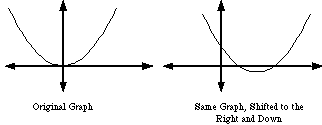
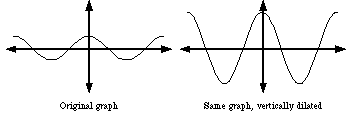
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name: | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | Date:*\_\_\_\_\_\_\_\_\_\_* |
| pact jpg1 | **Subject: METHODS MAT**  **Investigation 1, 2015**  **Topic – Transformation of Polynomials**  **Take home component** | | | |  |
| **Important Information:**  *Although the take-home component is not worth any marks, it is essential in preparation for the in-class component. Knowledge and skills gained will be extended in the in-class validation component. This in-class validation will be completed under test conditions on the day in which this take-home component is due. The take-home component may be used when completing the in-class component. Contact may be made to parent(s) if the take-home component is not available for submission (at the start of the lesson).* | | | | | |
| **Date out:** | | *Week \_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_* | **Date Due:** | *Week \_\_\_\_ Date \_\_\_\_\_\_\_\_\_* | |
| **Take home component weighting:** | | *0% of the year* | **In-class component weighting:** | *7% of the year.* | |
| **AIM:** *In this assessment, you will be investigating the language and nature of transforming*  *Quadratic functions.* | | | | | |

There is some terminology that can be used when discussing the ‘transformations’ of quadratic functions.

* **Transformation:** A graph is said to have transformed if it has altered through a transformation process. The standard transformations are translations, [reflections](http://www.mathwords.com/r/reflection.htm), [dilations (stretches)](http://www.mathwords.com/d/dilation.htm), [compressions (contractions or shrinks)](http://www.mathwords.com/c/compression.htm), and [rotations](http://www.mathwords.com/r/rotation.htm).
* **Translation:** A [transformation](http://www.mathwords.com/t/transformations.htm) in which a [graph](http://www.mathwords.com/g/graph_of_an_equation_or_inequality.htm) or [geometric figure](http://www.mathwords.com/g/geometric_figure.htm) is picked up and moved to another location without any change in size or orientation.



* **Dilation:** A [transformation](http://www.mathwords.com/t/transformations.htm) in which all distances on the [coordinate plane](http://www.mathwords.com/c/coordinate_plane.htm) are lengthened by multiplying either all x-coordinates ([horizontal dilation](http://www.mathwords.com/h/horizontal_stretch.htm)) or all y-coordinates ([vertical dilation](http://www.mathwords.com/v/vertical_stretch.htm)) by a common factor greater than 1. (Note: When the common factor is less than 1 the transformation is called a [compression](http://www.mathwords.com/c/compression.htm)).



**Transformation**: Changing a graph by translation (vertical or horizontal shift), dilation or reflection.

**VERTEX FORM** of a quadratic: 

**PART 1**: Graphing 

Use a table of values to graph .

|  |  |  |  |
| --- | --- | --- | --- |
| *x* | y |  |  |
| -2 |  |
| -1 |  |
| 0 |  |
| 1 |  |
| 2 |  |

\*\* We will use the graph of  as our **BASE GRAPH.**

ALL OTHER TRANSFORMATIONS MOVE RELATIVE TO IT.

**PART 2**: Comparing the graphs of  and .

Use a table of values to graph the following:

1. 

|  |  |  |  |
| --- | --- | --- | --- |
| *x* | y |  |  |
| -2 |  |
| -1 |  |
| 0 |  |
| 1 |  |
| 2 |  |
|  |  |

b) 

|  |  |  |  |
| --- | --- | --- | --- |
| *x* | y |  |  |
| -2 |  |
| -1 |  |
| 0 |  |
| 1 |  |
| 2 |  |
|  |  |

c) 

|  |  |  |  |
| --- | --- | --- | --- |
| *x* | y |  |  |
| -2 |  |
| -1 |  |
| 0 |  |
| 1 |  |
| 2 |  |
|  |  |

**CONCLUSIONS:** The role of ‘a’

* As I increase the value of ‘a’ (larger than 1), I notice …
* As I decrease the value of ‘a’ (between 1 and a fraction), I notice …
* As the value of ‘a’ becomes negative, I notice …

**PART 3**: Comparing the graphs of  and .

a) 

|  |  |  |  |
| --- | --- | --- | --- |
| *x* | y |  |  |
| -2 |  |
| -1 |  |
| 0 |  |
| 1 |  |
| 2 |  |
|  |  |

b) 

|  |  |  |  |
| --- | --- | --- | --- |
| *x* | y |  |  |
| -2 |  |
| -1 |  |
| 0 |  |
| 1 |  |
| 2 |  |
|  |  |

**CONCLUSIONS:** The role of ‘k’

* As I increase the value of ‘k’ (positive number), I notice …
* As I decrease the value of ‘k’ (negative number), I notice …

**PART 4**: Comparing the graphs of  and 

a)  \*\* h = +3

|  |  |  |  |
| --- | --- | --- | --- |
| *x* | y |  |  |
| -2 |  |
| -1 |  |
| 0 |  |
| 1 |  |
| 2 |  |
|  |  |

b)  \*\* h = -4

|  |  |  |  |
| --- | --- | --- | --- |
| *x* | y |  |  |
| -2 |  |
| -1 |  |
| 0 |  |
| 1 |  |
| 2 |  |
|  |  |

**CONCLUSIONS:** The role of ‘h’

* When ‘h’ is a positive number, it appears as a \_\_\_\_\_\_\_\_\_\_\_ in the equation
* As I increase the value of ‘h’(positive number), I notice …
* When ‘h’ is a negative number, it appears as a \_\_\_\_\_\_\_\_\_\_\_ in the equation
* As I decrease the value of ‘h’ (negative number), I notice …

**PART 5**: The graph of 

1. In the equation 

‘a’ = \_\_\_\_ ∴ Stretch OR Compress by a factor of \_\_\_\_\_

∴ Reflect over the x-axis? Yes OR No

‘h’ = \_\_\_\_ ∴ Translate left OR right by \_\_\_\_ units

‘k’ = \_\_\_\_ ∴ Translate up OR down by \_\_\_\_ units

2. In the equation 

‘a’ = \_\_\_\_ ∴ Stretch OR Compress by a factor of \_\_\_\_\_

∴ Reflect over the x-axis? Yes OR No

‘h’ = \_\_\_\_ ∴ Translate left OR right by \_\_\_\_ units

‘k’ = \_\_\_\_ ∴ Translate up OR down by \_\_\_\_ units

3. In the equation 

‘a’ = \_\_\_\_ ∴ Stretch OR Compress by a factor of \_\_\_\_\_

∴ Reflect over the x-axis? Yes OR No

‘h’ = \_\_\_\_ ∴ Translate left OR right by \_\_\_\_ units

‘k’ = \_\_\_\_ ∴ Translate up OR down by \_\_\_\_ units

4. In the equation 

‘a’ = \_\_\_ ∴ Stretch OR Compress by a factor of \_\_\_\_\_

∴ Reflect over the x-axis? Yes OR No

‘h’ = \_\_\_\_ ∴ Translate left OR right by \_\_\_\_ units

‘k’ = \_\_\_\_ ∴ Translate up OR down by \_\_\_\_ units

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Name: | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | | Date: *\_\_\_\_\_\_* |
| pact jpg1 | **Subject: METHODS MAT**  **Investigation 1, 2015**  **Topic: Transformation of Quadratic Functions**  **In class component** | | | | | 36  = % |
| **Total Time:** | ***45*** *minutes* | | **BONUS MARKS** (look at the whole assessment):  ❑*Notation*: appropriate (+1). 🞏 1st (+1/2 🞏 2nd (0)  ❑*Units*: appropriate (+1). 🞏 1st (+1/2) 🞏 2nd (0) | | | |
| **Reading Time:** | *5**minutes* | |
| **Working Time:** | *40**minutes* | |
| **Weighting:** | *7% of the year.* | |
| **Equipment:** | *Curriculum Council Formula sheets* | | | | | |
| **Important Information:**  *Although the take-home component is not worth any marks, it is essential in preparation for the in-class component. Knowledge and skills gained will be extended in the in-class validation component. This in-class validation will be completed under test conditions on the day in which this take-home component is due. The take-home component may be used when completing the in-class component. Contact will be made to parent(s) if the take-home component is not available for submission (at the start of the lesson).*  ***Answers should be rounded appropriately****. All working should be shown in the space provided. Your working should be in sufficient detail to allow your answers to be checked readily and for marks to be awarded for reasoning. Incorrect answers given without supporting reasoning cannot be allocated any marks. For any question or part question worth more than two marks, valid working or justification is required to receive full marks.*  *No pen, pencils, highlights etc. may be used during reading time. This time is to be used to read through the assessment and check that you understand what is being asked of you. You may speak with the teacher/supervisor during this time (by putting up your hand and waiting patiently for them to approach you) but you may only ask clarification questions and not how to solve the problems. After reading time has ended, you may not ask any more questions.* | | | | | | |
| **Take home component weighting:** | | *0% of the year* | | **In-class component weighting:** | *7% of the year.* | |
| **AIM:** *In this assessment, you will be investigating the transformation of quadratic functions* | | | | | | |

You may **NOT** use your CAS calculator for this assessment.

**1.** **(10 marks:4,1,2,3)**

The graph below shows the graphs of  ,  ,  and  .



a) Identify each of the graphs above.

A......................... B.........................

C........................... D.........................

b) Describe the transformation of the following graphs from 

(i)

(ii) y = (x -2)2 - 9

(iii) y = - (x-1)2 + 2

**2. (7 marks:3,3,1)**

a) Graph A, below, shows the graph of . Use your knowledge of graph transformations to give the equation of B, C and D (All graphs are congruent i.e. the value of a is the same for all graphs)



A: 

B:

C:

D:

b) If the graph  undergoes a transformation to become  , explain the effect that this will have on the original graph.

c) Does the order in which we perform these *movements* in (b) make a difference to the final look of the graph?

**3. (12 marks:3,3,3,3)**

Use what you know about transformations to graph each of the following quadratics:

1.  2. 



3.  4. 

**4. (7 marks:1,1,1,2,2)**

The following number planes each contain a graph of . Graph on the following set of axes the new graph that is listed on each number plane.

a)  b)   

c)  d) 

e) 



**Information for Students**

**Introduction to Graphing Quadratics**

|  |  |
| --- | --- |
| Create a new Document |  |
| Create a new Graph Page |  |
| In the graphing section add a new function x² |  |
| The function is now graphed |  |
| Now try graphing 2 (x-1)²-5 |  |
|  |  |