEARLY MARK THE QUESTION.

CHALLENGE

ONLY ATTEMPT THIS QUESTION IF YOU ARE FINISHED. It is not counted in your marks but more to encourage thinking.

Expand and simplify

$2x(9x-2y)^2$

~~$(18x^2 - 4xy)^2$
 $324x^4 - 144x^2y + 16x^2y^2$~~

~~$2x(9x-2y)^2$
 $2x(9x-2y)(9x-2y)$
 $(18x^2 - 4xy)(9x-2y)$~~

$2x \times \{81x^2 - 36xy + 4y^2\}$
 $= 162x^3 - 72x^2y + 8xy^2$