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

SYDNEY TECHNICAL HIGH SCHOOL

Year 10
Mathematics

Common Test

Assessment 1

May, 2016

Time allowed: 70 minutes

General Instructions:

- Marks for each question are indicated on the question.
- Approved calculators may be used
- All necessary working should be shown
- Full marks may not be awarded for careless work or illegible writing
- Write using black or blue pen
- Write your answers in the space provided

Multiple choice	/5
Question 1	/10
Question 2	/10
Question 3	/10
Question 4	/10
Question 5	/10
TOTAL	**/55**

Section 1 Multiple Choice (5 marks)

Circle the letter of the correct answer on your multiple choice answer sheet in your answer booklet

1. Three points are A (1, 2), B (2, -1) and C (-1, -2). Which interval has the greatest positive slope?

   A. Interval AB
   B. Interval BC
   C. Interval AC
   D. All the same

2. If a loan of $5800 is made at 4% p.a. interest, compounded quarterly over 6 years, the interest accrued would be

   A. $\$5800(1+0.04)^6$
   B. $\$5800(1+0.04)^{24}-\$5800$
   C. $\$5800(1+0.01)^6-\$5800$
   D. $\$5800(1+0.01)^{24}-\$5800$

3. The solutions to $3x^2-12x-63=0$ are

   A. $x=3, x=7$
   B. $x=-3, x=7$
   C. $x=3$
   D. $x=3, x=-7$

4. Two cards are drawn out of a normal pack of 52 playing cards without replacement. What is the probability that the two cards are both kings?

   A. $\frac{1}{26}$ B. $\frac{1}{221}$ C. $\frac{1}{169}$ D. $\frac{1}{13}$

5. What is the distance between the points (2, 4) and (-1, 1)?

   A. 18 units B. $3\sqrt{2}$ units C. $\sqrt{6}$ units D. $\sqrt{26}$ units

Section 2 (50 marks)

All answers are to be completed in your answer booklet. Show all necessary working

Question 1 (Start a New Page) **(10 marks)**

a) Solve

i) $(2x + 3)(x - 2) = 0$ **1**

ii) $x^2 - 5x + 6 = 0$ **2**

b) Find the simple interest earned on \$49 000 if it is invested at 11.25% p.a. for 1 year and 7 months. **1**

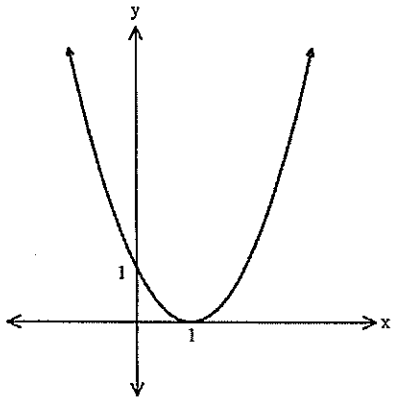
c) A coin is tossed 3 times.

i) Draw a tree diagram to show all possible outcomes **2**

ii) What is the probability of tossing 2 Tails and 1 Head? **1**

iii) What is the probability of tossing at least one Tail? **1**

d) Give a possible equation for this graph. **2**



Question 2 (Start a New Page) **(10 marks)**

a) Ryan invests \$18 500 at 6%pa with interest compounded annually. Calculate the amount to which the investment will grow at the end of 3 years.(Give your answer to the nearest dollar) **2**

b) Solve the equation $(2x-1)^2 = 5$ **2**

c) Consider the graph of $y = x^2 + 2x - 8$

i) Find the x and y intercepts. **2**

ii) Find the coordinates of the vertex. **2**

iii) Sketch the graph showing all important features. **2**

Question 3 (Start a New Page) **(10 marks)**

a) The value of a brand new tractor is \$175 000. The tractor depreciates in value at the rate of 12.5% pa. What percentage of the tractor's initial value is it worth after 8 years?

3

b) The weather forecast for each of the next three days is that it will either be
Sunny (20% chance),
Overcast (65% chance),
or Raining (15% chance).

What is the probability of

i) The next 3 days being all sunny **1**
ii) There being exactly 2 days of rain in the next 3 days? **2**

c) Solve $6x^2 + 5x - 2 = 0$ leaving your answer as a surd. **2**

d) Find a quadratic equation whose solutions are $x = 2$ and $x = \frac{1}{3}$. **2**

Question 4 (Start a New Page) **(10 marks)**

a) Solve the equation $x - 9 = \frac{10}{x}$. **3**

b) The table below shows the monthly repayments for a loan per $1000 borrowed.

% pa reducible interest rate	10 years	15 years	20 years
6.0	11.10	8.44	7.16
6.5	11.35	8.71	7.46
7.0	11.61	8.99	7.75
7.5	11.87	9.27	8.06

For a loan of $500 000

i) Find the monthly repayment if the loan is to be taken out over 10 years at 6.5% p.a. reducible interest. **1**

ii) How much will be repaid in total? **1**

iii) By finding the amount of interest paid, calculate the equivalent simple interest rate. **2**

c) i) Find the equation of the straight line that passes through the points (2, -1) and (3, 6). **2**

(ii) Explain why this line is parallel to the line $y = 7x + 2$. **1**

Question 5 (Start a New Page) **(10 marks)**

a) In how many different ways can the letters of the word PRIZE be arranged? **1**

b) A survey of 50 salespersons showed that in the last year 35 had travelled on Qantas, 15 had travelled on Virgin and 12 had travelled on both airlines.

i) Represent this information in a Venn Diagram. **2**

ii) What is the probability that a salesperson in the survey had travelled on Qantas but not Virgin. **1**

iii) What is the probability that a salesperson in the survey had not flown on either airline. **1**

c) Jonathan is planning to purchase a car costing $10 400. The car dealer offers him terms of a 20% cash deposit then a flat rate of interest of 7.5%pa paid on the balance over 2 years. The bank offers him a loan requiring monthly repayments of $456.88 over 2 years.

i) Calculate the total paid if Jonathan takes the car dealer option. **2**

ii) Calculate the total paid if Jonathan takes the bank option. **2**

iii) Find the total interest charged by the bank. **1**

YEAR 10 SOLUTIONS

PART A 1/ C 2/ D 3/ B 4/ B 5/ B

PART B

QUESTION 1:

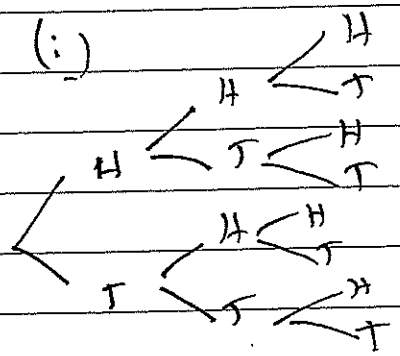
(a)(i) $x = -3/2$ or $x = 2$

(ii) $(x-3)(x-2) = 0$

$\therefore x = 3$ or $x = 2$.

(b) $SI = 49000 \times \frac{11.25}{100} \times \frac{19}{12} = \$8728.13$

(c) (i)



(ii) $3/8$

(iii) $7/8$

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

QUESTION 2:

(a) $18500(1.06)^3 = 22,03379$

$= 22,034$

(b) $2x - 1 = \pm\sqrt{5}$

$2x = 1 \pm \sqrt{5}$

$x = \frac{1}{2} \pm \frac{1}{2}\sqrt{5}$

(c)(i) Intercepts: $(0, -8)$ and $(-4, 0)$ and $(2, 0)$

(ii) Vertex is $(-1, -9)$

QUESTION 3:

(a) $\text{Value} = 175{,}000\left(1 - \frac{12.5}{100}\right)^8$

$= 60{,}131.56$

$\therefore$ As a percentage $= \frac{60\,131.56}{175000} \times \frac{100}{1}$

$= 34.4\ \%$

(b) (i) $\frac{20}{100} \times \frac{20}{100} \times \frac{20}{100} = \frac{1}{125}$

$0.8\ \%$

(ii) $3 \times \frac{15}{100} \times \frac{15}{100} \times \frac{85}{100} = \frac{57}{1000}$

$5.7\ \%$

(c) $x = \frac{-5 \pm \sqrt{25 + 48}}{2}$

$= \frac{-5 \pm \sqrt{73}}{2}$

(d) $(x-2)(3x-1) = 0$

or $3x^2 - 7x + 3 = 0$

QUESTION 4.

(a) $x^2 - 9x = 10$

$(x-10)(x+1) = 0$

$x = 10$ or $x = -1$

(b) (i) 500×11.35

$= 5{,}675$

(ii) $5675 \times 120 = 681{,}000$

(iii) Interest % $= \frac{181{,}000}{500{,}000} \times \frac{100}{10}$

$= 3.62\ \%$

(c). (i) $m = \frac{7}{1}$

$\therefore$ EQUATION is

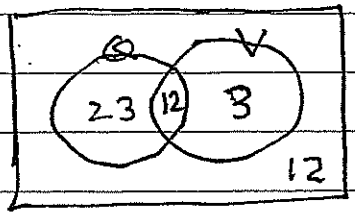
$y + 1 = 7(x-2)$

$y = 7x - 15$

(ii) same slope

(5) (a) $5^1 = 120$

(b)



(ii) $\frac{23}{50} \left(\times \frac{100}{1} = 46\%\right)$

(iii) $\frac{12}{50}$ or $\frac{6}{25}$

(c) (i) Deposit = $2080

Amount = $(8,320) \times \frac{7.5}{100} \times \frac{2}{1}$

= $1248

∴ TOTAL PAID = 2080 + 8320 + 1248

= 11,648

(ii) BANK:

$456.88 \times 2 \times 12 = \$10,968.12$

(iii) Interest charged by Bank = $565.12