

Name: _____

Time Allowed 45min

Circle Teacher: CJJ, GC, BMM

Section A

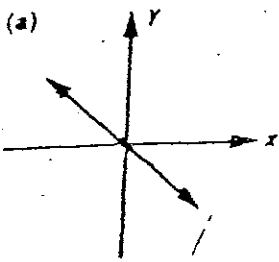
Marked by GC

13 marks

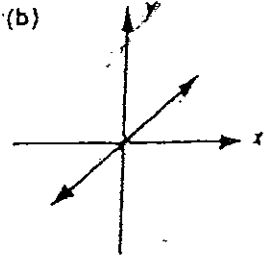
Choose the most correct answer to Questions 1-13

(1) $y = x$

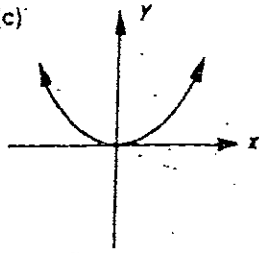
(a)



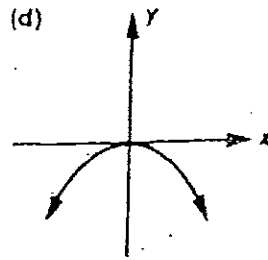
(b)



(c)

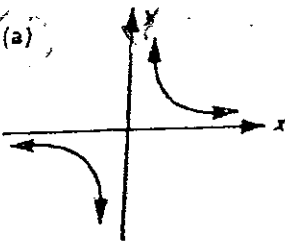


(d)

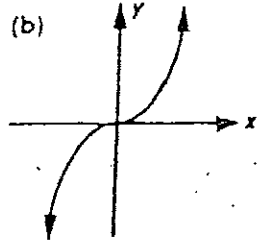


(2) $y = \frac{1}{x}$

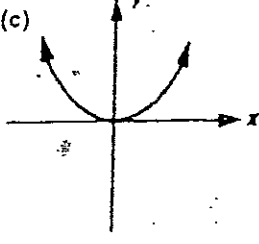
(a)



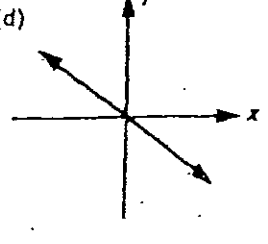
(b)



(c)

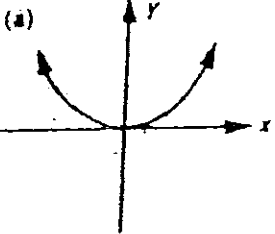


(d)

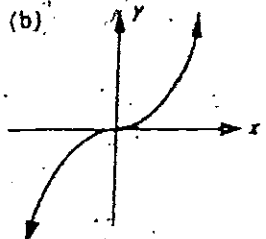


(3) $y = x^3$

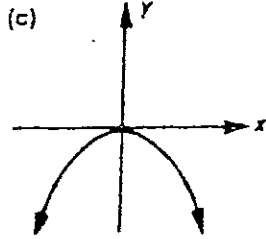
(a)



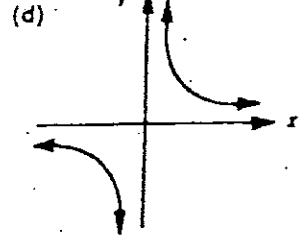
(b)



(c)

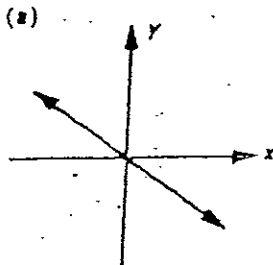


(d)

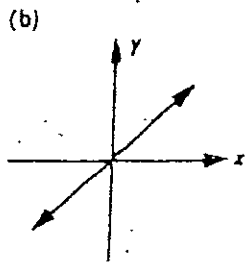


(4) $y = -x^2$

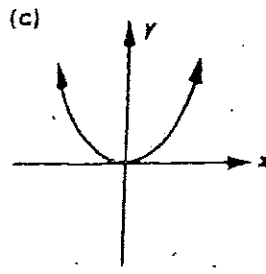
(a)



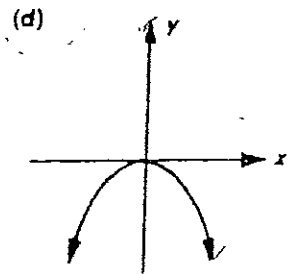
(b)



(c)

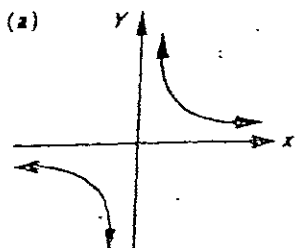


(d)

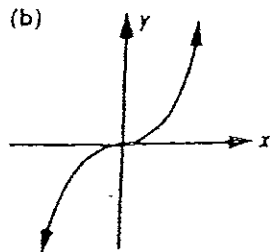


(5) $y = -x$

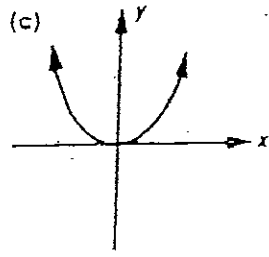
(a)



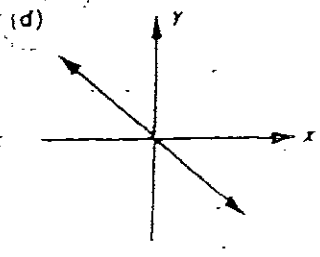
(b)



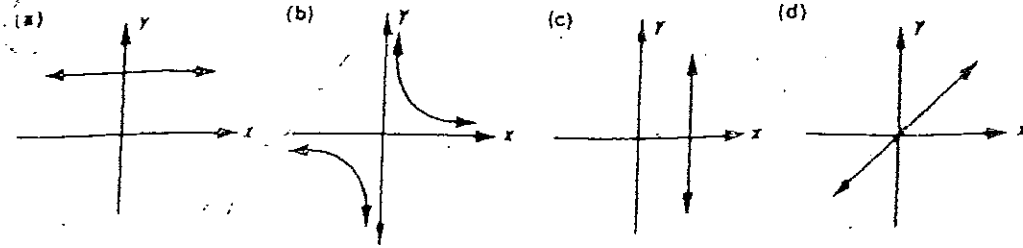
(c)



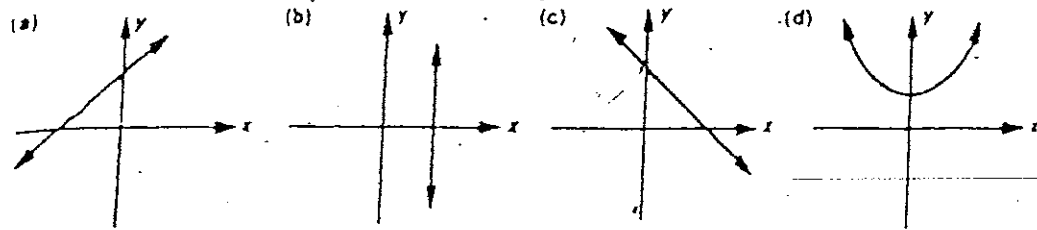
(d)



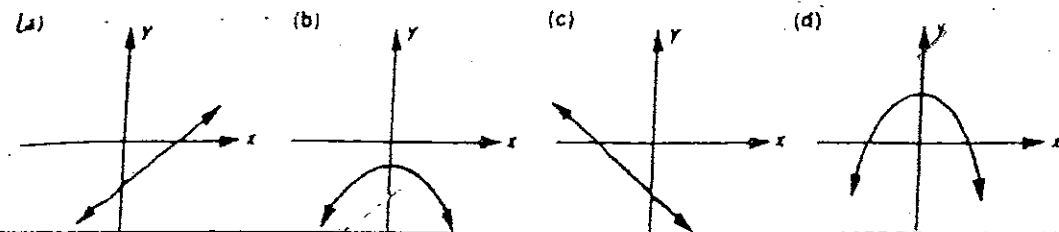
(6) $y = 1$



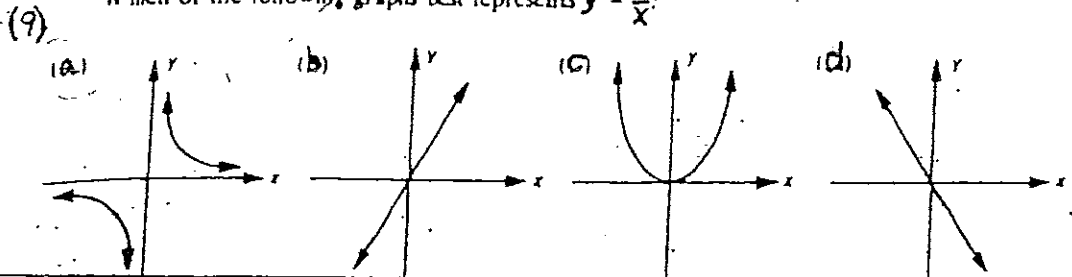
(7) $y = 1 - x$



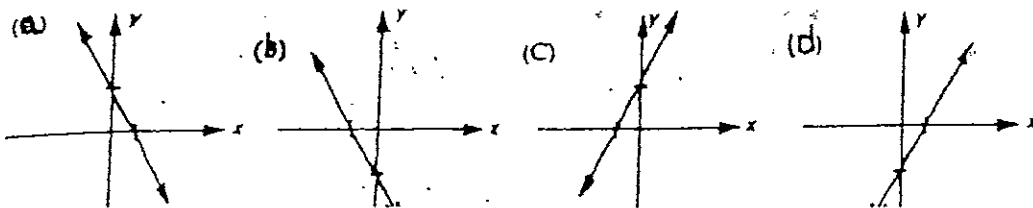
(8) $y = 1 - x^2$



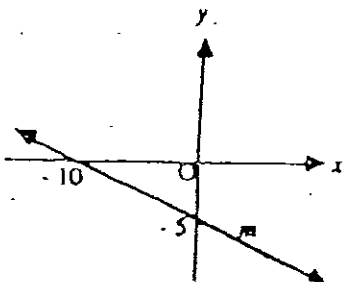
Which of the following graphs best represents $y = \frac{2}{x}$?



(10) Which graph could best represent $y = 2x - 1$?



(11)



The equation of the line m is

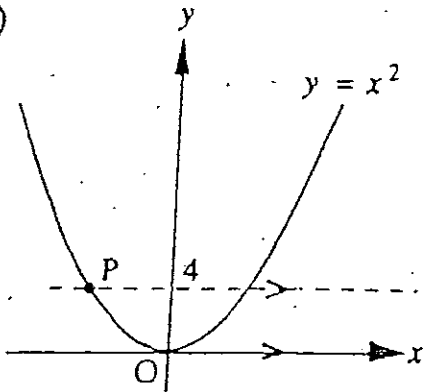
- (A) $x - 2y - 10 = 0$
- (B) $2x - y - 5 = 0$
- (C) $x + 2y + 10 = 0$
- (D) $2x + y + 5 = 0$

(12) The graph $y = 2x^2 + b$ passes through the point $(-3, 4)$.

What is the value of b ?

- (A) -35 (B) -32 (C) -14 (D) 22

(13)



The coordinates of the point P are

- (A) $(-2, 4)$ (B) $(-4, 2)$
(C) $(-4, 16)$ (D) $(-16, 4)$

Year 10 Adv — Non Linear Graphs and Trigonometry Test

Name: _____ Time Allowed 45min

Circle Teacher: C.J.L., GC, BMM

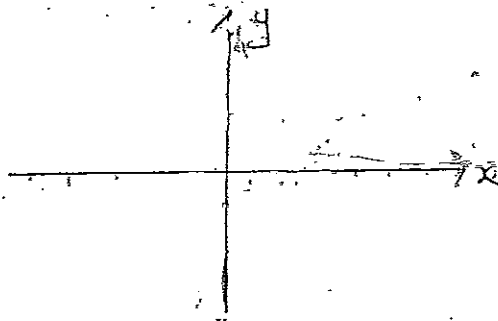
Section B Marked by C.J.L. 24 marks

a. For the expression $xy = 12$, answer the following questions

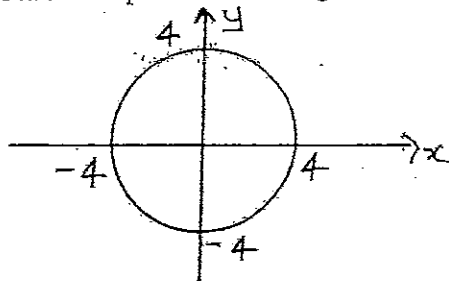
i. Fill in the table below

x	-12	-6	-1	1	6	12
y						

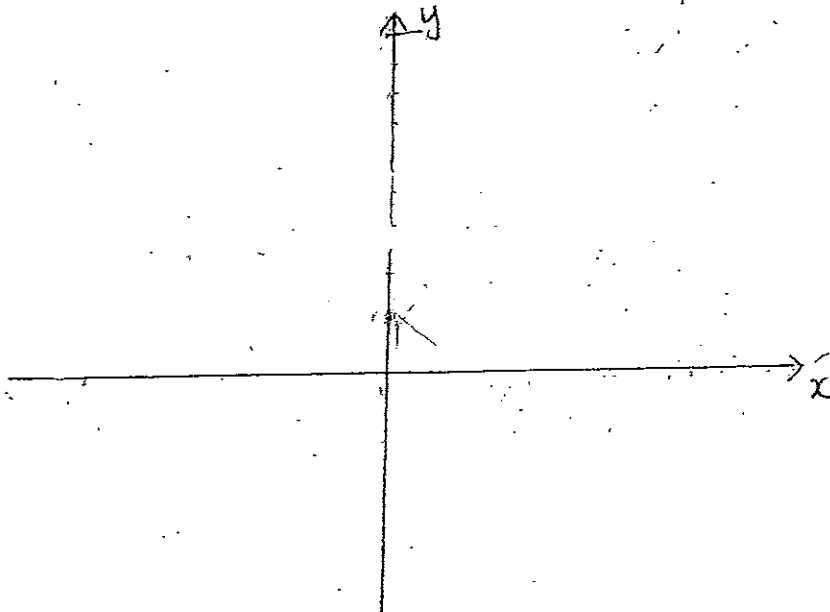
ii. Sketch the expression on the axes below labelling any asymptotes



b. Write down the equation of the figure below



c. On the same set of axes below sketch the graphs of $y = 4^x$ and $y = 4^{-x}$, labelling each graph clearly and showing any intercepts with the axes.



d. Sketch $y = \frac{1}{2}x^3 - 1$ on a set of axes showing x and y intercepts.

2

Draw the graph of the following equation $y = \sqrt{16 - x^2}$

2

f. What is the equation of a circle with centre the origin and radius $2\sqrt{3}$ units

1

g. Consider the parabola $y = x^2 + 6x + 10$

i Find the y -intercept

1

ii Find the equation of the axis of symmetry

1

iii Find the co-ordinates of the vertex

2

iv Use this information to draw a clear sketch of the curve

2

h. For the function $y = (x-2)^2 - 3$:

i. Find the equation of the axis of symmetry

1

ii. Find the coordinates of the vertex

1

iii. Graph the function, showing the information above and also any intercepts with the axes. (Note: Please give the x intercepts in exact value form)

4

Year 10 Adv Non Linear Graphs and Trigonometry Test

Name: Sam Kazacos Time Allowed 45min

Circle Teacher: CJL GC, BMM

Section C Marked by BMM 13 marks

13

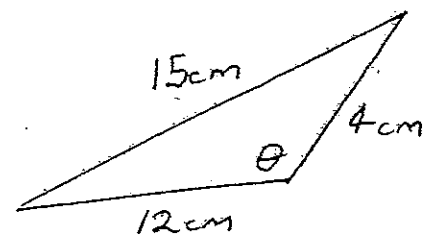
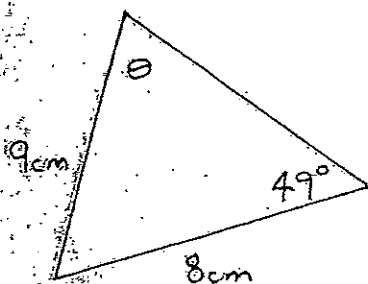
a. i If $0^\circ < x < 90^\circ$, show that $\sin(90^\circ - x) = \cos x$ 2

(Hint: Start with a right-angled triangle and let one of the other angles be x)

ii Hence, simplify $\frac{\cos 26^\circ}{\sin 64^\circ}$ 1

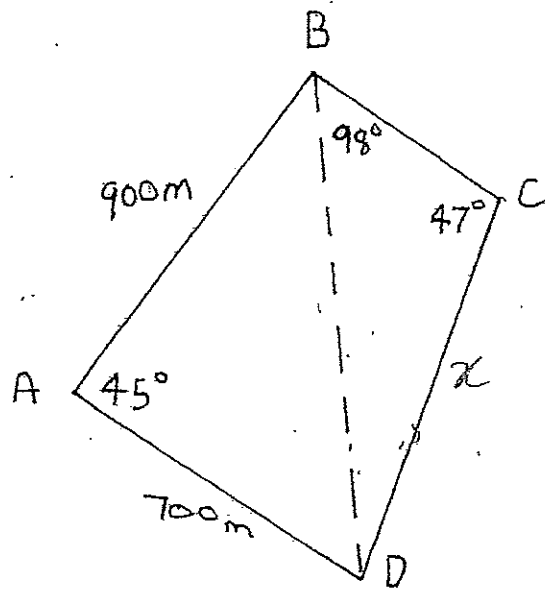
iii Find the exact value of $\sin 30^\circ + \cos 30^\circ$ 2

b. Find the value of θ to the nearest minute 4



- c. A large paddock has dimensions shown. Calculate the length of CD (correct to the nearest m).

4



SOLUTIONS — 4/10 { Non-Linear Graphs
Trigonometry

SECTION (A)

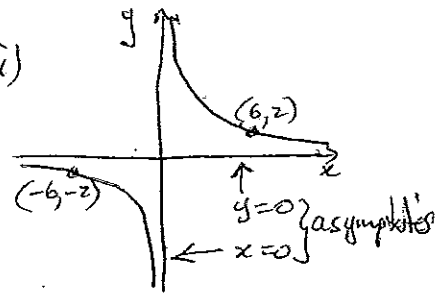
- (1) B
- (2) A
- (3) B
- (4) D
- (5) D
- (6) A
- (7) C
- (8) D
- (9) A
- (10) D
- (11) C
- (12) C
- (13) A

SECTION (B)

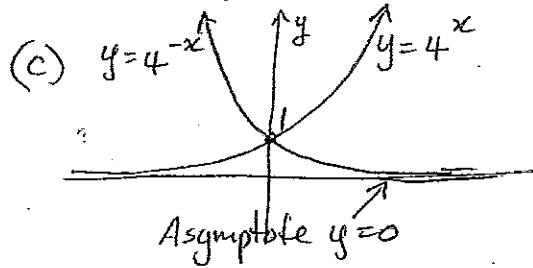
(a)

x	-12	-6	-1	1	6	12
y	-1	-2	-12	12	2	1

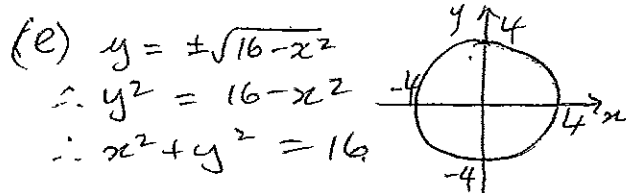
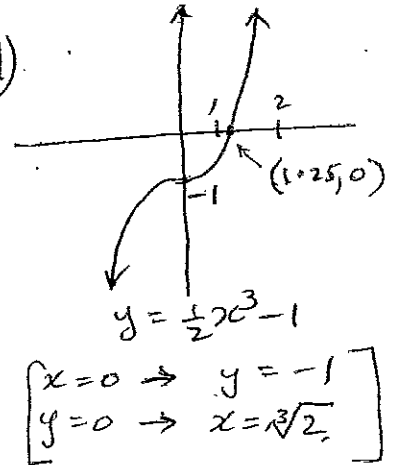
(ii)



(b) $x^2 + y^2 = 16$

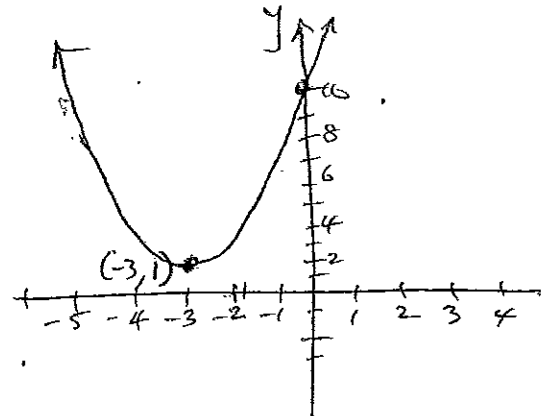


(d)



(f) $x^2 + y^2 = (2\sqrt{3})^2$

$\therefore x^2 + y^2 = 12$



(g) $y = x^2 + 6x + 10$

i) $x = 0 \Rightarrow y = 10$

ii) $x = -\frac{b}{2a} \Rightarrow x = -3$

iii) $y = (-3)^2 + 6(-3) + 10 = 1$

$\therefore \text{Vertex} = (-3, 1)$

(h) $y = (x-2)^2 - 3$

i) $y = x^2 - 4x + 1$

Axis of Symmetry at:

$x = -\frac{b}{2a} \Rightarrow x = 2$

ii) $V = (2, -3)$

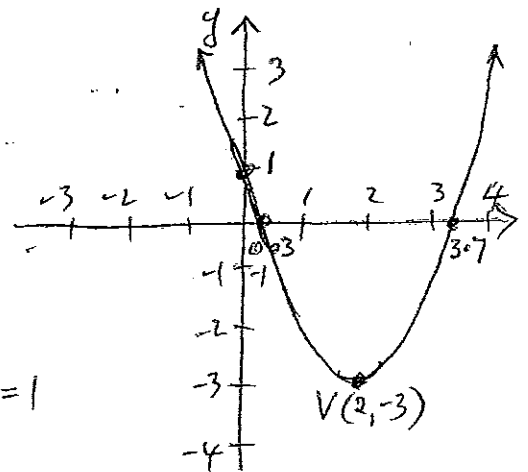
iii) at $x = 0 \rightarrow y = (0-2)^2 - 3 = 1$

at $y = 0 \rightarrow 0 = (x-2)^2 - 3$

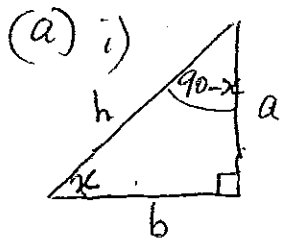
$3 = (x-2)^2$

$\pm\sqrt{3} = x-2$

$2 \pm \sqrt{3} = x$



SECTION C



$$\sin(90-x) = \frac{b}{h}$$

$$\cos(x) = \frac{b}{h}$$

$$\therefore \sin(90-x) = \cos x$$

$$\text{ii) } = \frac{\sin 64^\circ}{\sin 64^\circ} \quad \text{iii) } = \frac{1}{2} + \frac{\sqrt{3}}{2}$$

$$= 1$$

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

(b) i) $\frac{\sin \theta}{8} = \frac{\sin 49^\circ}{9}$

$$\therefore \sin \theta = \frac{8 \sin 49^\circ}{9} = 0.67$$

$$\therefore \theta = 42^\circ 8'$$

ii) $\cos \theta = \frac{12^2 + 4^2 - 15^2}{2 \times 12 \times 4}$

$$= -0.6770$$

$$\therefore \theta = 132^\circ 37'$$

(c) $BD^2 = 900^2 + 700^2 - 2 \times 900 \times 700 \cos 45^\circ$ (Cosine Rule)
 $= 1300000 - 1280000 \times \frac{1}{\sqrt{2}}$ $\triangle ABD$

$$\approx 409045$$

$$\therefore BD \approx 639.57$$

Using the SINE Rule in $\triangle BCD$:

$$\frac{x}{\sin 98^\circ} = \frac{639.57}{\sin 47^\circ}$$

$$\therefore x = \frac{639.57 \times \sin 98^\circ}{\sin 47^\circ}$$

$$= 865.99 \approx 866 \text{ m. (nearest metre)}$$