Name:_____

Teacher:_____

Sydney Technical High School

Mathematics

Year 8 Maths Exam

2009

Directions:

- You have 10 minutes to answer Part A – Non Calculator section
- You have 60 minutes to answer Part B – Calculator section (Calculators may be used)
- Show all necessary working
- Marks will be deducted for careless or badly arranged work

Part A Non-calculator	Part B Calculator Section					
	Q1	Q2	Q3	Q4	Q5	Total
Total 30 marks	17 marks	10 marks	14 marks	25 marks	13 marks	109

PART B

Calculators allowed

Question 1

Number

17 marks

1. Simplify the following

$$\frac{\frac{2}{5}+\frac{1}{4}}{\frac{2}{3}-\frac{1}{2}} =$$

(1)

2. Simplify:

$3\frac{3}{8} + 2\frac{1}{4} =$

(1)

3. Evaluate

$-\frac{7}{9} \div 4\frac{2}{3} =$

(1)

4. Circle the numbers divisible by:

(a) *2*: 21 84 3641 123456

(b) *5*: 551 135 1110 36284

(c) *3*: 123 12121 735 72222

(d) *9*: 27 345 3249 45451

(e) *10*: 101 2220 1000 3005

(5)

5. Maria cut 3.28 metre length from a roll of cloth 10 metres long. How much cloth remained on the roll?

(1)

6. Evaluate:

a. $9^2 =$

b. $5^3 =$

c. $3^4 =$

d. $\sqrt{169} =$

e. $\sqrt[3]{64} =$

f. $\sqrt[4]{81} =$ (6)

7. Add 3 h 27 min to 8 h 46 min and give the answer in hours and minutes

(1)

8. 17 h 25 min - 6 h 52 min. Answer in hours and minutes.

(1)

Question 2

Percentages

10 marks

1) In a class of 36 students, 9 students were absent. What percentage of the class were present?

(2)

2) If 20% of an amount is $14, calculate the full amount

(2)

3) John bought a painting for $600 and sold it for $648. Find the profit as a percentage of the cost price.

(2)

4) Find the simple interest earned on $800 invested at 12% pa for 3 years.

(2)

5) To increase the cost of a dress by 12%, a shop has to add $2.52. What is the new price?

(2)

Question 3

Pythagoras

14 marks

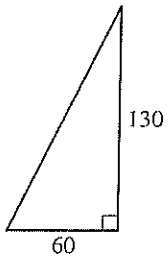
Are the numbers 9, 17, 19 a Pythagorean triad? Explain your answer.

(1)

Given n, n^2-1, n^2+1 is a triad, if the smallest number of a Pythagorean triad is 7, find the middle number and, hence, find the third number.

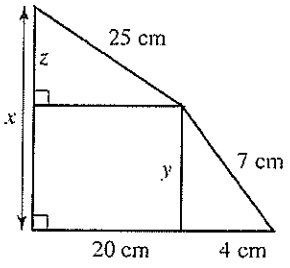
(2)

Calculate the length of the hypotenuse exactly if possible (if not, leave in exact or square root form).



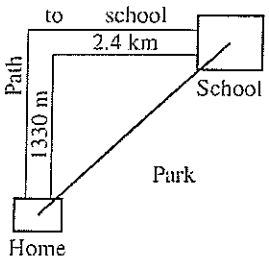
(2)

Find the value of the pronumeral in this figure. Give answer correct to 2 decimal places.



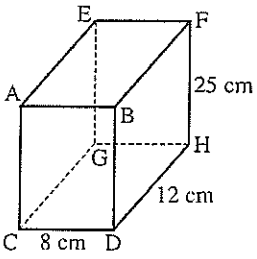
(3)

Josef and Maria walk to school every morning as shown in the figure. Josef decides to take the shortcut through the park. How much distance does he save in km to 2 decimal places.



(3)

Find the length of ED correct to 2 decimal places.



(3)

Question 4

Algebra

25 marks

Simplify the following:

1) m x 3n x 2 (1)	2) 15a ÷ 3 (1)	3) 8a ÷ 4a (1)
4) $9ab^2c \div 3ab$ (2)	5) 14ab ÷ 7a (1)	6) $8a^2bc^2 \div 3abc^2$ (2)
7) Fully factorise $12q + 144$ (1)	8) Factorise $16fgh + 64fg$ (1)	9) Fill in the missing term in the following factorised expressions. $12fgh - 16fg = 4fg(3h - \nabla)$ (1)

Substitute a = 2, b = 3 and c= - 4 into the following and find the value of the expressions

10) $\frac{2b+4}{a}$ (1)	11) 2b + a (1)	12) a(b + a) (1)

Simplify the following:

13) $5x + 2x + x$ (1)	14) $8y - y$ (1)	15) $4a - b - 3a + 5b$ (1)
16) $\frac{3p}{4} \div \frac{p}{2} =$ (1)	17) $5x^2 + 3x - 2x^2 + x$ (1)	18) $2ab + 3ba$ (1)
19) $y = 3x \text{ and } z = 4x$ $\text{then } x + y + z \text{ equals}$ (1)	20) Kathryn has 20 coins in her purse. They are 10c, 20c, and 50c coins, and the total value of the coins is \$5.00 If she has more 50c than 10c coins, how many 10c coins has she? (2)	21) A father in his will left all his money to his children in the following manner: \$1000 to the first born and $\frac{1}{10}$ of what then remains, then \$2000 to the second born and $\frac{1}{10}$ of what then remains, then \$3000 to the third born and $\frac{1}{10}$ of what then remains, and so on. When this was done each child then had the same amount. How many children were there? (2)

Question 5

Challenge

13 marks

Expand:

1) $-3(x-2)$ (1)	2) $(a+2)(a+4)$ (2)	3) $(5y+2)(2y-3)$ (2)

4) A plane carries m economy class passengers and 20 business class passengers.

(a) Write algebraic expressions to show:

(i) the total number of passengers carried

_____ (1 mark)

(ii) the number of passengers in 5 similar planes

_____ (1 mark)

(b) If the value of m is 120, find the number of passengers carried in 5 planes.

_____ (2marks)

5) $\frac{x+1}{3}+\frac{x}{4}=$ (2)	6) $\frac{x+y}{2}-\frac{x-y}{3}=$ (2)

Part A Non-Calculator Section

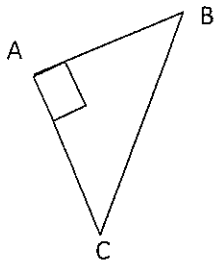
Time Allowed 10minutes

Name_____

Total for Part A 30 marks

Teacher _____

1. Write down Pythagoras' Theorem for this triangle:



(1)

2. Write the following fraction in its simplest form:

a. $\frac{26}{9}$ =

b. $\frac{6x}{8x}$ = (2)

3. Evaluate

a. 11^2

b. $\sqrt{16900}$

(2)

4. Write as a fraction in simples terms:

a. 0.44

b. 1.005

(2)

5. Evaluate:

a. -28 - 26 =

b. 14 - -12 =

c. 7 × -6 =

d. -64 ÷ 16 =

(4)

6. Change to a decimal:

a. $\frac{424}{10}$ =

b. $3 + \frac{9}{10} + \frac{9}{100} + \frac{9}{1000}$ =

c. $\frac{7}{1000}$ =

(3)

7. Round off to the nearest ten:

551 (1)

8. Express the first amount as a percentage of the second amount:

$45: $60

(1)

9. Round off to the nearest hundred:

751 ____

7818 _____

(2)

10.
Round off the following to two decimal places:

0.0652 _____ 35.629 _____

(2)

11. Round off the following numbers to the nearest tenth:

1.71 _____ 0.0821_____

(2)

12. Increase $240 by 12.5%.

(1)

13. Find the answer to:

a. $\frac{3}{8} \times \frac{4}{5} =$

b. $\frac{7}{10} \div \frac{3}{5} =$

(2)

14. At *TARGET'S* **15% OFF SALE**, how much would you pay for a jumper priced at $60?

(1)

15. Sue was given a commission of 5% when she sold goods to the value of $650. How much did she receive?

(1)

16. Convert 100 mins into hours and minutes

(1)

17. 3 decades = years

(1)

18. 4 centuries = decades

(1)

PART B

Calculators allowed

Question 1

Number

17 marks

1. Simplify the following

$$\frac{\frac{2}{5}+\frac{1}{4}}{\frac{2}{3}-\frac{1}{2}} =$$

$3\frac{9}{10}$ (1)

2. Simplify:

$3\frac{3}{8} + 2\frac{1}{4} =$

$5\frac{5}{8}$ (1)

3. Evaluate

$-\frac{7}{9} \div 4\frac{2}{3} =$

$-1/6$ (1)

4. Circle the numbers divisible by:

(a) 2: 21 (84) 3641 (123456)

(b) 5: 551 (135) (1110) 36284

(c) 3: 123 12121 (735) (72222)

(d) 9: (27) 345 (3249) 45451

(e) 10: 101 (2220) (1000) 3005

(5)

5. Maria cut 3.28 metre length from a roll of cloth 10 metres long. How much cloth remained on the roll?

6.72 m.

(1)

6. Evaluate:

a. $9^2 = 81$

b. $5^3 = 125$

c. $3^4 = 81$

d. $\sqrt{169} = 13$

e. $\sqrt[3]{64} = 4$

f. $\sqrt[4]{81} = 3$ (6)

7. Add 3 h 27 min to 8 h 46 min and give the answer in hours and minutes

12h 13m (1)

8. 17 h 25 min - 6 h 52 min. Answer in hours and minutes.

10h 33m (1)

Question 2

Percentages

10 marks

1) In a class of 36 students, 9 students were absent. What percentage of the class were present?

75% (2)

2) If 20% of an amount is $14, calculate the full amount

20% = $14

100% = $70

(2)

3) John bought a painting for $600 and sold it for $648. Find the profit as a percentage of the cost price.

$\frac{48}{600} \times 100 = 8\%$.

(2)

4) Find the simple interest earned on $800 invested at 12% pa for 3 years.

S.I = $288.

(2)

5) To increase the cost of a dress by 12%, a shop has to add $2.52. What is the new price?

12% = $2.52

100% = 21.00

N.P = $23.52

(2)

Part A Non-Calculator Section

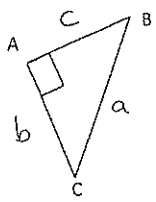
Time Allowed 10minutes

Name_____

Total for Part A 30 marks

Teacher _____

1. Write down Pythagoras' Theorem for this triangle:



$a^2 = b^2 + c^2$

$Bc^2 = AB^2 + AC^2$ (1)

2. Write the following fraction in its simplest form:

a. $\frac{26}{9} =$ $2\frac{8}{9}$

b. $\frac{6x}{8x} =$ $\frac{3}{4}$ (2)

3. Evaluate

a. $11^2 =$ 121

b. $\sqrt{16900} =$ 130 (2)

4. Write as a fraction in simples terms:

a. 0.44 $11/25$

b. 1.005 $1\frac{1}{200}$ (2)

5. Evaluate:

a. -28 - 26 = -54

b. 14 + 12 = 26

c. 7 × -6 = -42

d. -64 ÷ 16 = -4 .

(4)

6. Change to a decimal:

a. $\frac{424}{10} =$ 42.4

b. $3 + \frac{9}{10} + \frac{9}{100} + \frac{9}{1000} =$ 3.999

c. $\frac{7}{1000} =$ 0.007

(3)

7. Round off to the nearest ten:

551 (1)

550

8. Express the first amount as a percentage of the second amount:

$45: $60

$\frac{45}{60} = 75\%$.

(1)

9. Round off to the nearest hundred:

751 ~~750~~ 800

7818 7800 (2)

10. Round off the following to two decimal places:

0.0652 0.07 35.629 35.63 (2)

11. Round off the following numbers to the nearest tenth:

1.71 1.7

0.0821 0.1 (2)

12. Increase $240 by 12.5%.

10% = 24

5% = 12

2½% = 6.

$30 — (1)

13. Find the answer to:

a. $\frac{3}{8} \times \frac{4}{5} = \frac{12}{40} = \frac{3}{10}$

b. $\frac{7}{10} \div \frac{3}{5} = 1\frac{1}{6}$

$\frac{7}{10} \times \frac{5}{3} = \frac{7}{6}$ (2)

14. At *TARGET'S* **15% OFF SALE**, how much would you pay for a jumper priced at $60?

Pay = $51 (1)

15. Sue was given a commission of 5% when she sold goods to the value of $650. How much did she receive?

10% = 65

5% = 32.50

$32.50 (1)

16. Convert 100 mins into hours and minutes

60 | 100

1 hr 40 mins. (1)

17. 3 decades = 30 years (1)

18. 4 centuries = 40 decades (1)

Simplify the following:

13) $5x + 2x + x$

$8x$

(1)

14) $8y - y$

$7y$

(1)

15) $4a - b - 3a + 5b$

$a + 4b$

(1)

16) $\frac{3p}{4} \div \frac{p}{2} =$

$\frac{3\cancel{p}}{4} \times \frac{2}{\cancel{p}}$

$= \frac{3}{2}$.

(1)

17) $5x^2 + 3x - 2x^2 + x$

$3x^2 + 4x$

(1)

18) $2ab + 3ba$

$5ab$

(1)

19) *$y = 3x$ and $z = 4x$ then $x + y + z$ equals*

$x + 3x + 4x$

$= 8x$

(1)

20) Kathryn has 20 coins in her purse. They are 10c, 20c, and 50c coins, and the total value of the coins is $5.00 If she has more 50c than 10c coins, how many 10c coins has she?

20 coins

10	20	50c.
2	14	4 ←
5	10	5
8	6	6
11	2	7

2.

(2)

21) A father in his will left all his money to his children in the following manner: $1000 to the first born and $\frac{1}{10}$ of what then remains, then $2000 to the second born and $\frac{1}{10}$ of what then remains, then $3000 to the third born and $\frac{1}{10}$ of what then remains, and so on. When this was done each child then had the same amount. How many children were there?

9 children

(2)

Question 5

Challenge

13 marks

Expand:

1) $-3(x - 2)$

$-3x + 6$

(1)

2) $(a + 2)(a + 4)$

$a^2 + 6a + 8$

(2)

3) $(5y + 2)(2y - 3)$

$10y^2 - 11y - 6$.

(2)

4) A plane carries m economy class passengers and 20 business class passengers.

(a) Write algebraic expressions to show:

(i) the total number of passengers carried

Total $= m + 20$

(1 mark)

(ii) the number of passengers in 5 similar planes

Tot $= 5(m + 20)$

(1 mark)

(b) If the value of m is 120, find the number of passengers carried in 5 planes.

Tot $= 5(120 + 20)$

$= 700$.

(2marks)

5) $\frac{x+1}{3} + \frac{x}{4} = \frac{4x + 4 + 3x}{12}$

$= \frac{7x + 4}{12}$

(2)

6) $\frac{x+y}{2} - \frac{x-y}{3} = \frac{3x + 3y - 2x + 2y}{6}$

$= \frac{x + 5y}{6}$

(2)

Question 3

Pythagoras

14 marks

Are the numbers 9, 17, 19 a Pythagorean triad? Explain your answer.

NO.

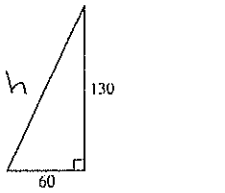
(1)

Given n, n^2-1, n^2+1 is a triad, if the smallest number of a Pythagorean triad is 7, find the middle number and, hence, find the third number.

7, 48, 50

(2)

Calculate the length of the hypotenuse exactly if possible (if not, leave in exact or square root form).

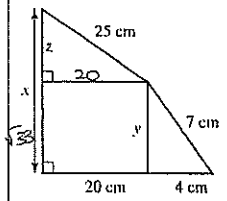


$h = \sqrt{60^2 + 130^2}$

$h = \sqrt{20,500}$

(2)

Find the value of the pronumeral in this figure. Give answer correct to 2 decimal places.



$y = \sqrt{49 - 16}$

$y = \sqrt{33}$

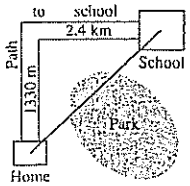
$z = \sqrt{25^2 - 20^2}$

$= 15$.

$x = 15 + \sqrt{33}$

(3)

Josef and Maria walk to school every morning as shown in the figure. Josef decides to take the shortcut through the park. How much distance does he save in km to 2 decimal places.



Total dist.

$= 2.4 + 1.33$

$= 3.73$ km.

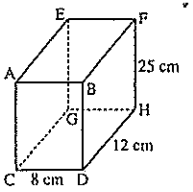
short $= \sqrt{2.4^2 + 1.33^2}$

$= 2.74$

Saving $= 0.99$ km.

(3)

Find the length of ED correct to 2 decimal places.



$ED = \sqrt{12^2 + 8^2 + 25^2}$

$= 28.86$ cm.

(3)

Question 4

Algebra

25 marks

Simplify the following:

1) m x 3n x 2

6mn

(1)

2) 15a ÷ 3

5a.

(1)

3) 8a ÷ 4a

2.

(1)

4) $9ab^2c \div 3ab$

$\frac{3}{9ab^2c}{3ab}$

$3bc$

(2)

5) $14ab \div 7a$

$2b$

(1)

6) $8a^2bc^2 \div 3abc^2$

$\frac{8a^2bc^2}{3abc^2}$

$\frac{8}{3}a$.

(2)

7) Fully factorise $12q + 144$

$12(q+12)$

(1)

8) Factorise $16fgh + 64fg$

$16fg(h+4)$

(1)

9) Fill in the missing term in the following factorised expressions.

$12fgh - 16fg = 4fg(3h - \nabla)$

$\nabla = 4$

(1)

Substitute a = 2, b = 3 and c= - 4 into the following and find the value of the expressions

10) $\frac{2b+4}{a}$

$\frac{2\times3+4}{2} = 5$

(1)

11) 2b + a

$2\times3+2 = 8$

(1)

12) a(b + a)

$2(3+2)$ 10.

(1)