Teacher's Name________________

Student Number

Knox Grammar School

2012

Preliminary
Yearly Examination

Mathematics Extension 1

General Instructions

- Reading time – 5 minutes
- Working time – 2 hours
- Write using blue or black pen only
- Board approved calculators may be used
- All necessary working should be shown in every question

Total Marks – 70

Section I Pages 4-8

- Attempt Questions 1 – 10.
- Use answer sheet attached.
- Allow 15 minutes for this section.

Section II Pages 9-15

- Answer each question in a separate writing booklet.
- Attempt questions 11- 14.
- All questions are of equal value.
- Allow 1 hour and 45 minutes for this section.

Subject Teachers

Bradford
Vuletich/Naidoo
Mulray
Johansen
Hall/Tran

This paper MUST NOT be removed from the examination room

Number of Students in Course: 88 **Examiner: Sedgman**

Number of Writing Booklets Per Student (Four Page): 7

Section I

10 marks

Attempt Questions 1-10

Allow about 15 minutes for this section

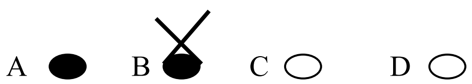
Use this multiple choice answer sheet for questions 1 – 10.

Select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.

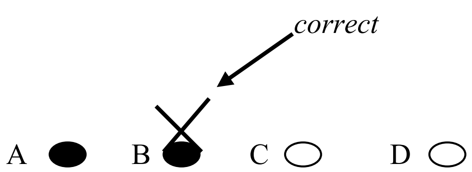
Sample

2 + 4 = ?　　　　(A) 2　(B) 6　(C) 8　(D) 9

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.



If you change your mind and have crossed out what you consider to be the correct answer, then indicate this by writing the word *correct* and drawing an arrow as follows:



Student Number ___________________________

Knox Grammar School

Preliminary Examination –

Extension 1 Mathematics 2012

Multiple Choice Answer Sheet

Teacher's Name ______________________________

Completely fill the response oval representing the most 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 ⬭

Section I

10 marks

Attempt Questions 1-10

Allow about 15 minutes for this section

Use the multiple choice answer sheet for questions 1 – 10.

---

1. Factorise $54x^3 + 16$.

   (A) $2(3x+2)\left(9x^2+6x+4\right)$

   (B) $2(3x+2)\left(9x^2-6x+4\right)$

   (C) $2(3x+2)\left(9x^2-12x+4\right)$

   (D) $2(3x+2)\left(3x^2-6x+4\right)$

2. State the largest possible domain of the function:

$$f(x) = \sqrt{x+3} - \sqrt{3-x}$$

   (A) $x \leq -3,\ x \geq 3$

   (B) $x \geq 3$

   (C) $-3 \leq x \leq 3$

   (D) $x \geq -3,\ x \geq 3$.

3. Simplify $\dfrac{\sin(180^\circ + \theta)}{\cos(90^\circ - \theta)}$.

(A) $\tan\theta$

(B) 1

(C) -1

(D) $\tan(90^\circ - \theta)$

4. Evaluate $\lim\limits_{x \to 2} \dfrac{x^3 - 8}{x - 2}$

(A) 0

(B) undefined

(C) 4

(D) 12

5. Find the Cartesian equation formed from the parametric equations:

$$y = \frac{1}{t-1} \text{ and } x = t^2 - 2t + 1$$

(A) $x = \dfrac{1}{y^2}$

(B) $y = \dfrac{1}{x}$

(C) $x = \dfrac{1}{y}$

(D) $y = \dfrac{1}{x^2}$

6. A (−7, 5) and B (3, 1) are two points. Find the coordinates of the point P which divides the interval AB **externally** in the ratio 3:1.

(A) (−12, 7)

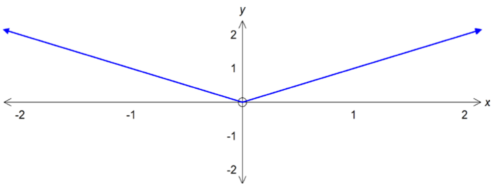
(B) (−1, 4)

(C) (8, −1)

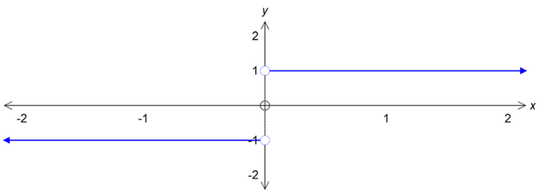
(D) $\left(\frac{1}{2}, 2\right)$

7. The sketch of the graph $f(x) = \frac{|x|}{x}$ *for* $x \neq 0$ is:

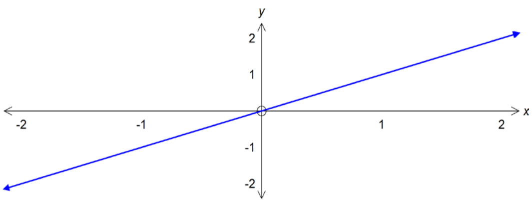
(A)



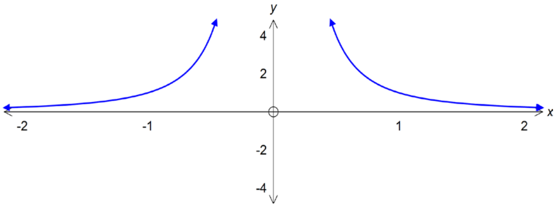
(B)



(C)



(D)



8. What is the first derivative of $y = \sqrt{x^2 - 1}$ with respect to x ?

(A) $\dfrac{1}{2\sqrt{x^2 - 1}}$

(B) $\dfrac{1}{2\sqrt{2x - 1}}$

(C) $\dfrac{x}{\sqrt{x^2 - 1}}$

(D) $\dfrac{2x}{\sqrt{x^2 - 1}}$

9. The solution set for the inequation $\dfrac{4}{x-1} \leq 3$ is given by which of these?

(A) $x \leq 1, x \geq \dfrac{7}{3}$

(B) $x \geq \dfrac{7}{3}, x \neq 1$

(C) $x \geq 1, x \leq \dfrac{7}{3}$

(D) $x < 1, x \geq \dfrac{7}{3}$

10. Which of these expressions will give the accumulated super payout when \$800 per month is invested at the beginning of each month for 30 years at the rate of 6% per annum. Interest is calculated monthly.

(A) $\dfrac{800(1.06^{360}-1)}{0.06}$

(B) $\dfrac{800(1.005)(1.005^{30}-1)}{0.005}$

(C) $\dfrac{800(1.005)(1.005^{360}-1)}{0.005}$

(D) $\dfrac{800(1.006^{30}-1)}{0.006}$

Section II

60 marks

Attempt Questions 11-14

Allow about 1 hour 45 minutes for this section

Answer each question in the appropriate writing booklet. Extra writing booklets are available.

All necessary working should be shown in every question.

Question 11 (15 marks) Use a SEPARATE writing booklet.

(a) Solve $\log_{10}(2x+3) = 2\log_{10}x$ for x. **2**

(b) (i) Factorise $(2^n)^2 - 1$ by the difference of two squares method. **1**

(ii) Hence, or otherwise, show that: **2**

$$\frac{4^n - 1}{4^n - 2^n} = 1 + \frac{1}{2^n}$$

.

(c) (i) Sketch the graph of $y = x^2 - 9$. **1**

(ii) Using another colour, sketch the graph of $y = |\, x^2 - 9 \,|$. **1**

(iii) Solve the equation $7 = |\, x^2 - 9 \,|$. **2**

(iv) Use a graphical approach and the solutions from (iii) above to solve $7 \geq |\, x^2 - 9 \,|$. **2**

(d) Find k if the line $y = x + 3$ is a tangent to $(x-1)^2 + (y+2)^2 = k^2$. **2**

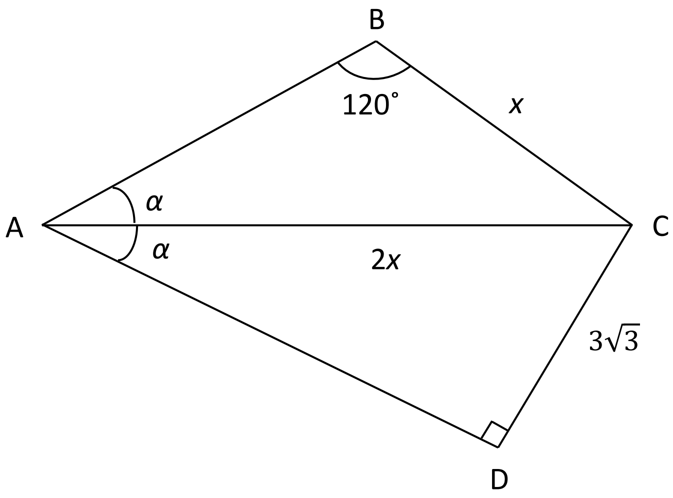
(e) Show that the points $P\,(2p, p^2)$, $F(0,1)$ and $Q(-\frac{2}{p}, \frac{1}{p^2})$ are collinear. **2**

Question 12 (15 marks) Use a SEPARATE writing booklet.

(a) In the quadrilateral ABCD below,

$\angle BAC = \angle CAD = \alpha$, $\angle ABC = 120°$, $\angle ADC = 90°$, $BC = x$, $AC = 2x$

and $CD = 3\sqrt{3}$.



(i) Using the Sine Rule in ΔABC, show that $\sin\alpha = \frac{\sqrt{3}}{4}$. **2**

(ii) Hence, or otherwise, find the value of x. **1**

(b) Show that $S(k) = \sum_{k=0}^{\infty}(-1)^k 2^{-k} + \sum_{k=1}^{5}(2k-1) = 25\frac{2}{3}$. **2**

Question 12 continues on the next page.

(c) Consider the function $y = f(x) = \dfrac{x^2 - 2x - 15}{(x-3)}$

(i) Show by factorizing that $y = f(x) = \dfrac{x^2 - 2x - 15}{(x-3)} = \dfrac{(x-5)(x+3)}{(x-3)}$ **1**

(ii) Show also that $(x+1) - \dfrac{12}{x-3} = \dfrac{x^2 - 2x - 15}{(x-3)}$ **2**

(iii) For the function $y = f(x)$ write down the x-intercepts. **1**

(iv) For the function $y = f(x)$ write down the y-intercept. **1**

(v) Explain what is happening at $x = 3$ on the graph of $y = f(x)$? **1**

(vi) Using parts (i), and (ii) above explain why $y = x + 1$ represents an oblique (diagonal) asymptote for the function $y = f(x)$. **1**

(vii) Make a neat sketch of $y = f(x)$ showing all the features above on a one third page grid. **3**

Question 13 (15 marks) Use a SEPARATE writing booklet.

(a) Differentiate the following

(i) $y = x\sqrt{x^2 - 1}$ **2**

(ii) $y = \dfrac{x^2}{x^2 + 1}$ **2**

(b) The quadratic equation $g(x) = ax^2 + bx + c$ is positive definite for all values of x.

(i) Find $g'(x)$ and $g''(x)$. **2**

(ii) If $G(x)$, where $G(x) = g(x) + g'(x) + g''(x)$, prove that $G(x)$ is also positive definite for all values of x. **3**

Question 13 continues on the next page.

(c) (i) Show the gradient of the tangent to the curve $y = x^3 - 3x$ is equal to zero at the point $P(1,-2)$ if $x > 0$. **2**

(ii) Write down the equation of the tangent at *P*. **1**

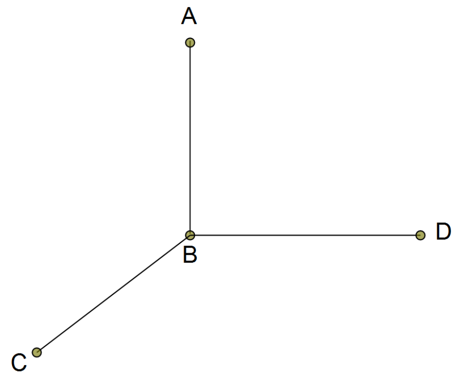
(iii) Explain why the *x* values of the points where this tangent from part (i) passes through (intersects) the curve are given by the equation $x^3 - 3x + 2 = 0$. **1**

(iv) Show, by inspection or otherwise, that the point *Q* where the tangent at *P* intersects the curve again (where $x < 0$) is given by the point $Q(-2,-2)$. **1**

(v) Find the value of "*k*" in $y = x^3 - 3x + k$ for which the point in pt (iv) $Q(-2,-2)$ becomes $Q(-2,0)$ instead. (Hint: Use a graph to assist your explanation.) **1**

Question 14 (15 marks) Use a SEPARATE writing booklet.

(a) In the diagram, the points B, C and D are in the same plane. A is a point vertically above point B. Points C and D are 850 metres apart and $\angle CBD$ is 120°.

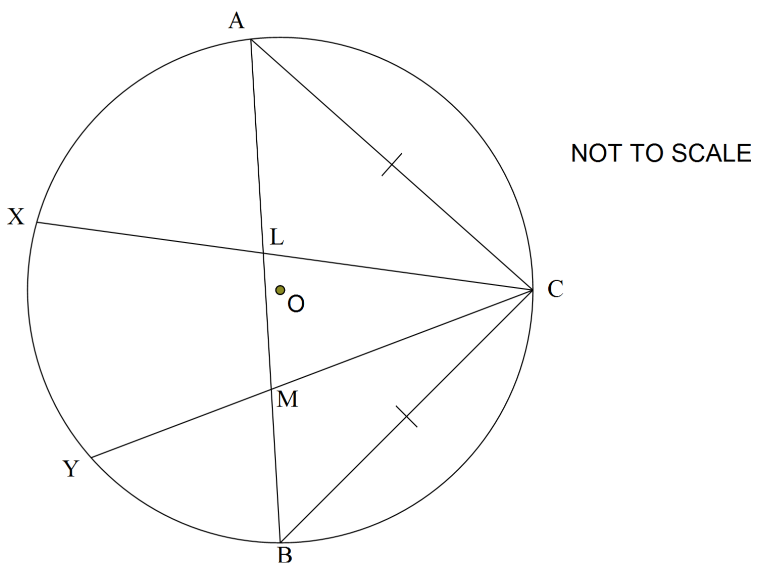


If $\angle CAB$ is 60° and $\angle DAB$ is 30° find the height of A above B in exact form. **3**

Question 14 continues on the next page.

(b) In the diagram A, B and C are 3 points on the circle. CX and CY are chords cutting AB at L and M respectively. $AC = CB$, $\angle CAB = \theta$ and $\angle ACX = \alpha$.

Copy the diagram onto your paper.



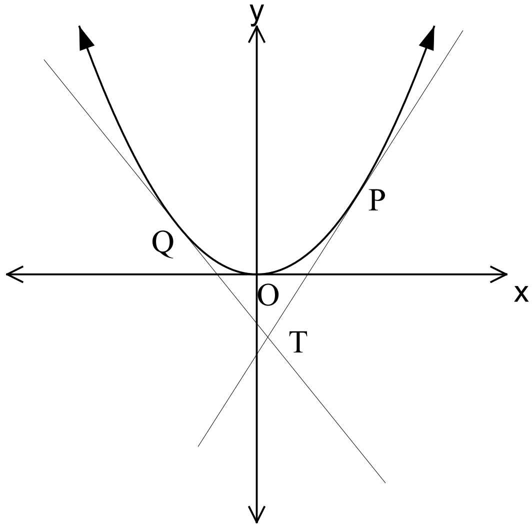
(i) State why $\angle CLB = \theta + \alpha$. **1**

(ii) Explain why $\angle AYC = \theta$ and $\angle AYX = \alpha$. **2**

(iii) Prove that $XYML$ is a cyclic quadrilateral. **3**

Question 14 continues on the next page.

(c)



The tangents to the parabola $x^2 = 4ay$ at the points $P(2ap, ap^2)$ and $Q(2aq, aq^2)$ meet at the point T whereby PQ is a focal chord.

(i) By derivation, show that the equation of the tangent passing through the point P is given by $y = px - ap^2$. **2**

(ii) By writing down the equivalent equation of the tangent at Q, and solving it simultaneously with the tangent at P, find the coordinates of the point T. **2**

(iii) Hence, given that PQ is a focal chord (i.e. $pq = -1$), determine and describe geometrically the Cartesian equation of the locus of point T. **2**

End of Examination

BLANK PAGE

Alternative Questions

Find the perpendicular distance between the parallel lines **2**

$x - y + 1 = 0$ and $x - y + 5 = 0$.

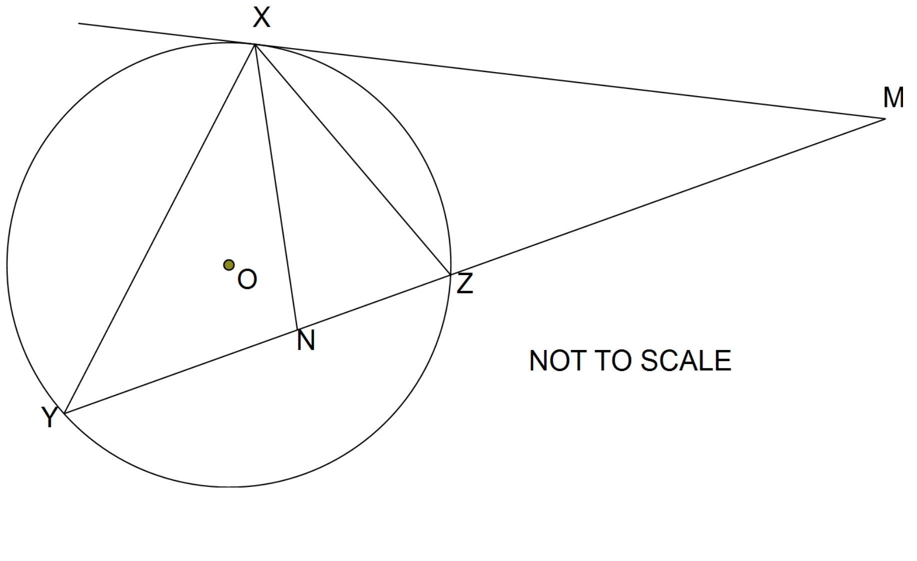
OR

Find the condition for this geometric progression S_∞ to have a limiting sum, **2**

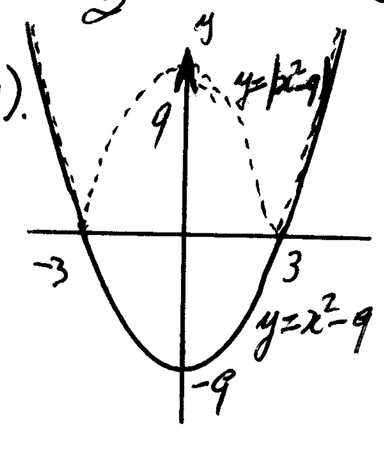
then find that sum.

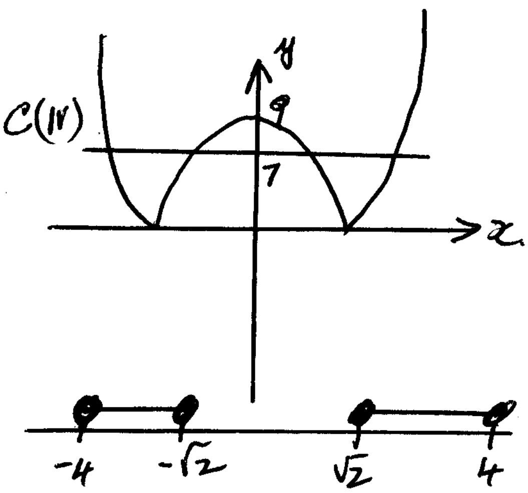
$$S_\infty = 1 - \frac{1}{(3-x)} + \frac{1}{(3-x)^2} - \frac{1}{(3-x)^3} + ...$$

In the diagram *X,Y* and *Z* are 3 points on the circle. The tangent to the circle at *X* meets *YZ* produced at *M*. *N* is a point on *YZ* such that *XN* bisects $\angle ZXY$.



Show that *MX* = *MN*, giving reasons.

Suggested Solution (s)	Comments
Multiple Choice Section I	
1. B 2. C 3. C 4. D 5. A	1 mark each.
6. C 7. B 8. C 9. D 10. C	
Question 11 Section II	
(a) $\log_{10}(2x+3) = \log_{10} x^2 \quad x>0$ $2x+3 = x^2$ $x^2-2x-3=0$ $(x-3)(x+1)=0$	✓
$x=3$, $x=-1$ but $x>0$ So $x=3$ only.	✓
b(i) $(2^n)^2-1^2 = (2^n-1)(2^n+1)$	✓
(ii) $LHS = \dfrac{(2^n-1)(2^n+1)}{2^n(2^n-1)}$	✓
$= \dfrac{2^n+1}{2^n} = 1+\dfrac{1}{2^n}$	✓
c (i). 	✓ (c(i)) ✓ (c(ii))

Suggested Solution (s)	Comments
c(iii) $\|x^2-9\|=7$ $x^2-9=7 \qquad x^2-9=-7$ $x^2=16 \qquad x^2=2$ $x=\pm 4 \qquad x=\pm\sqrt{2}$	
c(iv) 	
ie $-4 \le x \le -\sqrt{2}$, $\sqrt{2} \le x \le 4$.	✓✓
d. find the perpendicular distance from the centre of the circle to line $x-y+3=0$	
$pd = \dfrac{\|1(1)-1(-2)+3\|}{\sqrt{1^2+(-1)^2}}$ $= 3\sqrt{2}$	✓
Hence radius of circle $= k = 3\sqrt{2}$.	✓

Suggested Solution (s)	Comments	Suggested Solution (s)	Comments

Question 11e

$$m_{PF} = \frac{y_2-y_1}{x_2-x_1}$$

$$= \frac{p^2-1}{2p-0}$$

$$= \frac{p^2-1}{2p}$$

✓

Equation of PF

$$y-y_1 = m(x-x_1)$$

$$y-1 = \frac{p^2-1}{2p}(x-0)$$

$$y = \left(\frac{p^2-1}{2p}\right)x+1$$

Subst $Q\left(\frac{-2}{p}, \frac{1}{p^2}\right)$.

ie $\frac{1}{p^2} = \frac{p^2-1}{2p}\left(\frac{-2}{p}\right)+1$

$$\frac{1}{p^2} = \frac{-p^2+1}{p^2}+1$$

$$\frac{1}{p^2} = \frac{1-p^2+p^2}{p^2}$$

$$\frac{1}{p^2} = \frac{1}{p^2}$$

✓

Hence P, F, Q are collinear.

Could also be done by calculating a second gradient and finding two equal gradients.

2012 Year 11 Mathematics Extension 1 Yearly SOLUTIONS

Suggested Solution (s)	Comments	Suggested Solution (s)	Comments

Question 12(a) Section II

(i) In ΔABC. $\dfrac{x}{\sin\alpha} = \dfrac{2x}{\sin 120}$ ✓

$\dfrac{\sin\alpha}{1} = \dfrac{\sin 120}{2}$

$\sin\alpha = \dfrac{\sqrt{3}}{4}$ — (1) ✓

(ii) In ΔACD $\sin\alpha = \dfrac{3\sqrt{3}}{2x}$.

Using (1) $\dfrac{\sqrt{3}}{4} = \dfrac{3\sqrt{3}}{2x}$.

$2\sqrt{3}x = 12\sqrt{3}$ ✓

$x = 6$.

12(b) $S(k) = \left(1 - \frac{1}{2} + \frac{1}{4} - \cdots\right) + (1+3+5+7+9)$

$= \dfrac{1}{1-(-\frac{1}{2})} + 25$. ✓

$= \dfrac{2}{3} + 25$

$= 25\frac{2}{3}$. ✓

12(c).(i) $x^2 - 2x - 15 = (x-5)(x+3)$

Hence $y = f(x) = \dfrac{(x-5)(x+3)}{x-3}$. ✓

(ii) $\dfrac{(x+1)(x-3) - 12}{x-3} = \dfrac{x^2 - 2x - 3 - 12}{x-3}$ ✓

$= \dfrac{x^2 - 2x - 15}{x-3}$. ✓

(iii) $x = 5$, $x = -3$ ✓

(iv) y intercept $= 5$ ✓

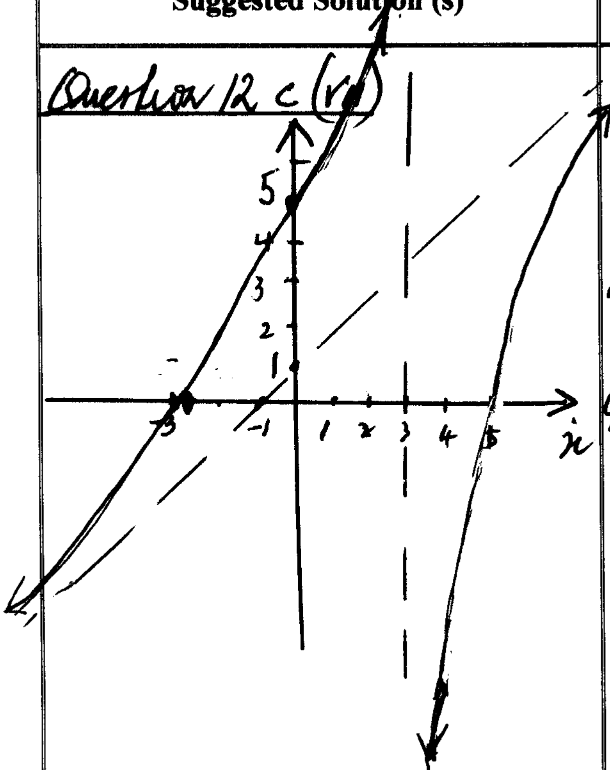
(v) A vertical asymptote occurs at $x = 3$. ✓

(vi) Taking the limit of $y = f(x)$ as $x \to \infty$ we see that the term $\frac{12}{x-3}$ becomes insignificant, hence $y = x + 1$ becomes the oblique asymptote ✓

2012 Year 11 Mathematics Extension 1 Yearly SOLUTIONS

Suggested Solution (s)	Comments	Suggested Solution (s)	Comments

Question 12 c (vi)



x-y intercept ✓

asymptote ✓

Graph ✓

Question 13 Section II

a (i) $\frac{d}{dx}\left(x\sqrt{x^2-1}\right)$

$= \frac{x \cdot 2x}{2\sqrt{x^2-1}} + \sqrt{x^2-1} \cdot 1$ ✓

$= \frac{x^2 + x^2 - 1}{\sqrt{x^2-1}}$

$= \frac{2x^2-1}{\sqrt{x^2-1}}$. ✓

a (ii) $\frac{d}{dx}\left(\frac{x^2}{x^2+1}\right)$

$= \frac{(x^2+1)(2x) - x^2(2x)}{(x^2+1)^2}$ ✓

$= \frac{2x}{(x^2+1)^2}$ ✓

(b) (i) $g(x) = ax^2 + bx + c$

$g'(x) = 2ax + b$ ✓

$g''(x) = 2a$ ✓

(ii) $G(x) = g(x) + g'(x) + g''(x)$

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

$= ax^2 + x(b+2a) + 2a + b + c$ — ① ✓

Using $\Delta = b^2 - 4ac$ for ①

$\Delta_2 = (b+2a)^2 - 4a(2a+b+c)$

$= b^2 - 4ac - 4a^2$ — ② ✓

Now since $g(x)$ is positive then $b^2-4ac<0$ $-4a^2<0$ ✓

Hence $\Delta < 0$ for $G(x)$ hence $G(x)$ is positive definite $\forall x$.

2012 Year 11 Mathematics Extension 1 Yearly SOLUTIONS

Suggested Solution (s)	Comments

13C (i) for $y = x^3 - 3x$.

$\frac{dy}{dx} = 3x^2 - 3 = 0$

hence $x = 1$, $x = -1$

$y = -2$, $y = 2$. ✓

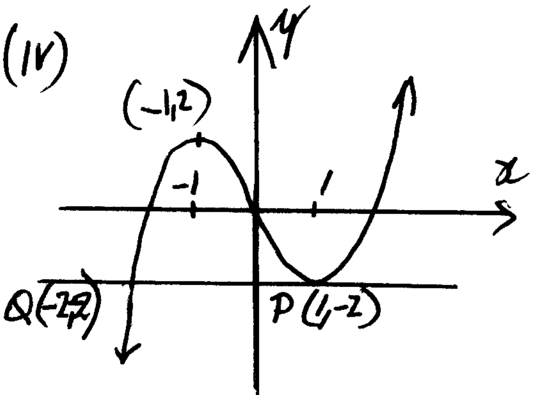
for $x > 0$ then $P(1,-2)$.

(ii) Since gradient of tangent is zero then tangent $y = -2$ ✓

(iii) Observe $y = x^3 - 3x$ intersects $y = -2$ ✓

ie $x^3 - 3x + 2 = 0$

(iv)



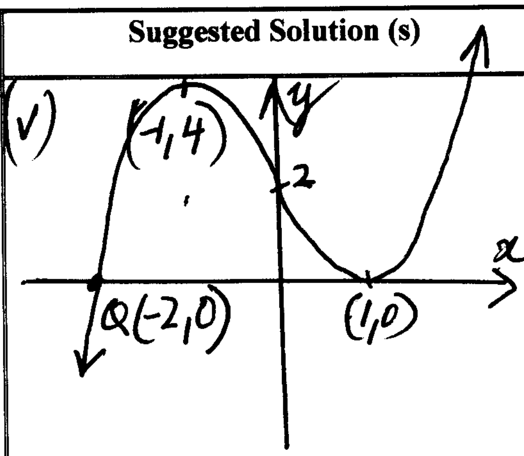
✓

By inspection when $x = -2$

$-8 + 6 + 2 = 0$

So $Q = (-2,-2)$

(v)



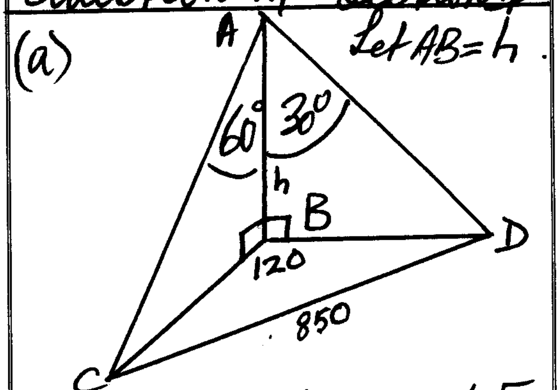
Translate the curve 2 squares (units) upwards. ✓

hence $k = 2$

Q becomes $Q(-2,0)$.

Question 14 Section II

(a) Let $AB = h$.



In $\triangle ABC$ $BC = h\tan 60 = h\sqrt{3}$.

In $\triangle ABD$ $BD = h\tan 30 = \frac{h}{\sqrt{3}}$ ✓

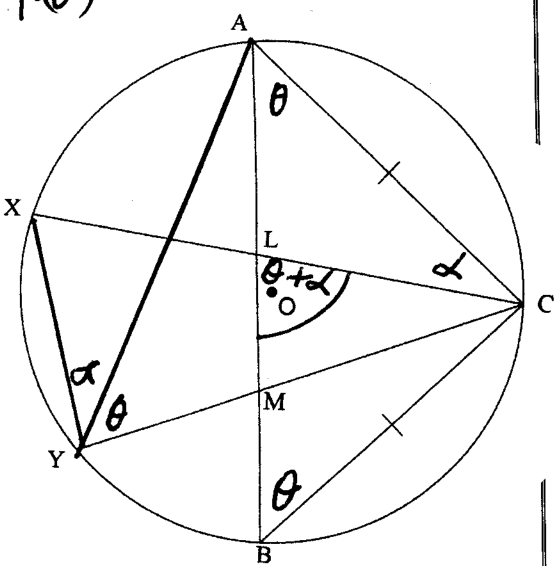
In $\triangle BCD$ Using Cosine Rule

$850^2 = (h\sqrt{3})^2 + \left(\frac{h}{\sqrt{3}}\right)^2 - 2h\sqrt{3}.\frac{h}{\sqrt{3}}\cos 120$ ✓

$850^2 = 3h^2 + \frac{h^2}{3} + h^2 = \frac{13h^2}{3}$ ✓

$h = \frac{850}{\sqrt{13/3}} = \frac{850\sqrt{3}}{\sqrt{13}}$ metres. ✓

2012 Year 11 Mathematics Extension 1 Yearly SOLUTIONS

Suggested Solution (s)	Comments	Suggested Solution (s)	Comments
14(b)  (i) $\angle CLB = \theta + \alpha$ (Exterior angle of Δ = Interior opposite angle sum) (ii) $\angle AYC = \theta$ (Since ΔABC is isosceles then $\angle ABC = \theta$) also $\angle AYC = \angle ABC$ (On same arc).	✓ ✓	(iii) $\angle MYX = \theta + \alpha$ (adjacent angles. $\angle AYM = \theta$ (on same arc) $\angle XLM = 180 - (\alpha + \theta)$ (Supplementary Angles) Hence XYML must be cyclic. (opposite angles are supplementary) or it can be seen that $\angle XYM = \angle MLC$ both $(\alpha + \theta)$, we can then invoke "exterior angle of a cyclic quadrilateral = remote interior opposite angle and hence XYML is cyclic.	✓ ✓ ✓

2012 Year 11 Mathematics Extension 1 Yearly SOLUTIONS

Suggested Solution (s)	Comments
14 (c) $x^2 = 4ay$.	
(i) $y = \frac{x^2}{4a}$ $\frac{dy}{dx} = \frac{x}{2a} = \frac{2ap}{2a}$	
Gradient of tangent at $(2ap, ap^2)$	✓
$m_T = p$.	
Equation of tangent	
$y - ap^2 = p(x - 2ap)$	✓
Hence $y = px - ap^2$.	
(ii) at Q $y = qx - aq^2$	
Solving $y = qx - aq^2$	
$y = px - ap^2$.	
$0 = x(q-p) - a(q^2 - p^2)$	
Hence $x = \frac{(q^2-p^2)a}{q-p}$	
$x = (q+p)a$	✓
By substitution	
$y = q(a(p+q)) - aq^2$.	
$y = apq$	

Suggested Solution (s)	Comments
Now hence	
$T = (a(p+q), apq)$.	✓
(iii) If PQ is a focal chord $pq = -1$.	
Locus of $T(x, y)$.	
$x = a(p+q)$	
$y = a(pq) = a(-1)$	✓
Hence $y = -a$	
The locus of T describes the directrix of the given parabola.	✓

2012 Year 11 Mathematics Extension 1 Yearly SOLUTIONS

Suggested Solution (s)	Comments
MULTIPLE CHOICE SOLUTIONS:	1. B 6. C 2. C 7. B 3. C 8. C 4. D 9. D 5. A 10. C
1. $54x^3+16 = 2(27x^3+8)$ $= 2((3x)^3+2^3)$ $= 2(3x+2)(9x^2-6x+4) \therefore (B)$	
2. Require $x+3 \geq 0$ & $3-x \geq 0$ $\Rightarrow x \geq -3$ & $x \leq 3$ $\Rightarrow -3 \leq x \leq 3. \quad \therefore (C)$	
3. $\dfrac{-\sin\theta}{\sin\theta} = -1 \quad \therefore (C)$	
4. $\lim\limits_{x\to 2} \dfrac{(x-2)(x^2+2x+4)}{x-2}$ $= \lim\limits_{x\to 2} (x^2+2x+4)$ $= 2^2+2\times 2+4 = 12 \quad \therefore (D)$	
5. $y = \dfrac{1}{t-1}$ or $(t-1) = \dfrac{1}{y}$ & $x = t^2-2t+1$ or $x=(t-1)^2$ $\Rightarrow x = \left(\dfrac{1}{y}\right)^2$ or $x = \dfrac{1}{y^2} \therefore (A)$	
6. $P\left(\dfrac{3\times 3 - 1\times(-7)}{3-1}, \dfrac{3\times 1 - 1\times 5}{3-1}\right)$ $\equiv (8,-1). \quad \therefore (C).$	
7. $\dfrac{\lvert x\rvert}{x} = \begin{cases} x/x \text{ or } 1 & \text{for } x>0 \\ -x/x \text{ or } -1 & \text{for } x<0 \end{cases}$ $\therefore (B)$	
8. $y = \sqrt{x^2-1} = (x^2-1)^{1/2}$ $\Rightarrow \dfrac{dy}{dx} = \dfrac{1}{2}(x^2-1)^{-1/2} \cdot \dfrac{d}{dx}(x^2-1)$ $= \dfrac{1}{2}(x^2-1)^{-1/2} \cdot 2x$ $= \dfrac{x}{\sqrt{x^2-1}} \quad \therefore (C)$	Chain rule
9. $\dfrac{4}{x-1} \leq 3 \;;\; x \neq 1$ $\Rightarrow 4(x-1) \leq 3(x-1)^2$ $\Rightarrow 3(x-1)^2 - 4(x-1) \geq 0$ $\Rightarrow (x-1)\{3(x-1)-4\} \geq 0$ $\Rightarrow (x-1)(3x-7) \geq 0$ $\Rightarrow x \leq 1$ or $x \geq \frac{7}{3}$ But $x \neq 1$ $\Rightarrow x < 1$ or $x \geq \frac{7}{3}$ only $\therefore (D)$	$\otimes$ by $(x-1)^2$
10. $800(1\cdot005)^{360} + 800(1\cdot005)^{359} + \dots + 800(1\cdot005)^1$ $= 800(1\cdot005) + \dots + 800(1\cdot005)^{359} + 800(1\cdot005)^{360}$ $= \dfrac{800(1\cdot005)\left[(1\cdot005)^{360}-1\right]}{1\cdot005-1}$ $= \dfrac{800(1\cdot005)\left[(1\cdot005)^{360}-1\right]}{0\cdot005} \quad \therefore (C)$	$30\times 12 = 360$ 6% p.a. compounded monthly is equivalent to 0.5% per month compounded monthly.

Τὸ τέλος