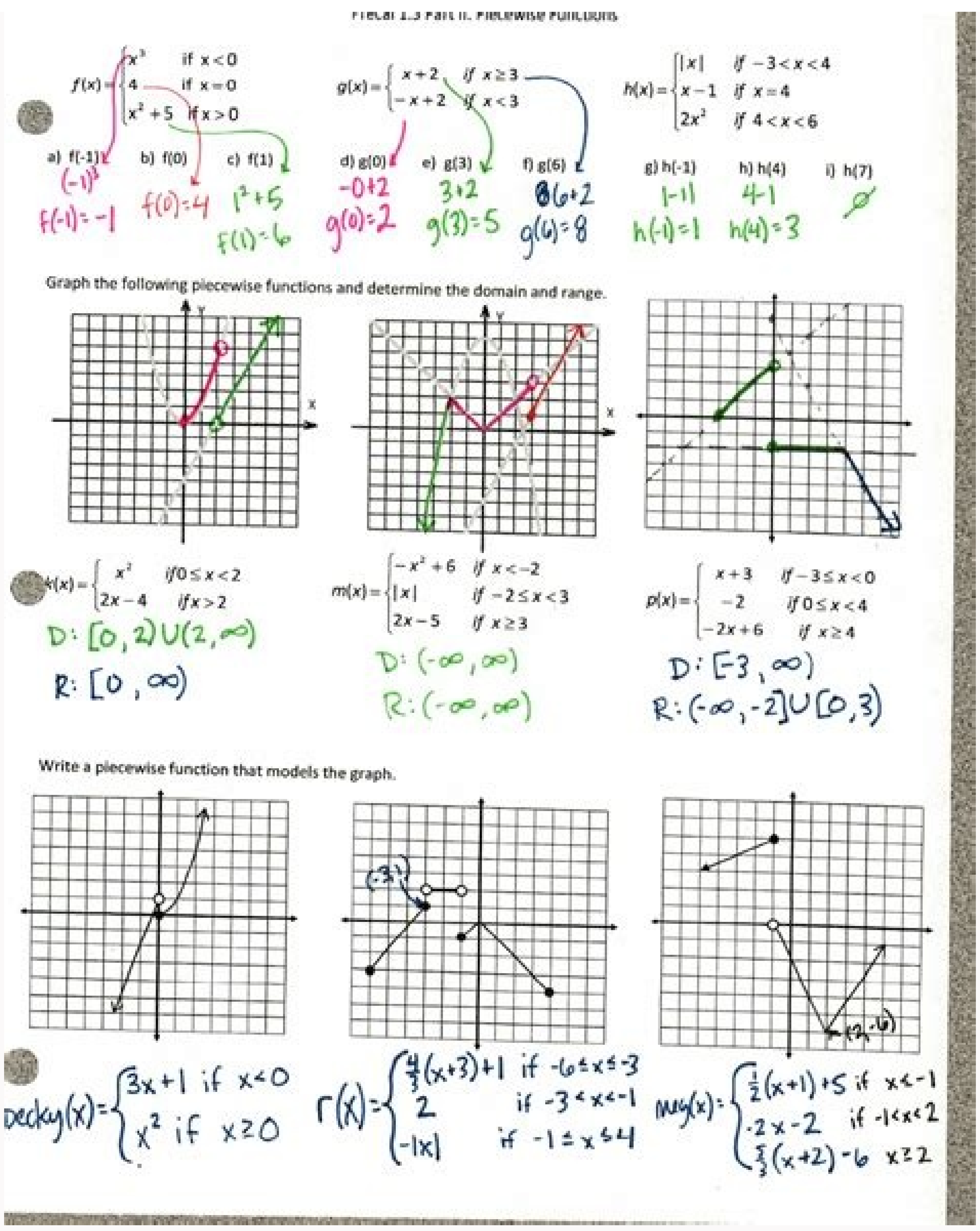
Function graph transformations worksheet



Precal 1.3 Part II: Piecewise Functions

$f(x)=\begin{cases} x^3 & \text{if } x<0 \\ 4 & \text{if } x=0 \\ x^2+5 & \text{if } x>0 \end{cases}$ $g(x)=\begin{cases} x+2 & \text{if } x\ge 3 \\ -x+2 & \text{if } x<3 \end{cases}$ $h(x)=\begin{cases} |x| & \text{if } -3<x<4 \\ x-1 & \text{if } x=4 \\ 2x^2 & \text{if } 4<x<6 \end{cases}$

a) f(-1) b) f(0) c) f(1) d) g(0) e) g(3) f) g(6) g) h(-1) h) h(4) i) h(7)

$(-1)^3$

$f(-1)=-1$ $f(0)=4$ 1^2+5 $f(1)=6$

$-0+2$ $g(0)=2$ $3+2$ $g(3)=5$ $6+2$ $g(6)=8$

$|-1|$ $h(-1)=1$ $4-1$ $h(4)=3$ $\varnothing$

Graph the following piecewise functions and determine the domain and range.

$k(x)=\begin{cases} x^2 & \text{if } 0\le x<2 \\ 2x-4 & \text{if } x>2 \end{cases}$

D: $[0,2)\cup(2,\infty)$

R: $[0,\infty)$

$m(x)=\begin{cases} -x^2+6 & \text{if } x<-2 \\ |x| & \text{if } -2\le x<3 \\ 2x-5 & \text{if } x\ge 3 \end{cases}$

D: $(-\infty,\infty)$

R: $(-\infty,\infty)$

$p(x)=\begin{cases} x+3 & \text{if } -3\le x<0 \\ -2 & \text{if } 0\le x<4 \\ -2x+6 & \text{if } x\ge 4 \end{cases}$

D: $[-3,\infty)$

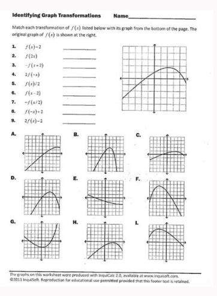
R: $(-\infty,-2]\cup[0,3)$

Write a piecewise function that models the graph.

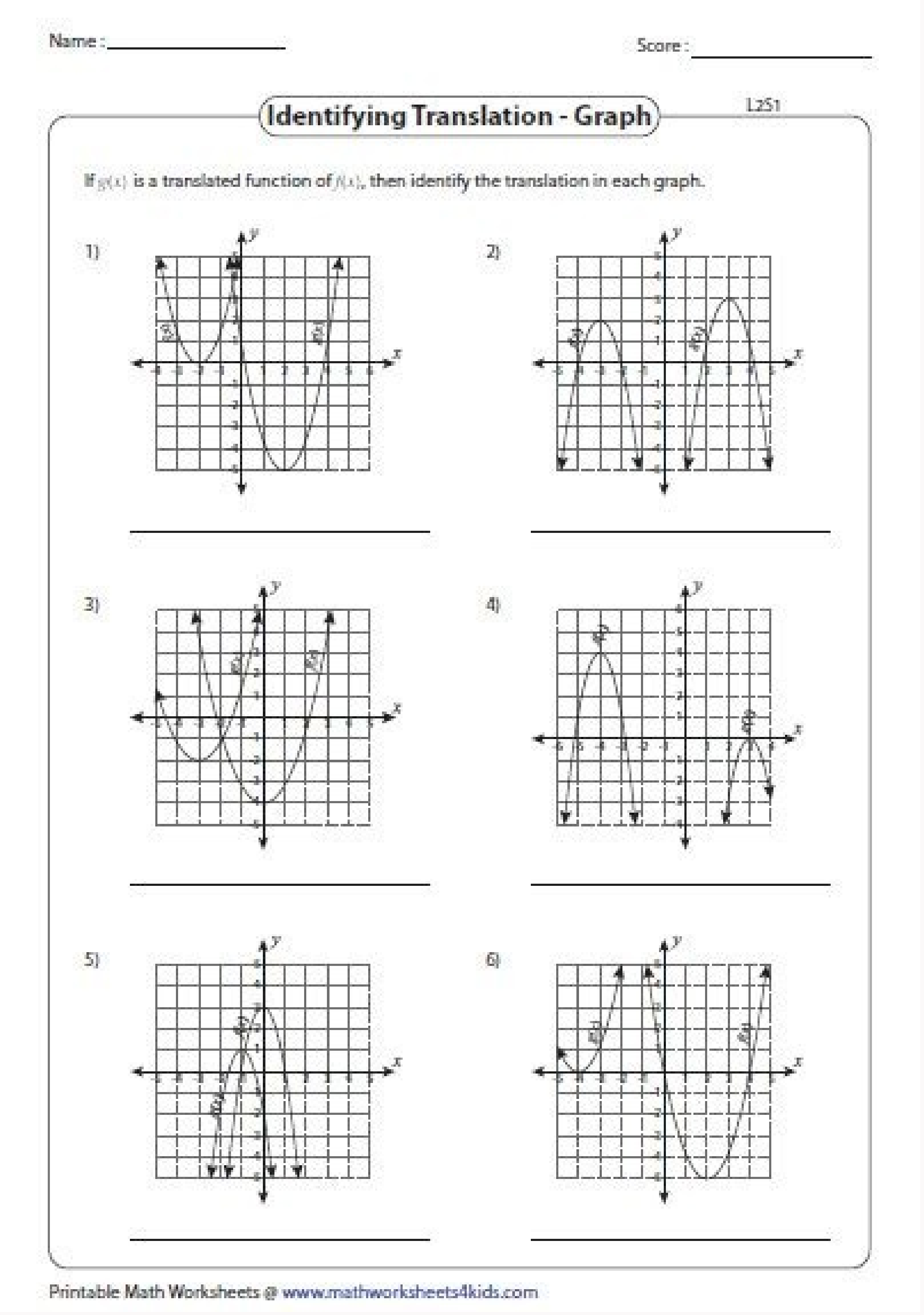
$\text{Decky}(x)=\begin{cases} 3x+1 & \text{if } x<0 \\ x^2 & \text{if } x\ge 0 \end{cases}$

$r(x)=\begin{cases} \frac{4}{3}(x+3)+1 & \text{if } -6\le x\le -3 \\ 2 & \text{if } -3<x<-1 \\ -|x| & \text{if } -1\le x\le 4 \end{cases}$

$\text{Mug}(x)=\begin{cases} \frac{1}{2}(x+1)+5 & \text{if } x\le -1 \\ -2x-2 & \text{if } -1<x<2 \\ \frac{5}{3}(x+2)-6 & x\ge 2 \end{cases}$



Identifying Graph Transformations Name__________



Name : ________________ Score : ________________

L2S1

Identifying Translation - Graph

If $g(x)$ is a translated function of $f(x)$, then identify the translation in each graph.

1) ________________

2) ________________

3) ________________

4) ________________

5) ________________

6) ________________

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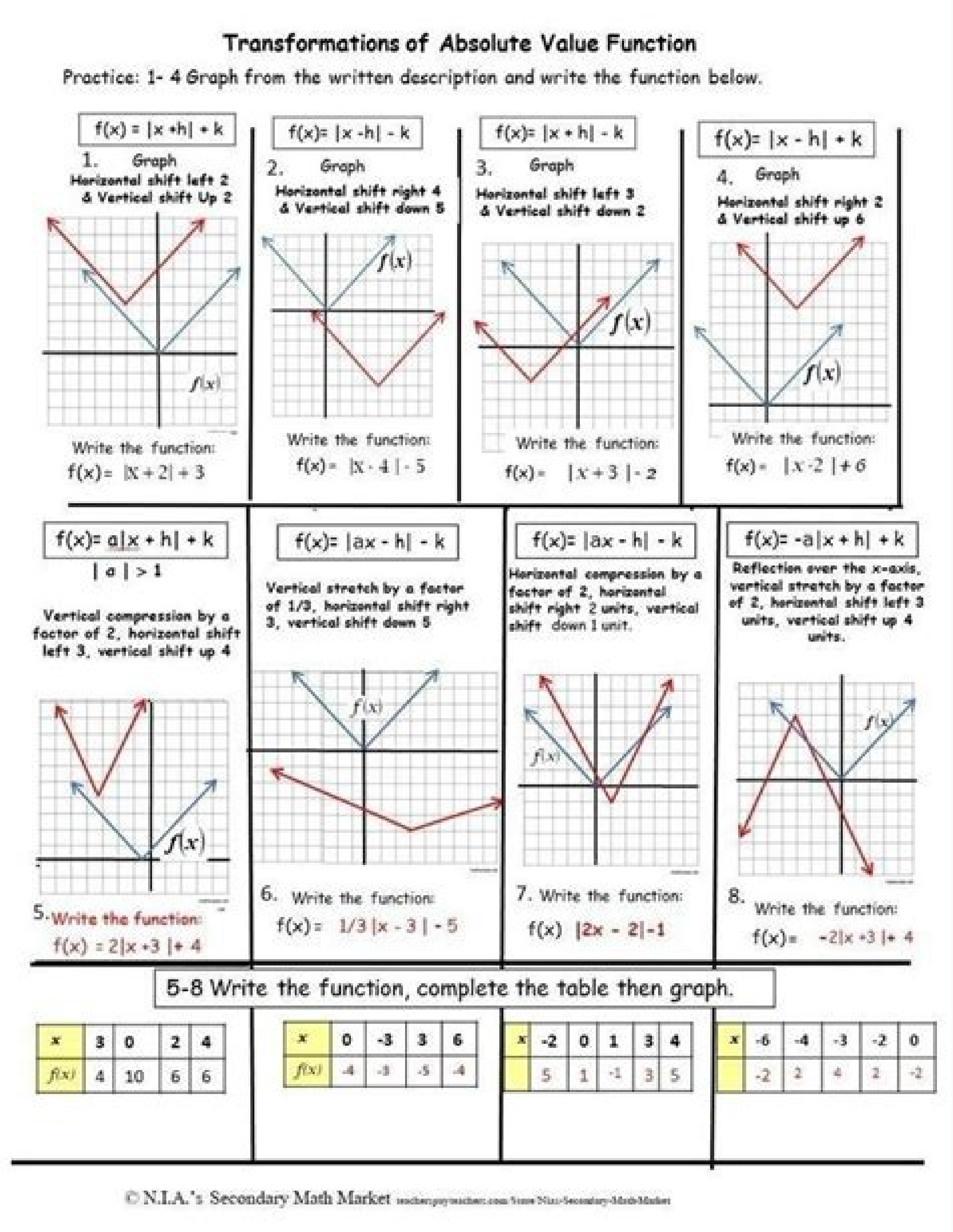

Transformations of Absolute Value Function

Practice: 1- 4 Graph from the written description and write the function below.

f(x) = |x +h| + k

1. Graph
Horizontal shift left 2 & Vertical shift Up 2

Write the function:
f(x)= |X + 2| + 3

f(x)= |x -h| - k

2. Graph
Horizontal shift right 4 & Vertical shift down 5

Write the function:
f(x)= |X - 4 | - 5

f(x)= |x + h| - k

3. Graph
Horizontal shift left 3 & Vertical shift down 2

Write the function:
f(x)= |x + 3 | - 2

f(x)= |x - h| + k

4. Graph
Horizontal shift right 2 & Vertical shift up 6

Write the function:
f(x)= |x -2 | + 6

f(x)= a|x + h| + k
| a | > 1

Vertical compression by a factor of 2, horizontal shift left 3, vertical shift up 4

5. Write the function:
f(x) = 2|x +3 |+ 4

f(x)= |ax - h| - k

Vertical stretch by a factor of 1/3, horizontal shift right 3, vertical shift down 5

6. Write the function:
f(x)= 1/3 |x - 3 | - 5

f(x)= |ax - h| - k

Horizontal compression by a factor of 2, horizontal shift right 2 units, vertical shift down 1 unit.

7. Write the function:
f(x) |2x - 2|-1

f(x)= -a|x + h| + k

Reflection over the x-axis, vertical stretch by a factor of 2, horizontal shift left 3 units, vertical shift up 4 units.

8. Write the function:
f(x)= -2|x +3 |+ 4

5-8 Write the function, complete the table then graph.

x	3	0	2	4
f(x)	4	10	6	6

x	0	-3	3	6
f(x)	-4	-3	-5	-4

x	-2	0	1	3	4
	5	1	-1	3	5

x	-6	-4	-3	-2	0
	-2	2	4	2	-2

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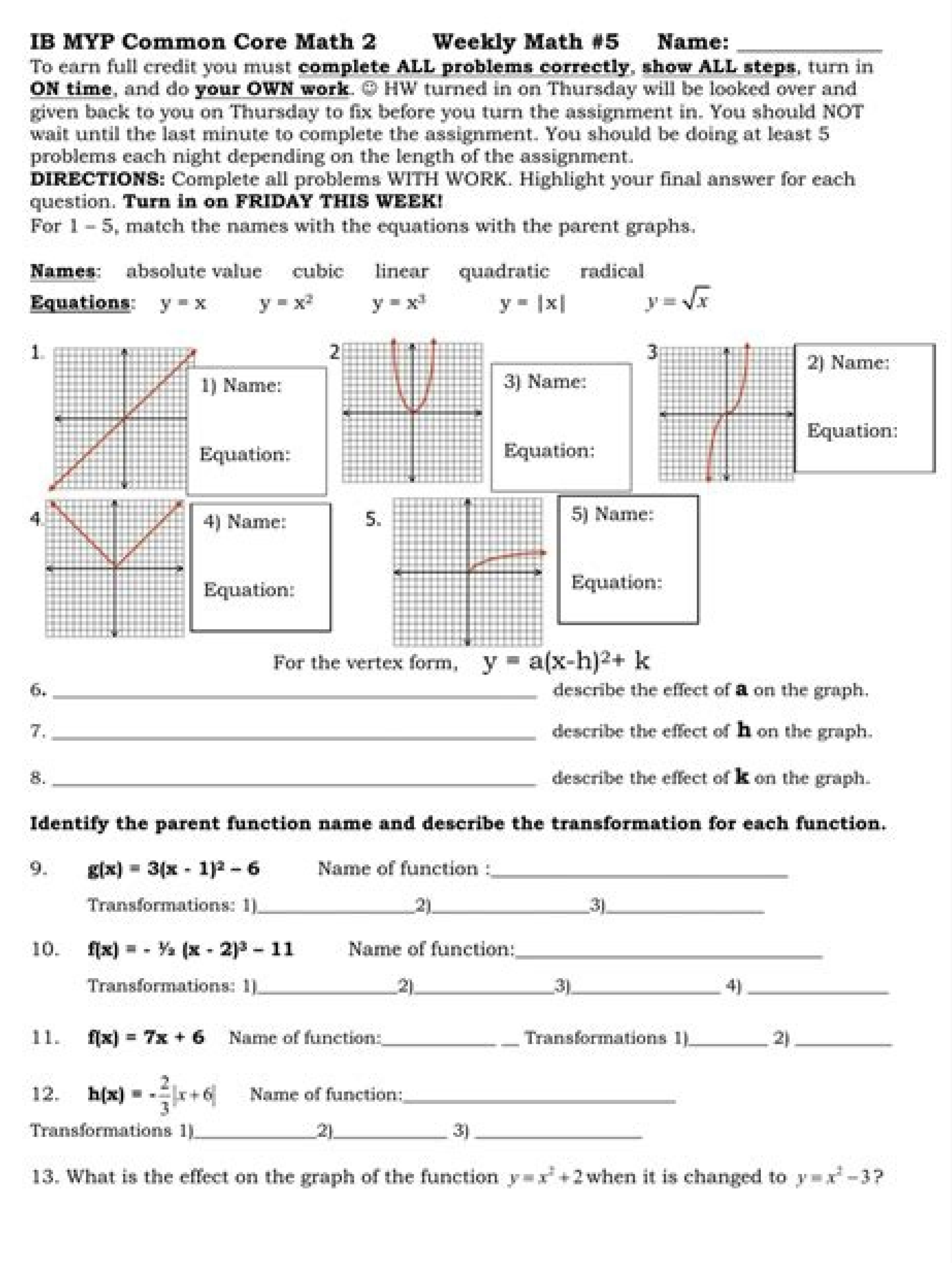

IB MYP Common Core Math 2 Weekly Math #5 Name: ____________

To earn full credit you must **complete ALL problems correctly**, **show ALL steps**, turn in **ON time**, and do **your OWN work**. ☺ HW turned in on Thursday will be looked over and given back to you on Thursday to fix before you turn the assignment in. You should NOT wait until the last minute to complete the assignment. You should be doing at least 5 problems each night depending on the length of the assignment.

DIRECTIONS: Complete all problems WITH WORK. Highlight your final answer for each question. **Turn in on FRIDAY THIS WEEK!**

For 1 – 5, match the names with the equations with the parent graphs.

Names: absolute value cubic linear quadratic radical

Equations: $y = x$ $y = x^2$ $y = x^3$ $y = |x|$ $y = \sqrt{x}$

1. 1) Name: Equation:

2. 3) Name: Equation:

3. 2) Name: Equation:

4. 4) Name: Equation:

5. 5) Name: Equation:

For the vertex form, $y = a(x-h)^2 + k$

6. ______________________________ describe the effect of **a** on the graph.

7. ______________________________ describe the effect of **h** on the graph.

8. ______________________________ describe the effect of **k** on the graph.

Identify the parent function name and describe the transformation for each function.

9. **$g(x) = 3(x - 1)^2 - 6$** Name of function :____________________
Transformations: 1)__________2)__________3)__________

10. **$f(x) = -\frac{1}{3}(x - 2)^3 - 11$** Name of function:____________________
Transformations: 1)__________2)__________3)__________ 4) __________

11. **$f(x) = 7x + 6$** Name of function:__________ __ Transformations 1)________ 2) ________

12. **$h(x) = -\frac{2}{3}|x+6|$** Name of function:____________________
Transformations 1)__________2)__________ 3) __________

13. What is the effect on the graph of the function $y = x^2 + 2$ when it is changed to $y = x^2 - 3$?

How to graph parent functions and transformations. Examples of graph transformations. Graph transformations explained. How to graph a function using transformations.

GCSE 6 - 7AQAEdexcelOCRWJECOCR November 2022WJEC November 2022Higher Level 6-7 GCSE Translation in the x-axis is a shift left or right. These look like: f(x + a); where a is added to each input before it is passed into the function, changing all values of x everywhere in the question. As a result, the whole graph is translated by a in the negative x direction (left): +a Translates Left -a Translates Right For instance on the axis shown: y = \textcolor{limegreen}{-x^3+4} and y = \textcolor{limegreen}{-(x}\textcolor{blue}{-2}\textcolor{limegreen}{)^3+4} \textcolor{blue}{-2} means 2 units to the right. Level 6-7 GCSE Translation in the y-axis is a shift up or down. These look like f(x) + a; where the function adds the value of b on top of all of its outputs. This means that the y values on the graph (the outputs of the function) are all increased by a. As a result, the whole graph is translated by a in the positive y direction (up). +a Translates Up -a Translates Down For instance: y =\textcolor{limegreen}{(x-3)^2 +1} and y=\textcolor{limegreen}{(x-3)^2 +1}\textcolor{blue}{+3} = \textcolor{red}{(x-3)^2 + 4} Level 6-7 GCSE When a function/graph is reflected in a line, everything on one side of the line is flipped over and swapped with everything on the other side of the line. This looks like -f(x); in this case, every positive y value is made negative and every negative y is made positive. As a result, the whole graph is reflected in the \bm{x}-axis. For instance: y = \textcolor{limegreen}{\sin(x)} and y=\textcolor{red}{\bf{-}}\textcolor{limegreen}{\sin(x)} Level 6-7 GCSE These look like f(-x); in this case, every positive x value is made negative and every negative x is made positive. As a result, the whole graph is reflected in the \bm{y}-axis. For instance: y = \textcolor{limegreen}{2x+4} and y=\textcolor{red}{\bf{-}}\textcolor{limegreen}{2x+4} Level 6-7 GCSE Level 6-7 GCSE Let \textcolor{Orange}{f(x) = x^2}. Sketch, on the same axes, the graphs of \textcolor{Orange}{f(x)}, \textcolor{limegreen}{f(x) + 4}, and \textcolor{blue}{f(x + 1)}. [3 marks] Firstly, you should recall the parabolic shape of the graph \textcolor{Orange}{y=x^2}. Now, in the case of the graph \textcolor{limegreen}{f(x) + 4 = x^2 + 4}, every y coordinate is increased by 4 and thus the whole graph is shifted upwards by 4. In the case of the graph \textcolor{blue}{f(x + 1) = (x + 1)^2}, every x coordinate is decreased by 1, and thus the whole graph is shifted left by 1. The resulting graphs should look like those in green and blue (respectively). Level 6-7 GCSE Let \textcolor{Orange}{f(x) = x^2 - 3x}. Sketch, on the same axes, the graphs of \textcolor{Orange}{f(x)}, \textcolor{blue}{f(-x)}, and \textcolor{limegreen}{-f(x)}. [3 marks] Now, in the case of the graph f(-x)= (-x)^2 - 3(-x) = \textcolor{blue}{x^2 +3x}, every positive x coordinate is made negative and vice versa, and thus the whole graph is reflected in the y-axis. In the case of the graph -f(x) = -(x^2 - 3x) = \textcolor{limegreen}{-x^2 + 3x}, every positive y coordinate is made negative and vice versa, and thus the whole graph is reflected in the x-axis. The resulting graphs should look like those in blue and green (respectively). Level 6-7 GCSE Example Questions If you don't recall the shape of the reciprocal graph, click here (Plotting Quadratics and Harder Graphs). Now, f(x - 3) = \dfrac{1}{x - 3} is a translation of positive 3 in the x-direction. So, we get Firstly, x^2 - x - 6 factorises to (x - 3)(x + 2), so it is a positive quadratic with roots at 3 and -2. Now, -f(x) + 4 is both a reflection in the x-axis and a translation of 4 in the positive y-direction. We should do the reflection first and the translation second – it often helps to sketch the intermediate step to help you, and you can always rub it out afterwards. Here, the dotted line will be the intermediate step (the reflection before the translation). So, we get Bonus questions: What would happen if you did the translation first and then the reflection? How would this answer be different, or would it be different at all? So, f(-x) means a reflection in the y-axis. In terms of the individual coordinates, the negative x values will be made positive and the positive x values will be made negative. So, we get Related Topics Worksheet and Example Questions Drill Questions You May Also Like... Revise for your GCSE maths exam using the most comprehensive maths revision cards available. These GCSE Maths revision cards are relevant for all major exam boards including AQA, OCR, Edexcel and WJEC. £8.99 View Product The MME GCSE maths revision guide covers the entire GCSE maths course with easy to understand examples, explanations and plenty of exam style questions. We also provide a separate answer book to make checking your answers easier! From: £19.99 £14.99 View Product The transition maths cards are a perfect way to cover the higher level topics from GCSE whilst being introduced to new A level maths topics to help you prepare for year 12. Your ideal guide to getting started with A level maths! £8.99 View Product What does ƒ(x) mean? Think of the function notation as a replacement for y. It reads "f of x." ƒ(x) = 2x + 1 is also known as y = 2x + 1.ƒ(x) = |-x + 5| is also known as y = |-x + 5|.ƒ(x) = 5x2 + 3x - 10 is also known as y = 5x2 + 3x - 10. What do these variations of notation share? ƒ(t) = -2t2ƒ(b) = 3ebƒ(p) = 10p + 12 Whether the function begins with ƒ(x) or ƒ(t) or ƒ(b) or ƒ(p) or ƒ(♣), it means that the outcome of ƒ depends on what's in the parentheses. ƒ(x) = 2x + 1 (The value of ƒ(x) depends on the value of x.)ƒ(b) = 3eb (The value of ƒ(b) depends on the value of b.) Learn how to use a graph to find specific values of ƒ. What is ƒ(2)? In other words, when x = 2, what is ƒ(x)? Trace the line with your finger until you get to the part of the line where x = 2. What is the value of ƒ(x)? Answer: 11 What is ƒ(-3)? In other words, when x = -3, what is ƒ(x)? Trace the graph of the absolute value function with your finger until you're touching the point where x = -3. What is the value of ƒ(x)? Answer: 15 What is ƒ(-6)? In other words, when x = -6, what is ƒ(x)? Trace the parabola with your finger until you touch the point at which x = -6. What is the value of ƒ(x)? Answer: -18 What is ƒ(1)? In other words, when x = 1, what is ƒ(x)? Trace the exponential growth function with your finger until you touch the point at which x = 1. What is the value of ƒ(x)? Answer: 3 What is ƒ(90°)? In other words, when x = 90°, what is ƒ(x)? Trace the sine function with your finger until you touch the point at which x = 90°. What is the value of ƒ(x)? Answer: 1 What is ƒ(180°)? In other words, when x = 180°, what is ƒ(x)? Trace the cosine function with your finger until you touch the point at which x = 180°. What is the value of ƒ(x)? Answer: -1 arrow_back Back to Transforming Graphs and Functions Whether you want a homework, some cover work, or a lovely bit of extra practise, this is the place for you. And best of all they all (well, most!) come with answers. Contents Mathster is a fantastic resource for creating online and paper-based assessments and homeworks. They have kindly allowed me to create 3 editable versions of each worksheet, complete with answers. 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