10/10

The Y.W.C.A. HIOE TJO YOENG COLLEGE

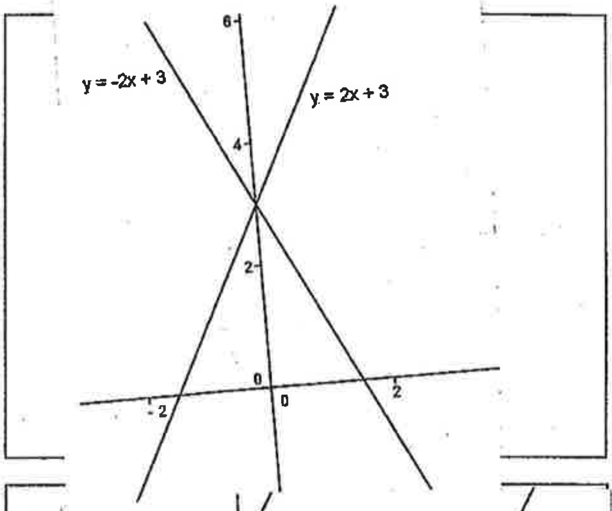
S2 MATHEMATICS WORKSHEET (Chapter 8 – Linera Equation in Two Unknown)

Name: Yung Yu Ki (34) S.2 C Date: 12/3/2014.

Using **Geogebra**, solve the following problems.

1. $y = 2x + 3$ ……….. (1)

   $y = -2x + 3$ ………. (2)



State some special features of the graphs

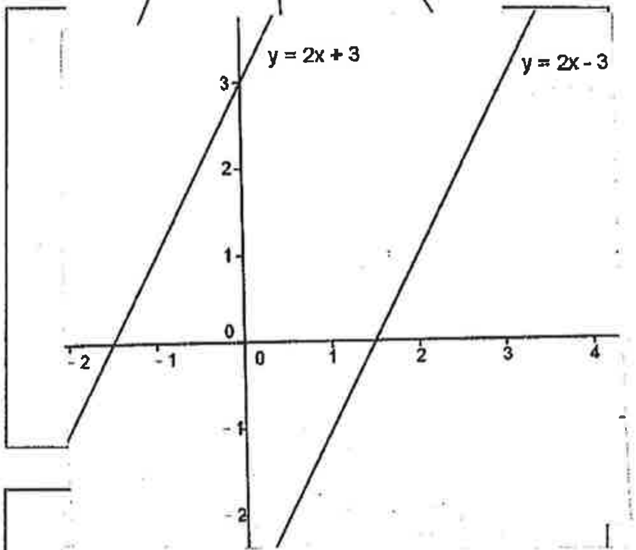
They are straight lines, they have the same y-intercept.

Solve the simultaneous equations (1) and (2).

(0, 3)

2. $y = 2x + 3$ ……….. (1)

   $y = 2x - 3$ ………... (2)



State some special features of the graphs

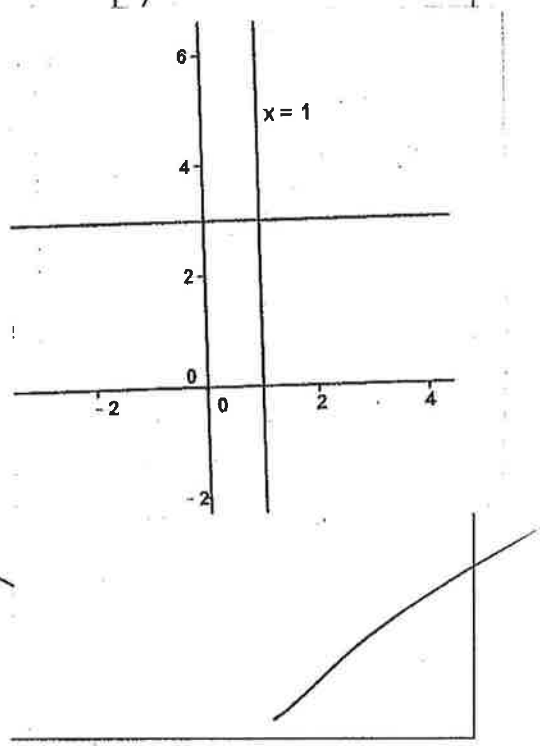
They are parallel lines, and straight lines.

Solve the simultaneous equations (1) and (2).

No solution.

3. (a) $y = 3$

   (b) $x = 1$

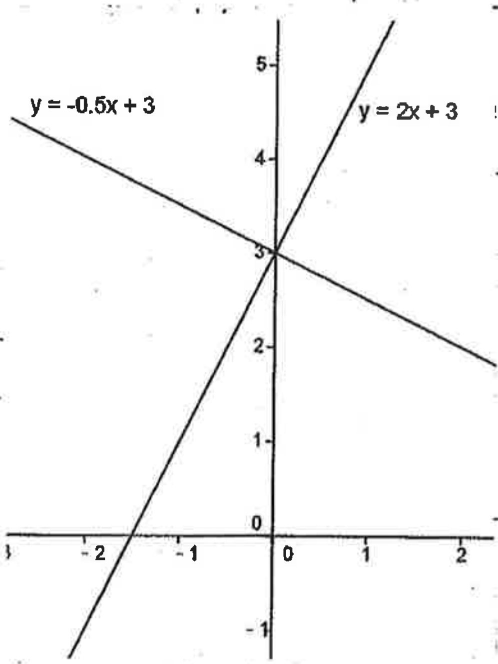


State some special features of the graphs

They are straight lines and perpendicular to others.

4. (a) $y = 2x + 3$

   (b) $y = -\frac{1}{2}x + 3$



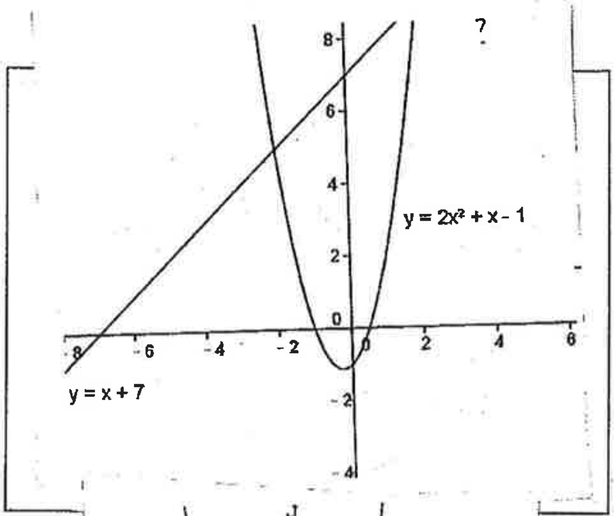
State some special features of

They are straight lines.

More to Learn:

5. $y = x + 7$ ………. (1)

$y = 2x^2 + x - 1$ ………. (2)



State some special features of the graphs

The graph of equation 2 is a parabola

Solve the simultaneous equations (1) and (2).

$(-2,5)$, $(2,9)$

6. (a) Solve $2x^2 + x - 1 = 0$ algebraically.

$2x^2 + x - 1 = 0$

$(2x-1)(x+1) = 0$

$x = -1 , \frac{1}{2}$

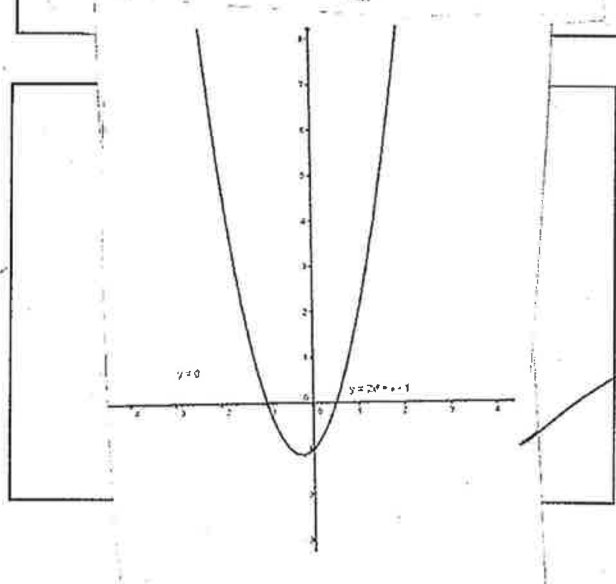
$2x \quad -1$

$x \quad 1$

$-x + 2x = x$

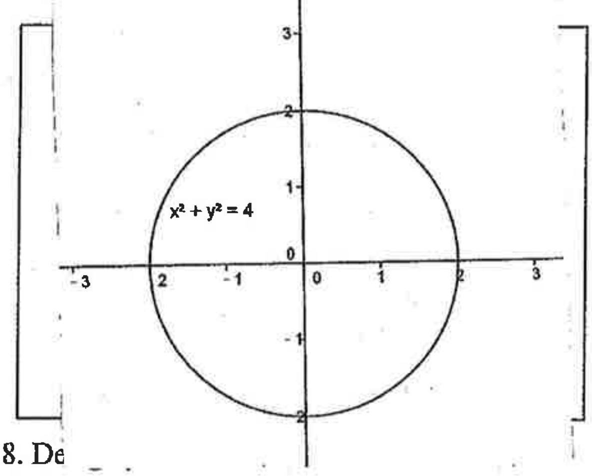
(b) Solve $2x^2 + x - 1 = 0$ graphically.

Draw the graph $\begin{cases} y = 2x^2 + x - 1 \\ y = 0 \end{cases}$

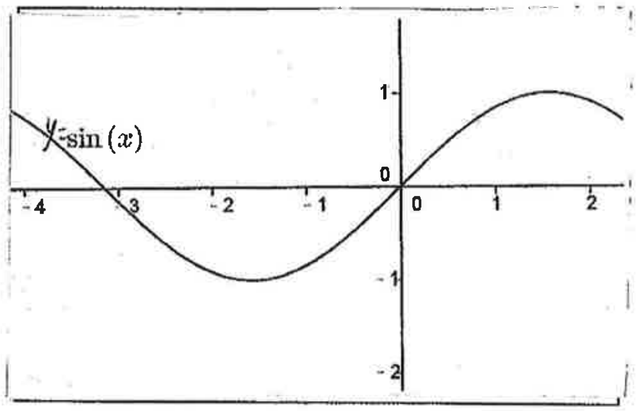


7. Some interesting graphs

(a) $x^2 + y^2 = 4$

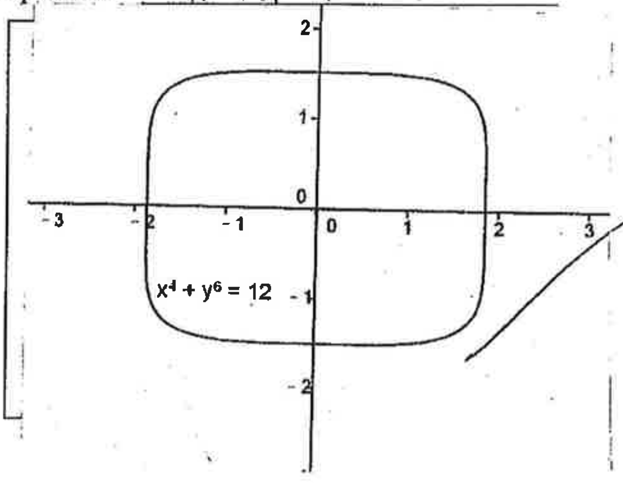


(b) $y = \sin x$ [Type: $y = \sin (x)$]

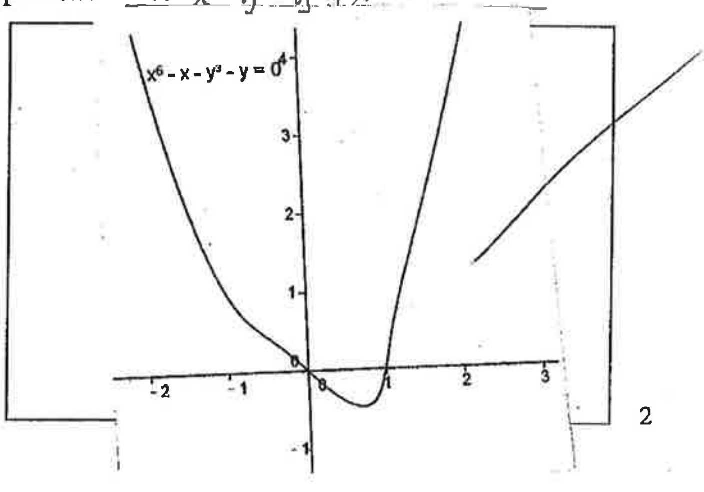


8. De

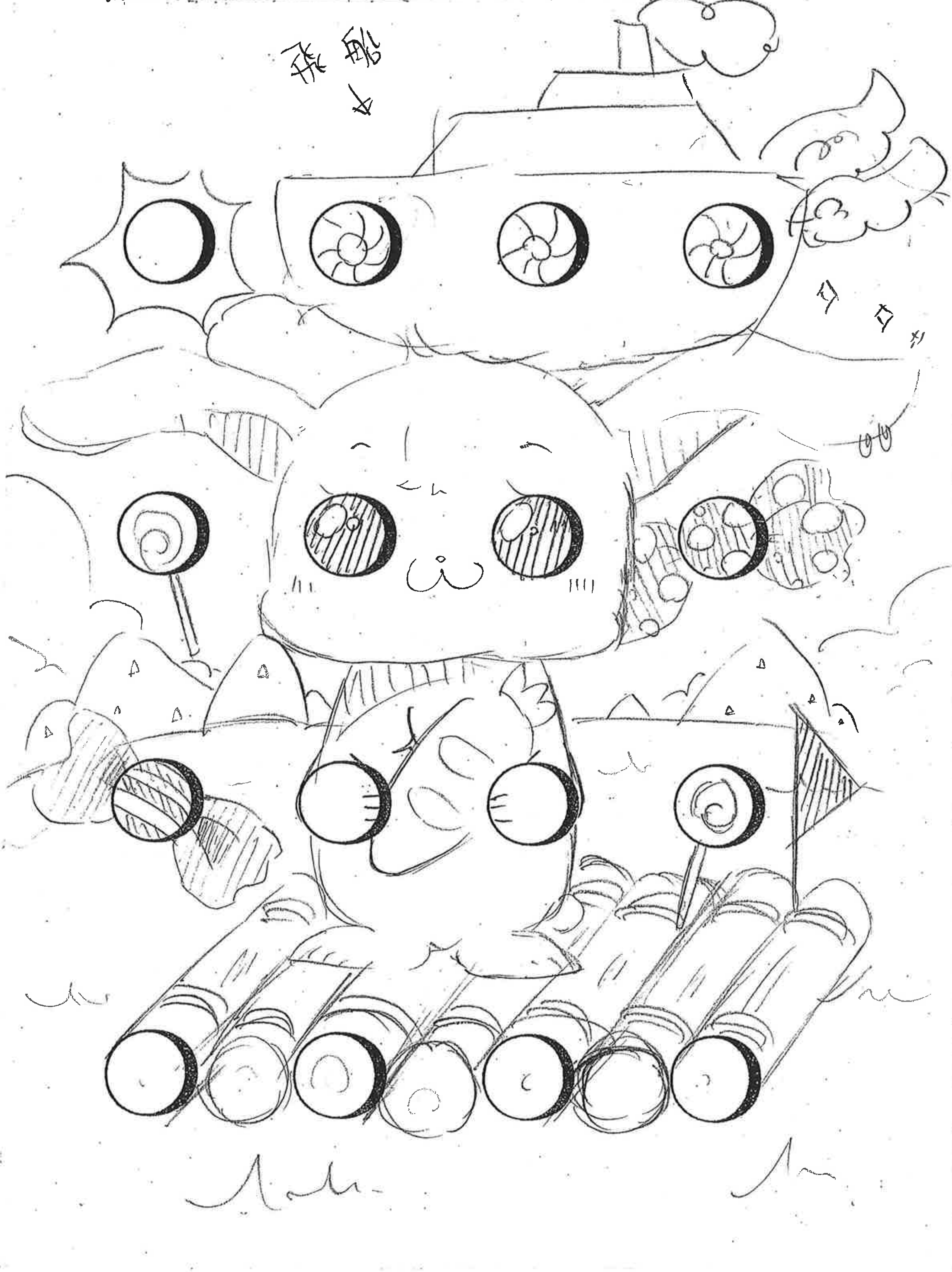
Equation: $x^4 + y^6 = 12$



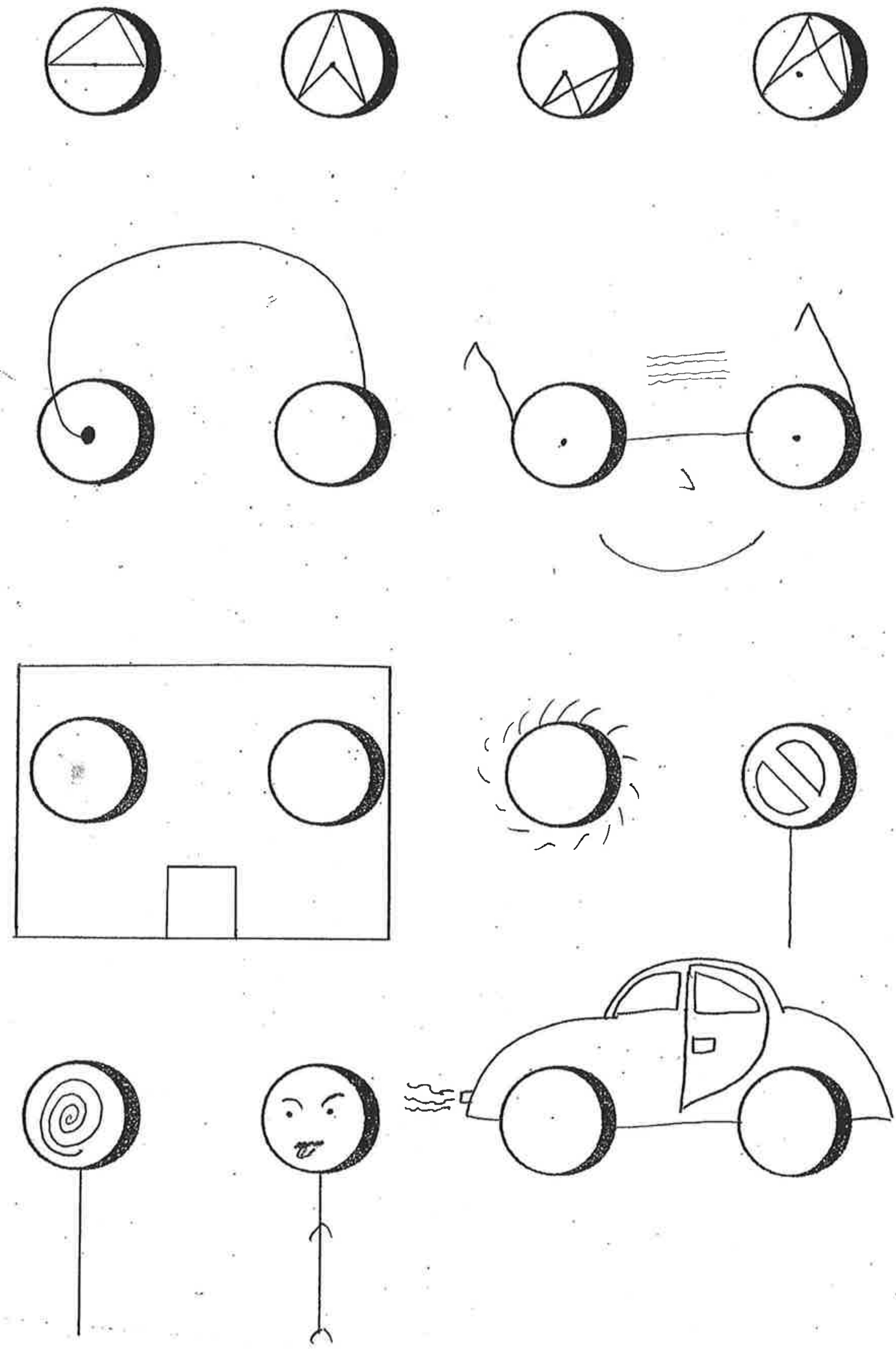
Equation: $x^6 - y = y^3 + x$



Name: Choi Sum Yi (8) 52D Date: 16-12-13



Name : Xu Weichang (30) 5 2 C Date : 16/12



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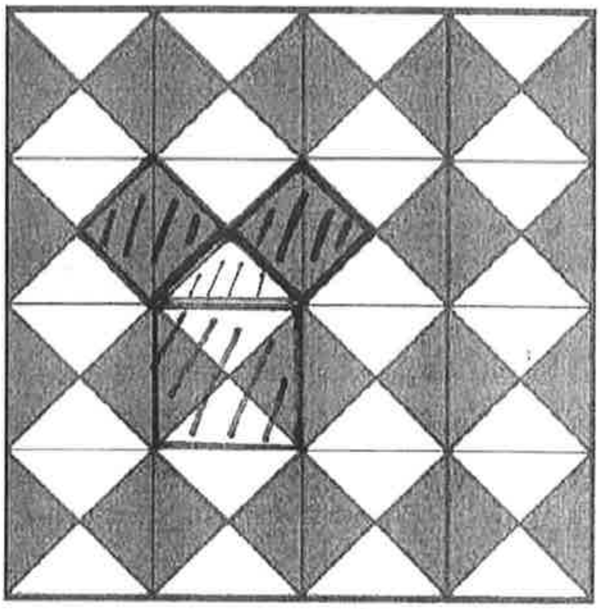
S2 MATHEMATICS WORKSHEET (Chapter 12 Pythagoras' Theorem)

Name:____________________________ (   ) S.2 ____ Date:____________

What is Pythagoras' Theorem? Choose one of the following topics and introduce it to your classmates.



Topic 1: How did Pythagoras discover the theorem?

Well, legend has it that he got his inspiration from looking at floor tiles.

(Just like how Decartes got his inspiration of the Coordinate System by looking at a fly.)

Have you ever seen such tiles somewhere?

Guess how Pythagoras discovered the theorem by drawing some lines on the figure. Explain your answer to your classmates.

Topic 2: 勾股定理

http://zh.wikipedia.org/wiki/%E5%8B%BE%E8%82%A1%E5%AE%9A%E7%90%86

Explain " 勾股各自乘，並之為弦實。開方除之，即弦。" in English. You may draw a figure in the box provided to remind yourself.

(a) 勾自乘 = the s_ _ _ _ _ of the shorter side

(b) 股自乘 = ____________________________

(c) 弦 = h_ _ _ _ _ _ _ _ _

(d) 實= a_ _ _

Find out how Zhao Shuang (趙爽, about 300 AD) proved the theorem.

Topic 3: Water proof

http://www.youtube.com/watch?v=hbhh-9edn3c&NR=1

Watch the video and think about how to use the apparatus to prove the Pythagoras Theorem.

What is common among the 3 containers in order to prove Pythagoras Theorem?

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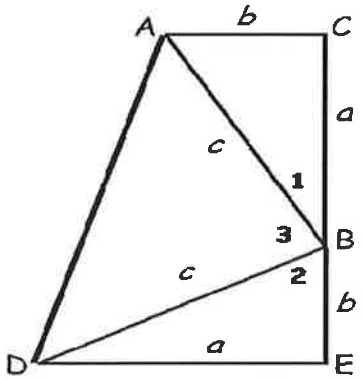
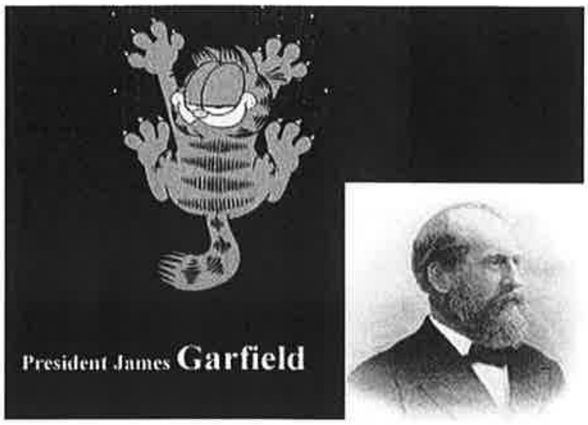
Topic 4: (The proof by Garfield the Cat … no … by the U.S. President James Garfield):





Given: Trapezium ACED is constructed using congruent right-angled triangles ABC and BDE such that CBE is a straight line.

(1) Is Δ ABD is a right-angled triangle? Explain your answer.

$\angle ABC = \angle BDE$ (corr. $\angle$s, $\cong \Delta s$)

$\angle BAC = \angle DBE$ (corr. $\angle$s, $\cong \Delta s$)

In ΔABC, $\angle ABC + \angle BAC + 90^\circ = 180^\circ$ ($\angle$sum of Δ)

$\angle ABC + \angle BAC + 90^\circ$

$\angle ABC + \angle DBE = 90^\circ$

$\angle ABD + \angle ABC + \angle DBE = 180^\circ$ (adj. $\angle$s on st. line)

$\angle ABD + 90^\circ = 180^\circ$

$\angle ABD = 90^\circ$

$\therefore$ ΔABD is a right-angled triangle

(2) Find the total area of the three triangles.

Total area of the three triangles = $\frac{1}{2}c^2 + \frac{1}{2}ab \times 2 = \frac{1}{2}c^2 + ab$

(3) Find the area of the whole trapezium.

Area of the whole trapezium = $\frac{1}{2}(a+b)(a+b)$

(Note: $\because$ **$\angle C + \angle E = 90^\circ + 90^\circ = 180^\circ$,**
$\therefore$ AC //DE (int. $\angle$s supp.)
Therefore, ACED is a trapezium)

(4) The whole trapezium is equal to the sum of its parts.

$$\frac{1}{2}(a+b)(a+b) = \frac{1}{2}c^2 + ab$$

(5) Simplify the equation.

$$\frac{1}{2}(a^2 + 2ab + b^2) = \frac{1}{2}c^2 + ab$$

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

Interesting Websites:

http://www.cut-the-knot.org/pythagoras/index.shtml

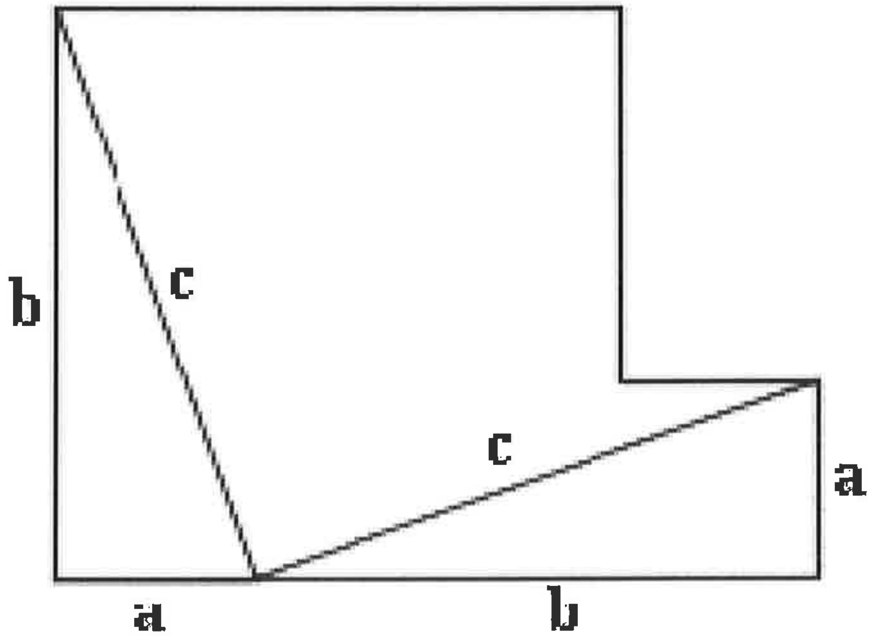
http://letsplaymath.net/2008/09/24/mathematician-for-president/

http://choosgs2math.wiki.hci.edu.sg/Pythagoras+Theorem

http://www.youtube.com/watch?v=7qRSPEv316U&feature=related (It is a song written by a group of students around 8 years old.)

Proof of Pythagoras' Theorem **DIY**:

1. Cut out the lines in the figure below to construct a bigger square.



2. Cut out the square A and B to form the square C.