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52'
37''S
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MATHS**



1. Find the value of $f(-x)$, given that

(a) $f(x) = 2x^2$

(b) $f(x) = x^4 - x$

(c) $f(x) = x^3 + 3x$

(d) $f(x) = x^5 - x^3 + 1$

2. Use the symmetry test $f(-x) = f(x)$ to check the following **even** functions and sketch them:

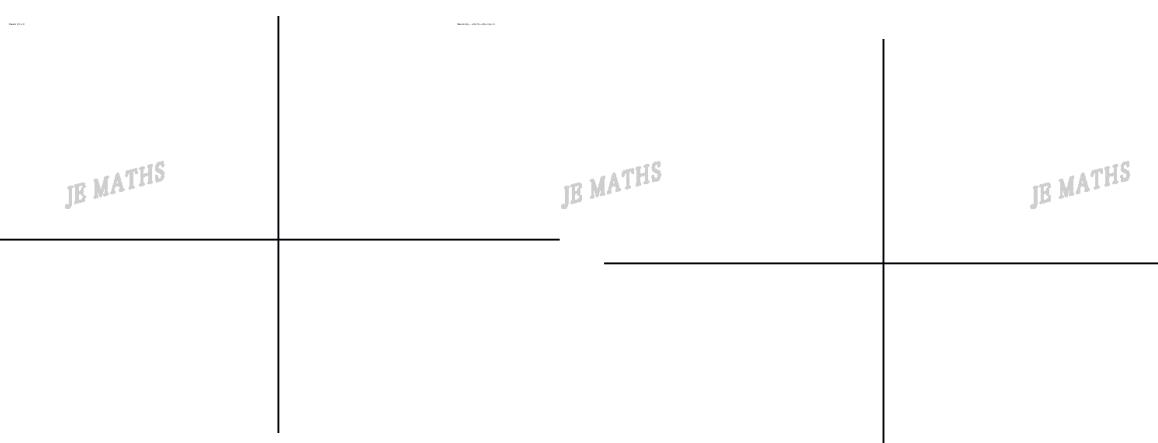
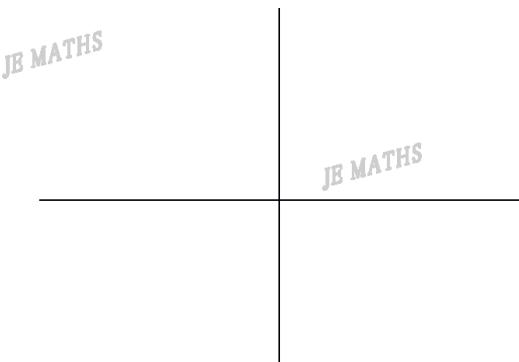
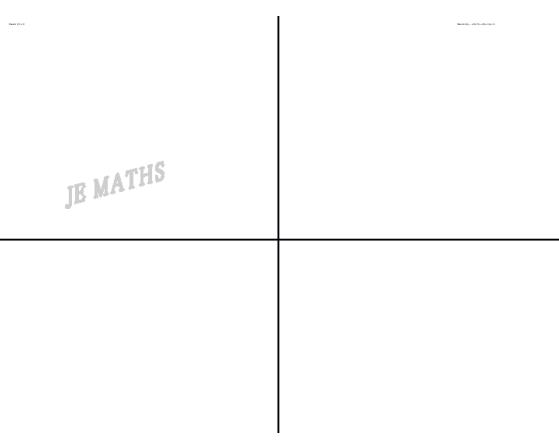
(a) $f(x) = x^2 - 2$

(b) $f(x) = -x^4$

(c) $f(x) = \sqrt{1-x^2}$

(d) $f(x) = x^4 - x^2$

(Sketch by using **Desmos** calculator or else.)



3. Find the value of $-f(x)$, given that

(a) $f(x) = 2^x$

(b) $f(x) = \frac{1}{x+1}$

(c) $f(x) = x^3 - x + 1$

(d) $f(x) = \frac{x}{x^2 + 1}$

4. Use the symmetry test $f(-x) = -f(x)$ to check the following **odd** functions and sketch them:

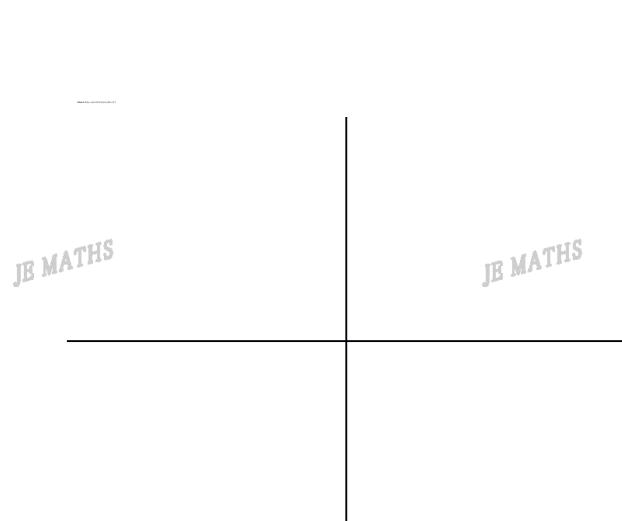
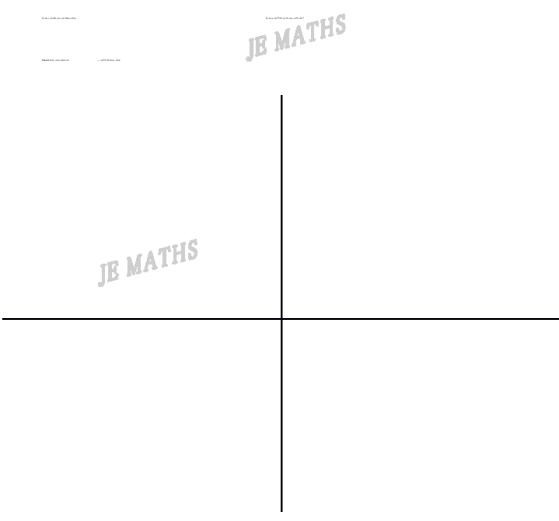
(a) $f(x) = x$

(b) $f(x) = 3x^3$

(c) $f(x) = x^3 - 4x$

(d) $f(x) = x^5 - 2x^3 + x$

(Sketch by using Desmos calculator or else.)



5. Determine whether the following is even, odd, both or neither.

(a) $f(x) = x^2 + 2^x$

(b) $f(x) = x^4 - 2x^2 + 1$

(c) $f(x) = 3^x - 3^{-x}$

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

6. Suppose that $h(x) = f(x) + g(x)$.

(a) If $f(x)$ and $g(x)$ are **both even**, show that $h(x)$ is even.

(b) If $f(x)$ and $g(x)$ are **both odd**, show that $h(x)$ is odd.

(c) If $f(x)$ is **even** and $g(x)$ is **odd**, show that $h(x)$ is neither even nor odd.

7. Evaluate:

(a) $|7|$

(b) $|-7|$

(c) $|11 - 7|$

(d) $|7 - 11|$

8. (a) Graph $y = |2x|$ by using a table of values.

x	-2	-1	0	1	2
$ 2x $					

(b) Write down the equations of the two branches.

9. (a) Graph $y = |x + 1|$ by using a table of values.

x	-2	-1	0	1	2
$ x+1 $					

(b) Write down the equations of the two branches.

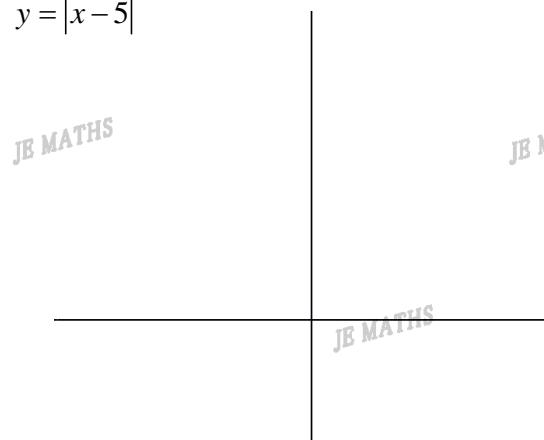
(c) Which translation maps $y = |x|$ to $y = |x + 1|$?

(d) Hence, use the **translation only** to

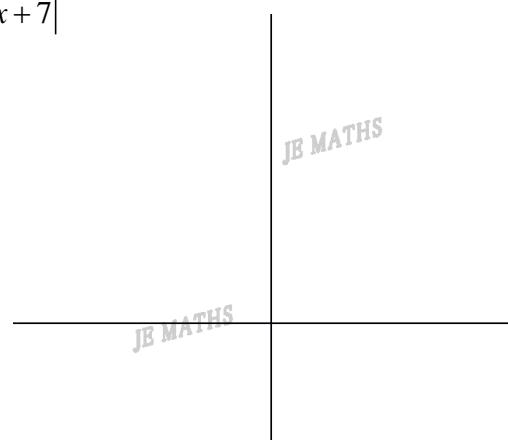
sketch $y = |x| + 1$ on the given number plane.

10. Sketch of the following absolute value functions and indicate all intercepts by using **translation only**:

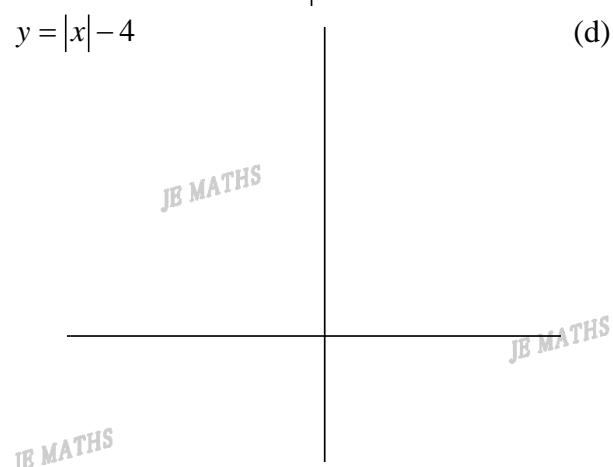
(a) $y = |x - 5|$



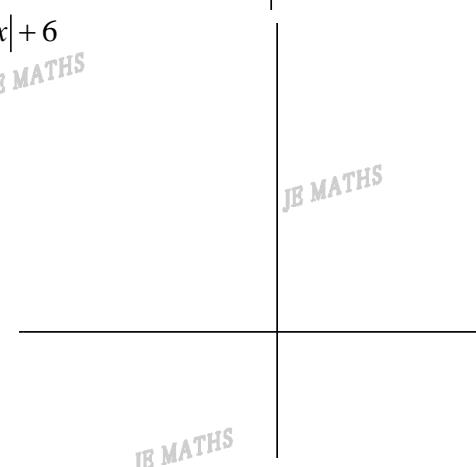
(b) $y = |x + 7|$



(c) $y = |x| - 4$

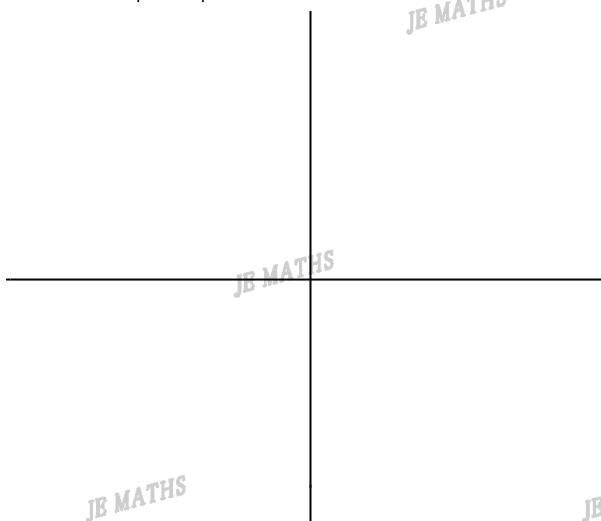


(d) $y = |x| + 6$

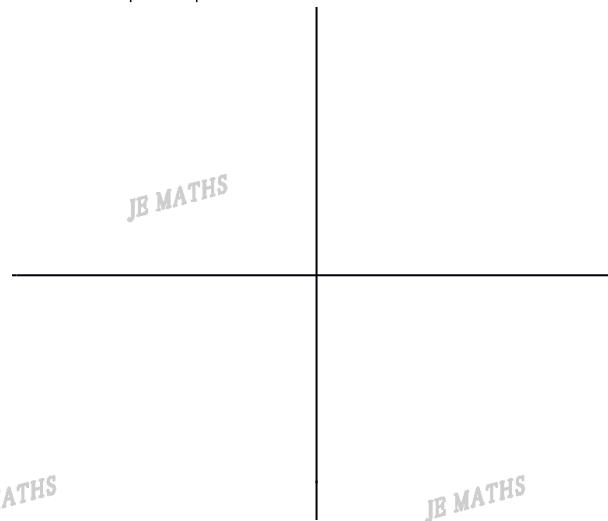


11. By using the **translation only** to sketch the following absolute value functions:

(a) $y = |x - 3| + 5$



(b) $y = |x + 5| - 1$



12. Which reflection maps $y = |x - 2|$ to

(a) $y = -|x - 2|$?

(b) $y = |x + 2|$?

13. Write down the two branches of the given absolute value functions.

(a) $y = |5x|$

(b) $y = -2|x|$

(c) $y = |x + 8|$

(d) $y = |x - 10|$

14. Given that $y = |8 - x|$.

(a) Rewrite the function by using the rule $|a - x| = |x - a|$

(b) Hence, sketch it.

15. Test the following identities by using a random number:

(a) $|-x| = |x|$

(b) $|a - b| = |b - a|$

(c) $|x|^2 = x^2$, test a negative number

(d) $\sqrt{x^2} = |x|$, test a negative number

16. Solve x:

(a) $|x + 6| = 4$

(b) $|6 - x| = 4$ by using $|a - x| = |x - a|$

(c) $|2x - 5| = 3$

(d) $|7x - 3| = 1$

17. Solve x:

(a) $|x - 6| = 0$

(b) $|7 + x| = 0$

(c) $|3x + 9| = 0$

(d) $|5 - 7x| = 0$

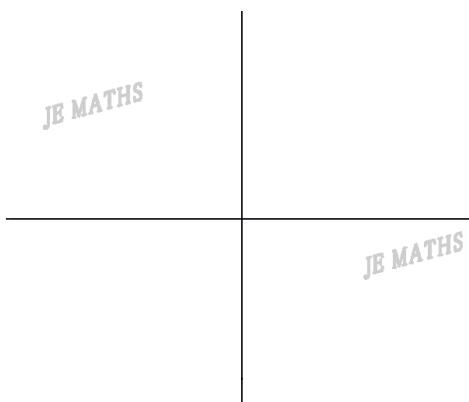
18. Solve x:

(a) $|x + 9| = -2$

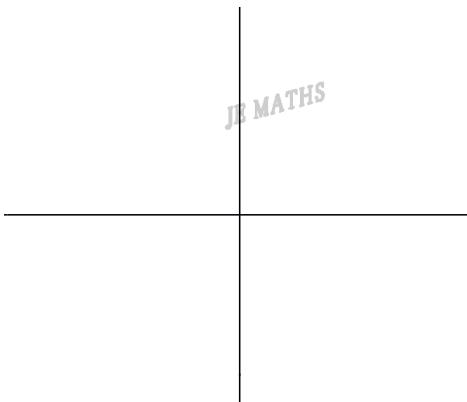
(b) $|11x - 11| = -11$

19. Sketch the following and indicate all intercepts by using the **two intercepts method**.

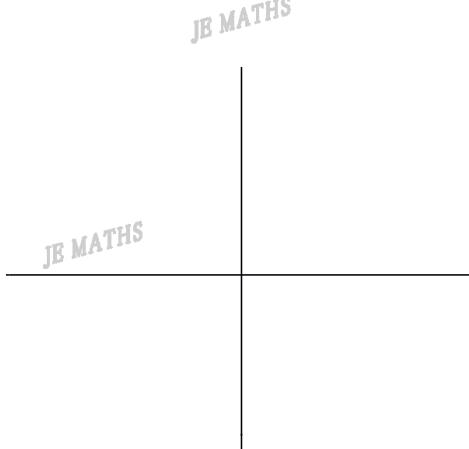
(a) $y = |2x - 4|$



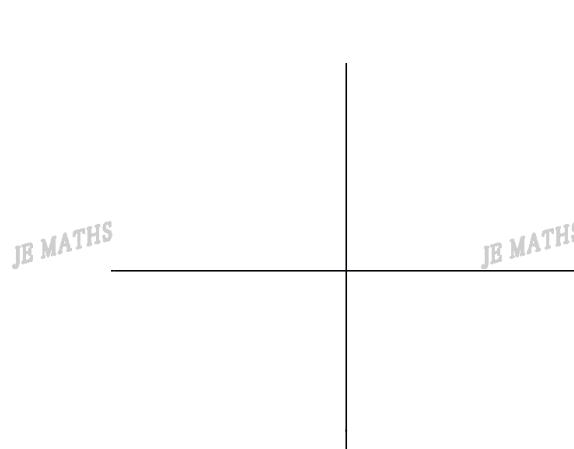
(b) $y = -|2x - 4|$ by transformation



(c) $y = |3x + 6|$



(d) $y = |3x + 6| - 1$ by transformation



20. Given that $y = |12 - 6x|$

(a) Change the function into a simple form

by using the rule $|a - b| = |b - a|$.

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(b) Hence, use the **two intercepts method**

to sketch this function and indicate all intercepts.

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(c) If this function has been translated by 1 unit left and 1 unit down, sketch the new graph on the same number plane in part b).

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(d) Hence, find the equation of the new function.

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JB MATHS

21. Given that $y = |x| + x$.

(a) Write down the two branches of the equations.

x	0	1	2	3
$2x$	-	-	-	-

x	-3	-2	-1	0
0	-	-	-	-

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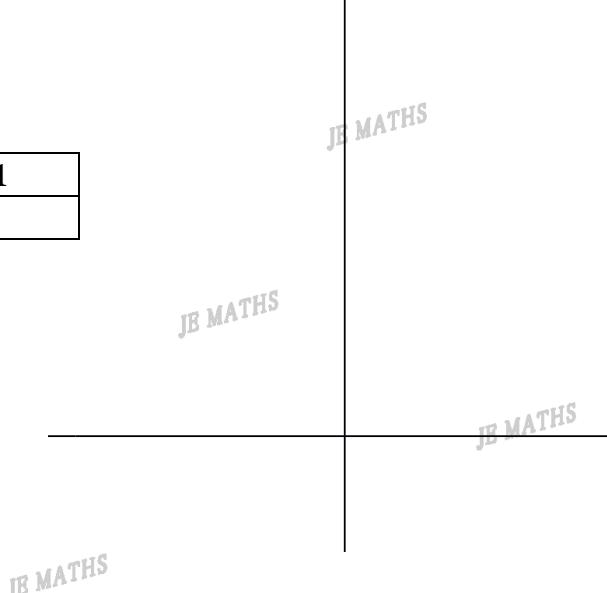
22. Given that $y = |x - 1| + x - 1$.

(a) Write down the two branches of the equations.

(b) By using two tables below with suitable values to sketch this function for $-3 \leq x \leq 3$.

x	1	2	3
$2x - 2$	-	-	-

x	-3	-2	-1	0	1
0	-	-	-	-	-



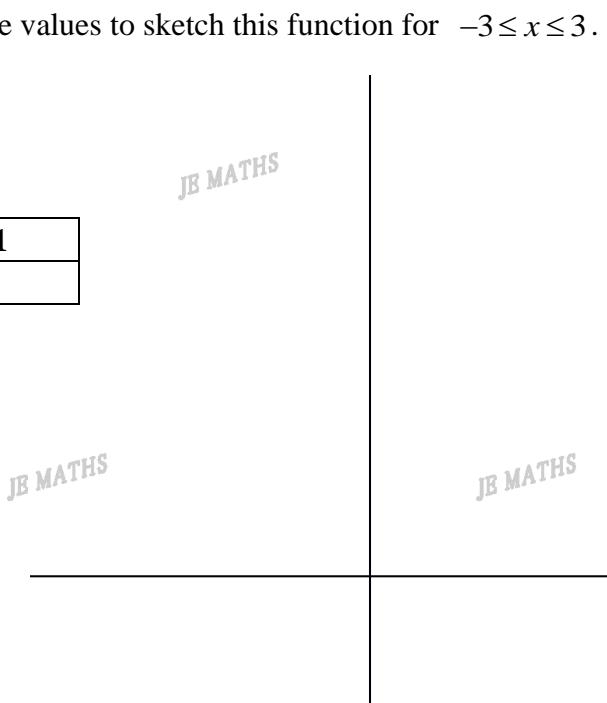
23. Given that $y = 2(x + 1) - |x - 1|$.

(a) Write down the equations of the two branches.

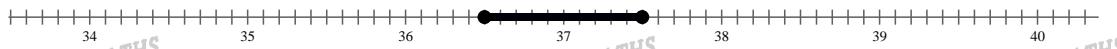
(b) By using two tables below with suitable values to sketch this function for $-3 \leq x \leq 3$.

x	1	2	3
$x + 3$	-	-	-

x	-3	-2	-1	0	1
$3x + 1$	-	-	-	-	-



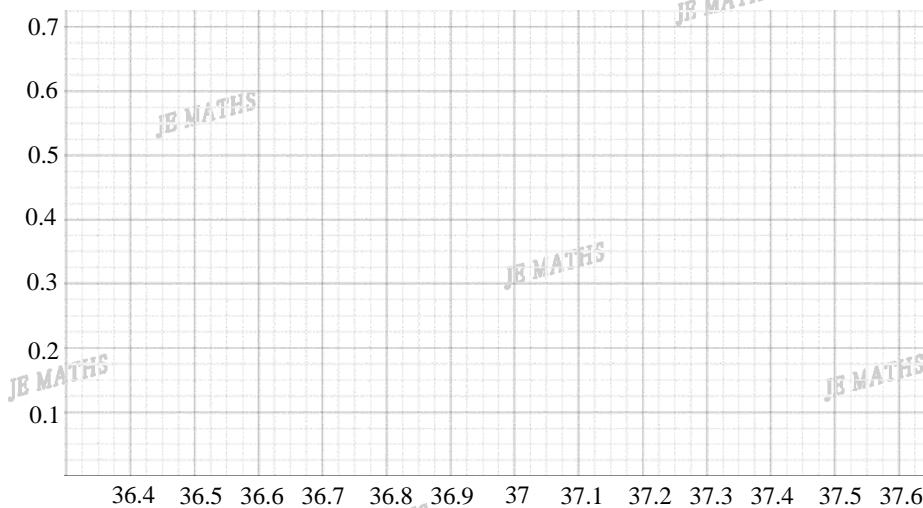
24. The absolute value function can represent the deviation of a value from its average. For instance, the **average internal body temperature** of humans is 37°C , and a variation of 0.5°C is still considered normal. Therefore, the normal temperature range for a healthy human can be represented on a number line as shown below.



(a) Let x be the temperature of a person in the question and y be the range of the temperature from the average, make an equation of y in terms of x .

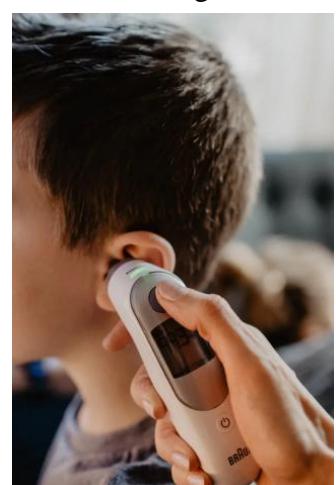
(b) To represent a normal temperature, what must the range (or y values) of the graph be limited to?

(c) Hence, sketch the graph to represent y in terms of x .



(d) The normal temperature range in a person's left ear may differ from that in their right ear.

(i) If the range (or y values) of the left ear's normal temperature is 0.42 , find the boundary of his normal temperature.



(ii) If the range (or y values) of the right ear's normal temperature is 0.39 , find the boundary of his normal temperature.

(iii) Does the temperature in a person's left ear tend to be higher than their right ear? If so, by how much in degrees Celsius? What conclusion can be drawn when taking the temperature from the ear?

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Avg:

Week _____

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Want to
learn?
We will
help u.

•
Don't
want to
learn?
We will
change u.

