Name: ................................................. Maths Class: ......................

# SYDNEY TECHNICAL HIGH SCHOOL

# YEAR 10 YEARLY EXAMINATION

## Mathematics

## PART B

### SECTION 2
#### (MULTIPLE CHOICE)
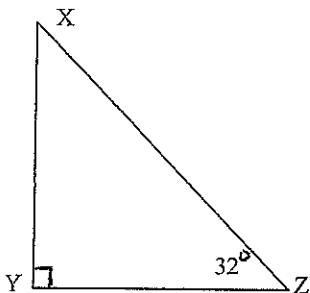
### OCTOBER 2009

*TIME ALLOWED: 40 minutes*

## *Instructions:*

- Write your name and class at the top of this page,
- Calculators may be used for this section.
- ALL questions are worth 1 mark. TOTAL MARKS FOR THIS SECTION = 25
- The answer sheet attached to the rear of this question paper may now be removed. Write your name on it NOW.
- The answers to all questions in this section are to be done on this answer sheet.
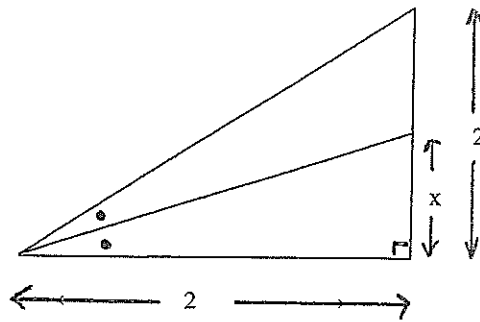
| 1 | Ricky Ponting wins the toss in the first 4 matches of the Champions League competition. When he comes to play India in game 5 his chance of winning the toss is: |
|---|---|
| | A. $\frac{1}{32}$      B. $\frac{1}{2}$      C. $\frac{4}{5}$      D. $\frac{31}{32}$ |
| 2 | Jun-Ho invests \$20 000 into an account earning 6% p.a. interest compounded monthly over 5 years. <br> At the end of this time his account (to the nearest dollar) is worth: |
| | A. \$20 505      B. \$26 765      C. \$26 977      D. \$659 754 |
| 3 | As a decimal rounded to 3 decimal places, the ratio $\frac{YZ}{XZ}$ is: <br><br>  <br><br> A. 0.530      B. 0.625      C. 0.848      D. 1 |
| 4 | Which of the following is NEVER an even number if n is an integer? <br><br> A. $2n$      B. $2^n$      C. $6^n$      D. $2n + 1$ |
| 5 | Simplify $-3a + 4x - 5a - 2x$ <br><br> A. $-8a + 2x$      B. $2a + 2x$      C. $-8a - 2x$      D. $-2a - 2x$ |

| 6 | In the following diagram, what is the approximate value of x? |



A. 0.7625          B.   0.828          C. 1          D.  there is not enough information

| 7 | Two normal (6 faced) unbiased dice are thrown into the air, and, when they land, the uppermost faces are recorded. This toss is repeated 36 times. How many times would you expect the result "double 6 or double 3" to occur? |

A. 1                    B.   2                    C.   6                    D.   12

| 8 | Using the tax scale given below, find the tax to be paid on a taxable income of $35 000. |

| Taxable Income | Tax on this income |
| --- | --- |
| $1 - $6 000 | Nil |
| $6 001 - $20 000 | 17 cents for each dollar over $6 000 |
| $20  001 - $50 000 | $2380 plus 30 cents for each $1 over $20 000 |
| $50 001 - $60 000 | $11 380 plus 42 cents for each $1 over $50 001 |
| $60 001 and over | $15 580 plus 47 cents for each $1 over $60 000 |

A. $4 500          B. $5 950          C. $6 880          D. $10 500

| 9 | $(x + y)^2 - (x - y)^2 =$ |
|---|---|
| | A. 0      B. *2xy*      C. *4xy*      D. $2y^2$ |
| 10 | Fred throws three coins into the air. The chance of their coming down as two Heads and a Tail are: |
| | A. $\frac{1}{3}$      B. $\frac{2}{3}$      C. $\frac{1}{8}$      D. $\frac{3}{8}$ |

11. Ben was trying to solve two simultaneous equations, namely

$$4x - 3y + 5 = 0 \quad ..... \text{ equation 1}$$
$$\text{and} \quad 2x + 5y - 1 = 0 \quad ..... \text{ equation 2}$$

His setting out was as follows:

LINE A: (equation 2) x 2      $4x + 10y - 2 = 0$ ....... equation 3

LINE B: equation 1 – equation 3      $7y + 7 = 0$

LINE C:      $y = -1$

LINE D: Substitute into equation 2      $x = 3$

He was marked incorrect . In which line did he make the error?

A. Line A      B. Line B      C. Line C      Line D

12. The solution to the pair of simultaneous equations

$$[4x - 3y + 10 = 0$$
$$[5y - 3x = 13$$

is:

A. (-1,2)      B. (-1,-2)      C. (1,-2)      D. (1, 2)

| 13 | Sue borrows $52 000 to buy a Camry (of course!) and is charged 12% p.a. on the amount outstanding at the end of each year. Repayments of $10 000 are made yearly just after the interest is calculated. |
| | How much does Sue owe after she has made the 2$^{nd}$ repayment? (to nearest dollar) |
| | A. $7 200     B. $41 520     C. $44 029     D. $47 040 |

---

| 14 | If $(2\sqrt{3} - 3)^2 = \Delta - \square\sqrt{3}$, then |
| | A. $\Delta = 3$ and $\square=0$    B. $\Delta = 3$ and $\square=12$    C. $\Delta = 21$ and $\square=6$    D. $\Delta = 21$ and $\square=12$ |

---

| 15 | $x$ is an even number greater than 2 |
| | The last 3 digits in the value of $5^x$ are: |
| | A. 025     B. 125     C. 625     D. varies |

---

| 16 | The circle $x^2 + y^2 = 25$ and the straight line $3y - 4x = 0$ intersect at the point whose co-ordinates are given by: |
| | A. x=5 and y=0    B. x=0 and y=5    C. x=4 and y=3    D. x=3 and y=4 |

---

| 17 | George stands on a hill a looks at a monument on a bearing of 062° from where he stands. If he then turns to look at another monument, bearing 318° what is the smallest angle through which he has turned? |
| | A. 20°     B. 104°     C. 256°     D. 380° |

| 18 | William draws 2 cards from a standard 52 card deck of playing cards, without replacing any of them, and places them face down on the desk. |
|----|---|

He turns over the cards.

What is the probability that both cards are Kings?

A. $\dfrac{1}{221}$    B. $\dfrac{1}{16}$    C. $\dfrac{1}{12}$    D. $\dfrac{1}{2}$

---

**19** Apples cost $1.25 each, while Bananas cost $1.40 each. Quentin bought 12 pieces of fruit and paid a total of $15.60.

Which pair of simultaneous equations can be solved to answer this question?

A
$$x - y = 12$$
$$125x + 140y = 1560$$

C
$$x - y = 12$$
$$\dfrac{x}{125} + \dfrac{y}{140} = 1560$$

B
$$x + y = 12$$
$$125x + 140y = 1560$$

D
$$x + y = 12$$
$$\dfrac{x}{125} + \dfrac{y}{140} = 1560$$

---

**20** When simplified, $\dfrac{1}{\sqrt{2}-1} - \dfrac{1}{\sqrt{2}+1} =$

A. -2    B. -1    C. 1    D. 2

---

**21** Zoran's car depreciates at a rate of 10% p.a.
How many years is it before his car is worth less than half of its original value?

A. it will never be worth half its original value    B. there is not enough information    C. 7 years    D. 10 years

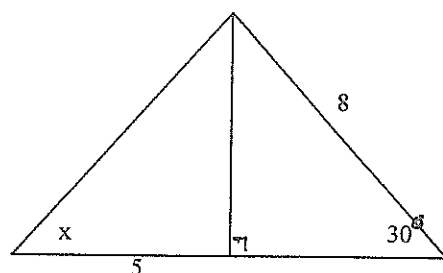| 22 | If $2^q = \dfrac{4^{3x+1}}{2^2 \cdot 8^{2x}}$ then $q=$ |
|---|---|

A. $x-1$      B. 0      C. 1      D. 4

---

**23** In the diagram below, the value of x (to the nearest degree) is:



A. $30^{\circ}$      B. $37^{\circ}$      C. $39^{\circ}$      D. $53^{\circ}$

---

**24** The solution set to the inequality $3 < 2x - 1 < 5$ is:

A. $2 < x < 3$      B. $1 < x < 2$      C. $2 < x < 2.5$      D. $1.5 < x < 3$

---

**25** Simplify the following algebraic fraction:

$$\frac{3x^2 - 3y^2}{x^2 + 2xy + y^2} \div \frac{xy - y^2}{9(x+y)}$$

A. $\dfrac{27}{y}$      B. $\dfrac{3(x-y)^2}{(x+y)^2}$      C. $\dfrac{27(x-y)}{(x+y)}$      D. $\dfrac{y(x-y)^3}{3(x+y)^3}$

# MATHEMATICS YEAR 10 YEARLY EXAMINATION 2009

| Name | |
|---|---|
| Teacher | |

**Part B Section 2**

**Answer Sheet**

Circle the letter corresponding

to the correct answer.  ☺

1.    A    B    C    D

2.    A    B    C    D

3.    A    B    C    D

4.    A    B    C    D

5.    A    B    C    D

6.    A    B    C    D

7.    A    B    C    D

8.    A    B    C    D

9.    A    B    C    D

10.   A    B    C    D

11.   A    B    C    D

12.   A    B    C    D

13.   A    B    C    D

14.   A    B    C    D

15.   A    B    C    D

16.   A    B    C    D

17.   A    B    C    D

18.   A    B    C    D

19.   A    B    C    D

20.   A    B    C    D

21.   A    B    C    D

22.   A    B    C    D

23.   A    B    C    D

24.   A    B    C    D

25.   A    B    C    D

Name: ...........(SOLUTIONS)............    Maths Class: ......................

# SYDNEY TECHNICAL HIGH SCHOOL

# YEAR 10 YEARLY EXAMINATION

## Mathematics

## PART B

### SECTION 2
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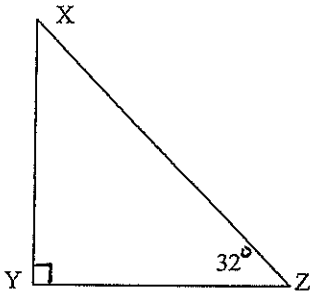### OCTOBER 2009

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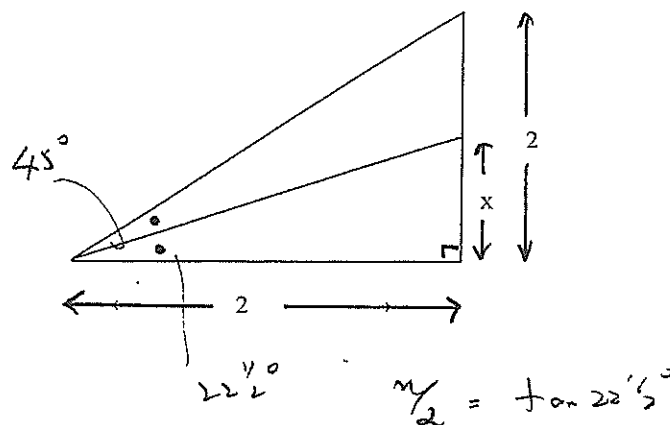
(FOR MARKERS USE ONLY)

| PART B SECTION 1 | PART B SECTION 2 | TOTAL PART A | TOTAL |
|---|---|---|---|
| /15 | /25 | /60 | /100 |

| | |
|---|---|
| 1 | Ricky Ponting wins the toss in the first 4 matches of the Champions League competition. When he comes to play India in game 5 his chance of winning the toss is: |

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---

2. Jun-Ho invests $20 000 into an account earning 6% p.a. interest compounded monthly over 5 years.

At the end of this time his account (to the nearest dollar) is worth:

$$20,000 \left(1.005\right)^{60}$$

A. $20 505   B. $26 765   C. $26 977   D. $659 754

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3. As a decimal rounded to 3 decimal places, the ratio $\frac{YZ}{XZ}$ is:



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A. $-8a + 2x$   B. $2a + 2x$   C. $-8a - 2x$   D. $-2a - 2x$

| 6 | In the following diagram, what is the approximate value of x? |
|---|---|



$45°$

$22\frac{1}{2}°$

$\frac{x}{2} = \tan 22\frac{1}{2}°$

A. 0.7625          B.   0.828          C.  1          D.  there is not enough information

| 7 | Two normal (6 faced) unbiased dice are thrown into the air, and, when they land, the uppermost faces are recorded. This toss is repeated 36 times. How many times would you expect the result "double 6 or double 3" to occur? |
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| $60 001 and over | $15 580 plus 47 cents for each $1 over $60 000 |

35 000

− 20 000

15 000

15000 × 0.30 → 2380

A. $4 500          B. $5 950          C. $6 880          D. $10 500

| 9 | $(x+y)^2 - (x-y)^2 =$ |
|---|---|

$$x^2 + 2xy + y^2 - (x^2 - 2xy + y^2)$$

A. 0     B. *2xy*     C. *4xy*     D. $2y^2$

| 10 | Fred throws three coins into the air. The chance of their coming down as two Heads and a Tail are: |
|---|---|

*(handwritten tree diagram)*

3/8

A. $\frac{1}{3}$     B. $\frac{2}{3}$     C. $\frac{1}{8}$     D. $\frac{3}{8}$

| 11 | Ben was trying to solve two simultaneous equations, namely |
|---|---|

$$4x - 3y + 5 = 0 \quad \text{..... equation 1}$$
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His setting out was as follows:

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LINE D:     Substitute into equation 2     $x = 3$

He was marked incorrect . In which line did he make the error?

A. Line A     B. Line B     C. Line C     Line D

| 12 | The solution to the pair of simultaneous equations |
|---|---|

$$[4x - 3y + 10 = 0 \quad (1)$$
$$[5y - 3x = 13 \quad (2)$$

is:

(1) x 5     $20x - 15y + 50 = 0$ (3)

(2) x 3     $15y - 9x = 39$ (4)

(3) + (4)     $11x + 50 = 39$

$x = -1$

$y = 2$

A. (-1,2)     B. (-1,-2)     C. (1,-2)     D. (1, 2)

| | |
|---|---|
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| 14 | If $(2\sqrt{3} - 3)^2 = \triangle - \square\sqrt{3}$, then<br><br>$12 + 9 - 12\sqrt{3}$<br>$= 21 - 12\sqrt{3}$<br><br>A. $\triangle = 3$ and $\square = 0$   B. $\triangle = 3$ and $\square = 12$   C. $\triangle = 21$ and $\square = 6$   D. $\triangle = 21$ and $\square = 12$ |
| 15 | $x$ is an even number greater than 2<br><br>The last 3 digits in the value of $5^x$ are:<br><br>A. 025     B. 125     C. 625     D. varies |
| 16 | The circle $x^2 + y^2 = 25$ and the straight line $3y - 4x = 0$ intersect at the point whose co-ordinates are given by:<br><br><br><br>A. x=5 and y=0    B. x=0 and y=5     C. x=4 and y=3    D. x=3 and y=4 |
| 17 | George stands on a hill a looks at a monument on a bearing of 062° from where he stands. If he then turns to look at another monument, bearing 318°, what is the smallest angle through which he has turned?<br><br>A. 20°     B. 104°     C. 256°     D. 380° |

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A. $\frac{1}{221}$  B. $\frac{1}{16}$  C. $\frac{1}{12}$  D. $\frac{1}{2}$

| 19 | Apples cost $1.25 each, while Bananas cost $1.40 each. Quentin bought 12 pieces of fruit and paid a total of $15.60.<br><br>Which pair of simultaneous equations can be solved to answer this question? |
|---|---|

A

$$x - y = 12$$

$$125x + 140y = 1560$$

C

$$x - y = 12$$

$$\frac{x}{125} + \frac{y}{140} = 1560$$

B

$$x + y = 12$$

$$125x + 140y = 1560$$

D

$$x + y = 12$$

$$\frac{x}{125} + \frac{y}{140} = 1560$$

| 20 | When simplified, $\dfrac{1}{\sqrt{2}-1} - \dfrac{1}{\sqrt{2}+1} =$ |
|---|---|

$$\frac{\sqrt{2}+1}{1} - \frac{\sqrt{2}-1}{1}$$

A. -2  B. -1  C. 1  D. 2

| 21 | Zoran's car depreciates at a rate of 10% p.a.<br>How many years is it before his car is worth less than half of its original value? |
|---|---|

$$\tfrac{1}{2}T = P(0.90)^n$$

Push calculator

A. it will never be worth half its original value  B. there is not enough information  C. 7 years  D. 10 years

| 22 | If $2^q = \dfrac{4^{3x+1}}{2^2.8^{2x}}$ then $q=$ |
|---|---|

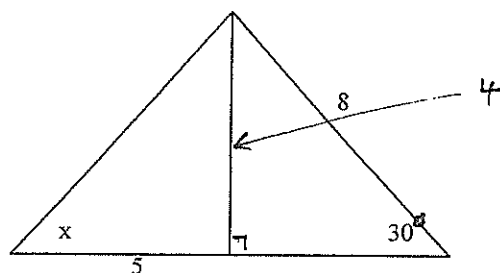$$2^q = \frac{2^{6x+2}}{2^2.2^{6x}} = 1$$

A. $x-1$      B. 0      C. 1      D. 4

---

| 23 | In the diagram below, the value of x (to the nearest degree) is: |
|---|---|



8    4

x    7    30°

5

A. $30^0$      B. $37^0$      C. $39^0$      D. $53^0$

---

| 24 | The solution set to the inequality $3 < 2x - 1 < 5$ is: |
|---|---|

$$4 < 2x < 6$$
$$2 < x < 3$$

A. $2 < x < 3$      B. $1 < x < 2$      C. $2 < x < 2.5$      D. $1.5 < x < 3$

---

| 25 | Simplify the following algebraic fraction: |
|---|---|

$$\frac{3x^2-3y^2}{x^2+2xy+y^2} \div \frac{xy-y^2}{9(x+y)}$$

$$= \frac{3(x+y)(x-y)}{(x+y)^2} \times \frac{9(x+y)}{y(x-y)}$$

$$= \frac{27}{y}.$$

A. $\dfrac{27}{y}$      B. $\dfrac{3(x-y)^2}{(x+y)^2}$      C. $\dfrac{27(x-y)}{(x+y)}$      D. $\dfrac{y(x-y)^3}{3(x+y)^3}$

# MATHEMATICS YEAR 10 YEARLY EXAMINATION 2009

| Name | |
|------|--|
| Teacher | SOLUTIONS |

**Part B Section 2**

**Answer Sheet**

Circle the letter corresponding

to the correct answer.  ☺

1.   A   **B**   C   D

2.   A   B   **C**   D

3.   A   B   **C**   D

4.   A   B   C   **D**

5.   **A**   B   C   D

6.   A   **B**   C   D

7.   A   B   **C**   D

8.   A   B   **C**   D

9.   A   B   **C**   D

10.   A   B   C   **D**

11.   A   **B**   C   D

12.   **A**   B   C   D

13.   A   B   **C**   D

14.   A   B   C   **D**

15.   A   B   **C**   D

16.   A   B   C   **D**

17.   A   **B**   C   D

18.   **A**   B   C   D

19.   A   **B**   C   D

20.   A   B   C   **D**

21.   A   B   **C**   D

22.   A   **B**   C   D

23.   A   B   **C**   D

24.   **A**   B   C   D

25.   **A**   B   C   D