Student ______

BRIGIDINE COLLEGE RANDWICK

HALF YEARLY

MATHEMATICS EXTENSION 1

- 2013 -

(TIME - 2 HOURS)

DIRECTIONS TO CANDIDATES

* *Put your **name** at the top of this paper and on **each of the 5 sections** to be collected.*
* *All **questions** are to be attempted.*
* *All **questions** are to be answered on **separate pages** and will be collected in 5 **separate bundles** at the end of this exam.*
* *All necessary working should be shown in every question in PEN.*
* *Full marks may not be awarded for careless or badly arranged work*

Brigidine College Randwick
2013 Extension One Half Yearly Task

MULTIPLE CHOICE (PLACE ANSWERS ON THE ANSWER SHEET PROVIDED)

1 What is the solution to the equation $|2x-5|=x+2$?

(A) $x=1$
(B) $x=7$
(C) $x=1$ or $x=7$
(D) $x=1$ and $x=7$

2 What is the exact value of $\tan(\theta-180)$, if $4\cos\theta=-3$ and $\tan\theta>0$?

(A) $-\frac{\sqrt{7}}{3}$

(B) $\frac{\sqrt{7}}{3}$

(C) $-\frac{3}{\sqrt{7}}$

(D) $\frac{3}{\sqrt{7}}$

3 Which of the following is equivalent to the expression $\frac{\sin 2\theta+\sin\theta}{\cos 2\theta+\cos\theta+1}$?

(A) $\cot\theta$
(B) $\sec\theta$
(C) $\sin\theta$
(D) $\tan\theta$

4 What is the acute angle to the nearest degree between the lines $y=2x-1$ and $x-3y+6=0$?

(A) 45°
(B) 54°
(C) 79°
(D) 82°

5 A parabola has the parametric equations $x = 12t$ and $y = -6t^2$.
What are the coordinates of the focus?

(A) $(-6,0)$
(B) $(0,-6)$
(C) $(6,0)$
(D) $(0,6)$

6 How many arrangements of all of the letters of the word TRIGONOMETRY are possible?

(A) 59 875 200
(B) 119 750 400
(C) 239 500 800
(D) 479 001 600

7 It is known that two of the roots of the equation $3x^3 + x^2 - kx + 6 = 0$ are reciprocals of each other. What is the value of k?

(A) -2
(B) 6
(C) 7
(D) 17

8 Which of the following is an expression for $\int \frac{e^{-2x}}{e^{-x}+1}\,dx$?

Use the substitution $u = e^{-x} + 1$.

(A) $\frac{(e^{-x}+1)^2}{2} - e^{-x} + c$

(B) $\frac{(e^{-x}+1)^2}{2} + e^{-x} + c$

(C) $\log_e(e^{-x}+1) - e^{-x} + c$

(D) $\log_e(e^{-x}+1) + e^{-x} + c$

9 Which of the following is an expression for $\int \sin^2 6x\,dx$?

(A) $\frac{x}{2} - \frac{1}{24}\sin 6x + c$

(B) $\frac{x}{2} + \frac{1}{24}\sin 6x + c$

(C) $\frac{x}{2} - \frac{1}{24}\sin 12x + c$

(D) $\frac{x}{2} + \frac{1}{24}\sin 12x + c$

10 What is the derivative of $y = \cos^{-1}(\frac{1}{x})$ with respect to x?

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

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

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

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

End of Multiple Choice

Question 11 (15 Marks) (Start a New Page) **Marks**

(a) Evaluate $\int_0^3 \frac{1}{16+x^2}\,dx$ **3**

(b) Differentiate $2x^3 \tan x$ with respect to x **2**

(c) The point $(-6t, 9t^2)$, where t is a variable, lies on a curve. Find the Cartesian equation of the curve. **2**

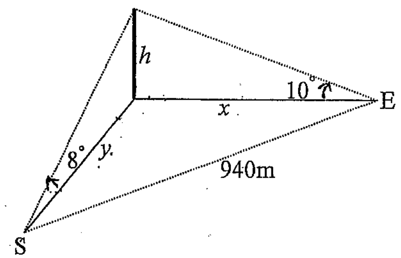
(d) Use the substitution $u = x-2$ to evaluate $\int_3^4 \left(\frac{x}{\sqrt{x-2}}\right)dx$. **3**

(e) A surveyor who is y metres south of a tower sees the top of it with an angle of elevation 8°. A second surveyor is x metres east of the tower. From his position the angle of elevation is 10° to the top of the tower.

The two surveyors are 940m apart.

(i) Show that $y = h\cot 8^\circ$ **1**

(ii) Find the height of the tower to the nearest metre. **4**



Question 12 (15 Marks) (Start a New Page) **Marks**

(a) Evaluate $\lim_{x\to 0}\frac{\sin 4x}{5x}$ **1**

(b) The chord joining P $(2ap, ap^2)$ and Q $(2aq, aq^2)$ on the parabola $x^2 = 4ay$ subtends a right angle at the vertex of the parabola.

(i) Show that $pq = -4$ **2**

(ii) Show that the locus of the point M, the midpoint of PQ, is also a parabola and give its vertex. **2**

(c) (i) Prove the identity **2**

$$\frac{\sin 2\theta}{2\sin\theta} - \cos\theta\cos 2\theta = 2\cos\theta\sin^2\theta$$

(ii) Hence solve the equation **3**

$$\frac{\sin 2\theta}{2\sin\theta} - \cos\theta\cos 2\theta = \cos\theta \quad \text{for } 0 \le \theta \le 2\pi.$$

(d) A particle moves in a straight line starting at the origin.
At t seconds, the velocity of the particle is given by

$v = 2\sin t - \sqrt{3},\ 0 \le t \le 2\pi$, where v is in metres per second.

(i) When is the particle at rest? **2**

(ii) Find an expression for the acceleration a, of the particle a time t. **1**

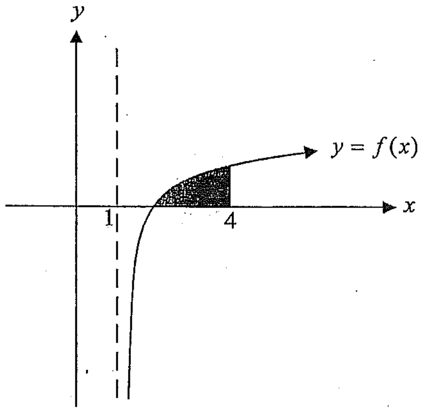
(iii) Find the displacement of the particle x, in metres, when the particle is first at rest. **2**

Question 13 (15 Marks) (Start a New Page) **Marks**

(a) Use mathematical induction to prove that $n^2 + 2n$ is divisible by 8 for even $n \geq 2$. **3**

(b) Find the general solution to $2\sqrt{3}\cos^2\theta = \sin 2\theta$ **4**

(c)



The sketch shows the graph of the curve $y = f(x)$ where $f(x) = \ln(x-1)$, $x > 1$.

Copy or trace this diagram onto your page.

(i) Sketch the graph of the inverse function $y = f^{-1}(x)$ on the same diagram. **2**

(ii) Show that the inverse function is given by $f^{-1}(x) = e^x + 1$. **2**

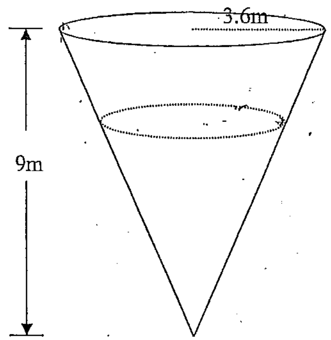
(iii) Hence find the area of the shaded region. **2**

(d) The polynomial $P(x) = x^3 + 5x^2 - cx + 2$ is exactly divisible by $x - 2$. Find the value of c. **2**

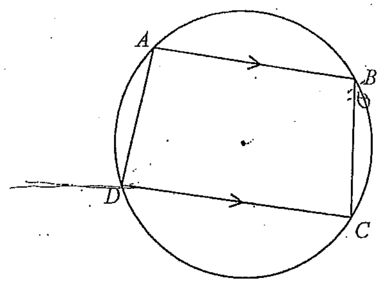
Question 14 (15 Marks) (Start a New Page) **Marks**

(a) The diagram shows a milk storage unit in the shape of an inverted cone with radius 3.6m and height 9m. **3**

When the gate at the bottom is open, milk pours out at a rate equal to $\frac{\sqrt{h}}{10} m^3 s^{-1}$. At what rate is the height changing when $h = 7{\cdot}2m$.



(b)



ABCD is a cyclic quadrilateral with AB||DC.

(i) Prove $\angle ADC = \angle BCD$ **2**

(ii) Hence, use congruent triangles to prove that any trapezium inscribed in a circle must be isosceles. (i.e. has its non-parallel sides equal in length) **3**

Question 14 continued **Marks**

(c) Let $f(x) = \tan^{-1}\left(\frac{2}{x}\right) - \tan^{-1}(-2x)$ where $x > 0$.

(i) Find $f'(x)$. **2**

(ii) Hence explain why the inverse function $f^{-1}(x)$ does not exist. **3**

(iii) Find the largest possible continuous domain for $f(x)$ so that its inverse function $f^{-1}(x)$ exists. **2**

End of Exam

MULTIPLE CHOICE
ANSWERS AT THE BACK

$12 + 1 = \frac{13}{15}$

Question 11

a) $\displaystyle\int_0^3 \frac{1}{16+x^2}\,dx$

$= \left[\frac{1}{4}\tan^{-1}\left(\frac{x}{4}\right)\right]_0^3$ ✓

$\boxed{= \frac{1}{4}\tan^{-1}\frac{3}{4}} - \cancel{\frac{1}{4}\tan^{-1}\left(\frac{0}{4}\right)}$ ✓ ✓ Exact given

$\doteqdot 0.16$ (to 2d.p.)

b) $2x^3 \tan x$ ✓

$u = 2x^3 \quad v = \tan x$ ✓

$u' = 6x^2 \quad v' = \sec^2 x$

$\frac{dy}{dx} = 6x^2 \tan x + 2x^3 \sec^2 x$

$= 2x^2(3\tan x + x\sec^2 x)$

c) $(-6t, 9t^2)$

$x = -6t \qquad y = 9t^2 \qquad \cancel{y^2 = -4ax}$

$t = \frac{x}{-6} \qquad \cancel{a = 9} \qquad x = 2at \quad y = \cancel{at^2}$

$y = 9 \times \left(\frac{x}{-6}\right)^2$ ✓

$y = \cancel{9} \times \frac{x^2}{\cancel{36}\,4}$ ✓

$x^2 = 4y.$

d) $\displaystyle\int_3^4 \left(\frac{x}{\sqrt{x-2}}\right) dx \qquad$ let $u = x - 2 \qquad u' = 1 \qquad x = u + 2.$

$du = dx.$

Why?

$(+)\displaystyle\int_1^2 \frac{u+2}{\sqrt{u}}\,du \qquad$ when $x = 4 \quad u = 2$

$x = 3 \quad u = 1$

$= \displaystyle\int_1^2 \frac{u}{\sqrt{u}} + \frac{2}{\sqrt{u}}\,du.$ good.

$= \displaystyle\int_1^2 \sqrt{u} + \frac{2}{\sqrt{u}}\,du = \left[\frac{u^{3/2}}{3/2} + \frac{2u^{1/2}}{1/2}\right]_1^2 = \left[\frac{2}{3}u\sqrt{u} + 4\sqrt{u}\right]_1^2$

$= \left[\left(\frac{4}{3}\sqrt{2} + 4\sqrt{2}\right) - \left(\frac{2}{3} + 4\right)\right] = \frac{16}{3}\sqrt{2} - 4\frac{2}{3}$

$= -\frac{1}{2}\left[\frac{u^{3/2}}{3/2}\right]_1^2 - \displaystyle\int_1^2 \frac{1}{\sqrt{u}}\,du.$

$= -\frac{1}{2}\left[\frac{2 \times 2^{3/2}}{3} - \frac{2 \times 1^{3/2}}{3}\right] - \left[\frac{u^{1/2}}{1/2}\right]_1^2$ ✓ for subst^n

$= -\frac{1}{2}\left[\frac{2}{3} \times 2\sqrt{2} - \frac{1}{3}\right] - \left[\frac{2 \times 2^{1/2}}{1} - 2 \times 1\right]$

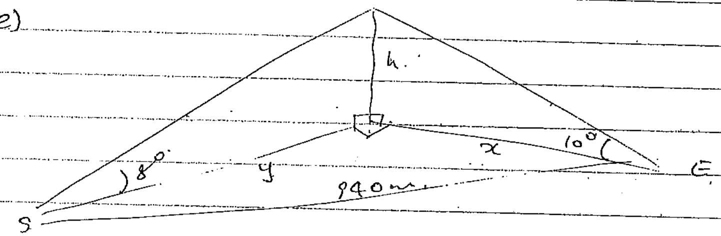
$= -\frac{1}{2}\left[\frac{4}{3}\sqrt{2} - \frac{1}{3}\right] - 2\sqrt{2} + 2.$

$= -\frac{2\sqrt{2}}{3} + \frac{1}{6} - 2\sqrt{2} + 2$

$= \frac{-8\sqrt{2}}{3} + \frac{13}{6}$ ✗

$= \frac{1}{3}\left(\frac{13}{2} - 8\sqrt{2}\right)$

e)



a) $\tan 8° = \frac{h}{y}$ ✓

$y = \frac{h}{\tan 8°}$

$y = h.\cot 8°$

b) $\tan 10° = \frac{h}{x}$ ✓

$x = h\cot 10°.$ ✓

$940^2 = x^2 + y^2$ ✓

$940^2 = h^2\cot^2 10° + h^2\cot^2 8°.$

$h^2 = \frac{940^2}{\cot^2 10° + \cot^2 8°}$ ✓

$h \doteqdot 103$ m.

14/15

Question 12

a) $\lim_{x \to 0} \frac{\sin 4x}{5x}$

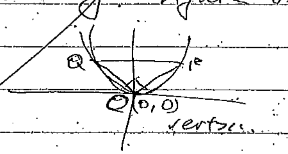
$= \frac{4}{5} \lim_{x \to 0} \frac{\sin 4x}{4x}$

$= 4/5$

~~b) $P(2ap, ap^2)$ $Q(2aq, aq^2)$. $x^2 = 4ay$ right< vertex~~

~~$x^2 = 4ay$~~

~~$y = \frac{x^2}{4a}$~~



~~$y' = \frac{x}{2a}$~~

~~at $P(2ap, ap^2)$~~ ~~∴ similarly at Q $y' = q$~~

~~$y' = \frac{2ap}{2a}$~~

~~$= p$~~

~~eqn P to vertex~~ ~~similarly at Q eqn~~

~~$y - ap^2 = p(x - 2ap)$~~ ~~$y = qx - aq^2$~~

~~$y - ap^2 = px - 2ap^2$~~

~~$y = px - ap^2$~~

~~$m_{PO} \times m_{QO} = -1$~~

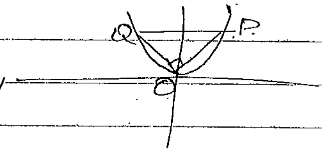
~~$pq = -1$~~

b) $P(2ap, ap^2)$ $Q(2aq, aq^2)$ $x^2 = 4ay$

$x^2 = 4ay$

$y = \frac{x^2}{4a}$

y'



i) $M_{QO} = \frac{aq^2 - 0}{2aq - 0} = \frac{q}{2}$

$M_{OP} = \frac{ap^2 - 0}{2ap - 0} = \frac{p}{2}$

$m_{QO} \times m_{OP} = -1$ ← great :)

$\frac{q}{2} \times \frac{p}{2} = -1$

$\therefore pq = -4$

ii) M ⇒ mid point of PQ vertex?

M of PQ $= \left(\frac{2ap + 2aq}{2}, \frac{ap^2 + aq^2}{2}\right)$

$= \left(ap + aq, \frac{ap^2 + aq^2}{2}\right)$

$= \left(a(p+q), \frac{a}{2}(p^2 + q^2)\right)$

$x = a(p+q)$ $\quad y = \frac{a}{2}(p^2 + q^2)$

$\frac{x}{a} = p + q \longrightarrow y = \frac{a}{2}[(p+q)^2 - 2pq]$

$y = \frac{a}{2}\left[\frac{x^2}{a^2} - 2 \times -4\right]$

$y = \frac{a}{2}\left[\frac{x^2}{a^2} + 8\right]$

$y = \frac{x^2}{2a} + \frac{8a}{2}$

$y = \frac{x^2}{2a} + \frac{8a^2}{2a}$

$2ay = x^2 + 8a^2$

$x^2 = 2ay - 8a^2$

$x^2 = 2a(y - 4a)$ $\quad$ vertex $(0, 4a)$

c) i) $\frac{\sin 2\theta}{2\sin\theta} - \cos\theta\cos 2\theta = 2\sin^2\theta\cos\theta$.

LHS: $\frac{\sin 2\theta}{2\sin\theta} - \cos\theta\cos 2\theta$

$= \frac{\cancel{2\sin\theta}\cos\theta}{\cancel{2\sin\theta}} - \cos\theta(1-2\sin^2\theta)$

$= \cancel{\cos\theta} - \cancel{\cos\theta} + 2\sin^2\theta\cos\theta$

$\therefore = 2\sin^2\theta\cos\theta$

$=$ RHS.

ii) solve $0 \leq \theta \leq 2\pi$

~~$2\sin^2\theta\cos\theta = \cos$~~

$\frac{\sin 2\theta}{2\sin\theta} - \cos\theta\cos 2\theta = \cos\theta$

$2\sin^2\theta\cos\theta = \cos\theta$

Take out $\cos\theta$.

$\cos\theta(2\sin^2\theta - 1) = 0$ $\rightarrow$ $2\sin^2\theta = 1$

$\sin^2\theta = \frac{1}{2}$ $\quad 45° \ \frac{\pi}{4}$

$\sin\theta = \pm\frac{1}{\sqrt{2}}$

$\theta = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

d) $v = 2\sin t - \sqrt{3}$ $\quad 0 \leq t \leq 2\pi$ $\quad v = m/s$

i) $v = 0$?

$0 = 2\sin t - \sqrt{3}$

$\frac{\sqrt{3}}{2} = \sin t$

$t = \frac{\pi}{3}, \frac{2\pi}{3}$

~~ii) $a = \int 2\sin t - \sqrt{3} \ dt$~~

$=$

ii) $v = 2\sin t - \sqrt{3}$

$v' = a$

$v' = 2\cos t$

$a = 2\cos t$

iii) displacement(s) $= \int v$

$= \int 2\sin t - \sqrt{3} \ dt$

$= -2\cos t - \sqrt{3}t + c$

$t = 0 \quad s = 0$

$0 = -2\cos(0) - 0 + c$

$0 = -2 + c$

$c = 2$

$s = -2\cos t - \sqrt{3}t + 2$

when $t = \frac{\pi}{3}, \frac{2\pi}{3}$

$s = -2\cos\frac{\pi}{3} - \sqrt{3}\frac{\pi}{3} + 2$

$= -1 - \frac{\pi}{3}\sqrt{3} + 2$

$= (1 - \frac{\pi}{3}\sqrt{3})$ m

$s = -2\cos\frac{2\pi}{3} - \sqrt{3}\times\frac{2\pi}{3} + 2$

$= 1 - \frac{2\sqrt{3}\pi}{3} + 2$

$= \cancel{3 - \frac{\pi 2\sqrt{3}}{3}}$

$= 3 - \frac{2\sqrt{3}\pi}{3}$ m

(13)(a) To prove n^2+2n is divisible by 8 for $n \geqslant 2$ (for even 'n')

Step 1 : Prove true for $n=2$

$2^2+2(2) = 8$ which is divisible by 8

$\therefore$ true for $n=2$

Step 2 : Assume true for $n=k$

i.e. $k^2+2k = 8M$ (where M is an integer)

R.T.P. true for $n=k+2$

i.e. $(k+2)^2 + 2(k+2) = 8N$ (where N is another integer)

Proof

LHS $= k^2+4k+4+2k+4$

$= (k^2+2k) + 4k+8$

$= 8M+8+4k$

$= 8(M+1) + 4(2l)$ since k is even

$= 8(M+1+l)$

$= 8N$ which is divisible by 8.

$2\cos\theta = 0$.

$\theta = \frac{\pi}{2} + 2n\pi$

b). $2\sqrt{3}\cos^2\theta = \sin 2\theta$

$2\sqrt{3}\cos^2\theta = 2\sin\theta\cos\theta$.

$\underset{a}{2\sqrt{3}}\cos\theta - \underset{b}{2}\sin\theta = 0$.

$\frac{a}{\sqrt{a^2+b^2}} = \cancel{\frac{2\sqrt{3}}{\sqrt{12+4}}} \frac{2\sqrt{3}}{\sqrt{16}}$

$\frac{2\sqrt{3}}{4} = \frac{\sqrt{3}}{2} = r$.

$\therefore$ solution:

$\frac{\sqrt{3}}{2}\sin\left(\frac{\pi}{6}-\theta\right)$

$r = 2$.

$\cancel{\sqrt{3}\cos\theta}$ $\tan\theta = \frac{1}{\sqrt{3}}$

$\theta = \frac{\pi}{3} + 2n\pi$

$r\sin(x-\theta)$ $2\cos\left(\theta+\frac{\pi}{6}\right)$

$r\sin x\cos\theta - r\cos x\sin\theta$

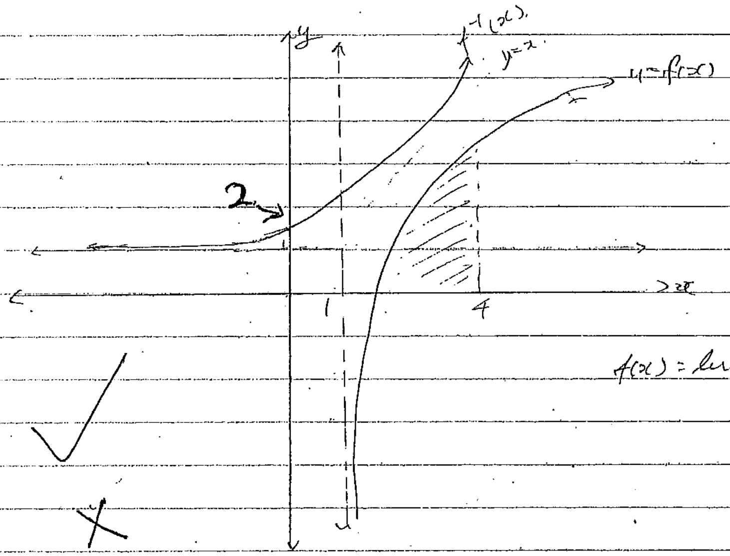
$\sqrt{3}\cos\theta - \sin\theta$.

$\tan\theta = \frac{2}{2\sqrt{3}}$

$\tan\theta = \frac{1}{\sqrt{3}}$

$\theta = \frac{\pi}{6}$

c).



$f(x) = \ln(x-1)$

ii). $f(x) = \ln(x-1) \qquad x > 1$

$y = \ln(x-1)$

$x = \ln(y-1)$

$e^x = y-1$

$y = e^x + 1$

$\therefore f^{-1}(x) = e^x + 1$

iii). $y = \ln(x-1)$

~~when $x = 0$~~

~~$y = \ln 1$~~

when $y = 0. \quad x = 2$

$$\int_2^4 \ln(x-1)\,.dx$$

$u = \ln(x-1) \qquad v' = 1$

$u' = \frac{1}{x-1} \qquad v = x$

$$y = \left[x\ln(x-1)\right]_2^4 - \int_2^4 \frac{x}{x-1}\,dx$$

$$= 4\ln 3 - \cancel{2\ln 1} - \int_2^4 \frac{x-1}{x-1}\,dx - \int_2^4 \frac{1}{x-1}\,dx$$

$$= 4\ln 3 - [x-2] - [\ln(x-1)]_2^4$$

$$= 4\ln 3 - 2 - [\ln 3 - \cancel{\ln 1}]$$

$$= 3\ln 3 - 2 \quad u^2$$

d) $P(x) = x^3 + 5x^2 - cx + 2 \qquad (x-2)$

$P(2) = \cancel{8} \; 0.$

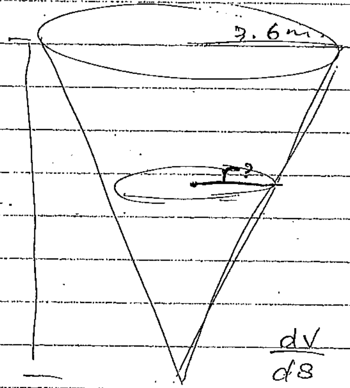
$0 = 8 + 20 - 2c + 2$

$-30 = -2c$

$c = 15$

Q.14. 7/15

a)



$\frac{\sqrt{h}}{10}\ m^3 s^{-1} = \frac{dV}{ds}$

$h = 7.2m.$

?? rate h changing $\frac{dh}{ds}$

$V_{cone} = \frac{1}{3}\pi r^2 h.$

$V = \frac{1}{3}\pi r^2 h.$

$\frac{dV}{dh} = \frac{1}{3}\pi r^2$ ✗

$\frac{dV}{ds} = \frac{dV}{dh} \times \frac{dh}{ds}.$

$h = 7.2.$ $\frac{\sqrt{h}}{10} = \frac{1}{3}\pi r^2 \times \frac{dh}{ds}.$

$r = 3.6$ $\frac{\sqrt{7.2}}{10} = \frac{1}{3}\pi(3.6)^2 \times \frac{dh}{ds}.$ ✓

$\frac{r}{h} = \frac{3.6}{9} = \frac{2}{5}.$ $V = \frac{1}{3}\pi \frac{4h^3}{25}.$

$r = \frac{2h}{5}.$

$\frac{dV}{ds} = \frac{dV}{dh} \times \frac{dh}{ds}$

$\frac{\sqrt{7.2}}{10} = \frac{1}{3}\pi \times \frac{4(7.2)^3}{25} \times \frac{dh}{ds}.$

$\frac{dh}{ds} = \ldots$

b) i). $\angle ADC = \angle BCD$

$\angle ADB = \angle BCA$

($\angle$ subtended by same arc are equal). ✓

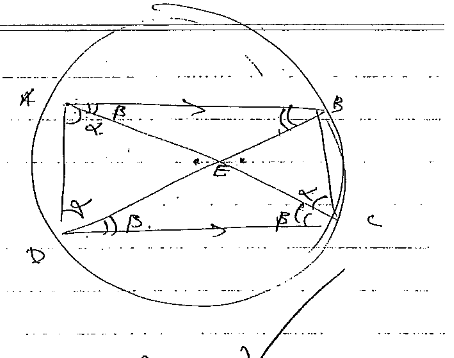
$\angle ABD = \angle ACD$

($\angle$ subtended by same arc).

$\angle ABD = \angle BDC$

(alternate $\angle$ in $\parallel$ lines are equal).

$\therefore \angle ADC = \angle BCD$ ✓



ii) $\angle ABC + \angle ACD = \angle BAC + \angle CAD$

(opp. $\angle$s of cyclic quad are equal)

$\therefore$ let $\angle BCA = \alpha$. $\angle ACD = \beta$.

$\angle BAC = \beta$ $\angle CAD = \alpha$.

$\angle ADB = BCA$ proven above (pt. i).

$= \alpha$.

$\angle CAD = \angle BCA = \alpha$. ✓ 4/4

$\therefore \triangle AED$ is an isosceles $\triangle$.

$\angle AED = \angle BEC$ (vert opp. $\angle$ are equal).

$\angle BCA = \alpha = \angle ADE$

(proven pt. i)

$\therefore \triangle AED \equiv \triangle BEC$ by AAA ✗ ✗ 3/3

$\therefore AD = BC.$

(chords subtending the same $\angle$ are equal in length)

OR matching sides of ~~isos $\triangle$~~ cong $\triangle$ are equal

$\therefore$ any trapezium inscribed in a circle must be isosceles.

Congruency !! equiangular !! NOT AAA !!

c) $f(x) = \tan^{-1}\left(\frac{2}{x}\right) - \tan^{-1}(-2x) \quad x > 0.$

$\frac{2}{x}$

$2x^{-1}$

$-2x^{-2}$

$-2x$

i) $f'(x) = ?$

$$f'(x) = \frac{\frac{-2}{x^2}}{1 + \frac{4}{x^2}} \quad \left(\frac{-2}{1+4x^2}\right)$$

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

good

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

ii) Since ~~the denominator of~~ both fractions are even functions.

~~therefore~~

$f'(-x) = f(x)$.

and the domain of $f(x)$ is only restricted for ~~any values~~ for any values $x > 0$.

$\therefore$ graph $(f(x))$ will not satisfy the horizontal line test

$\frac{\frac{-2}{x^2}}{1+4} \quad \frac{2}{x^2}$

0.

~~$\sin x$~~ $f'(x) =$

$\sin^{-1} x$

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

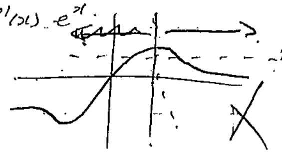
$2x^{-1}$

when $f''(x)$ or $f(x) = e^x \rightleftharpoons \ln x \; f^{-1}(x)$

ii) max turning point

Does not pass horizontal test

$f'(x)\ e^x$



iii) $x \geq 1$

Multiple Choice Answer Sheet

Name : ______

Teacher : ______

Select Your Answers

1.	A	B	C	~~D~~
2.	A	~~B~~	C	D
3.	A	B	C	~~D~~
4.	~~A~~	B	C	D
5.	~~A~~	B correct	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

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