Quadratic transformations worksheet answers key

Find the vertex domain area and describe each transformation for the absolute value function. Each one has model problems worked out step-by-step practice issues challenging proglems quadratic equation spreadsheets with answer keys. Graphing Square Functions Worksheet Blackast Use transformations to graph each square function. Quadratic transformation worksheet response. Did you hear about mathematical spreadsheet responses. The unformed graph of a square function is called a parabola. Y x 1 2 4 write the equation for function y x2 with the following transformations. Free spreadsheets with black aster on square equations. The difference between a number and the positive square root is 12. Vertical stretch with a factor of 3 shift right 5. Quadratic transformation worksheet answers important results for square transformation worksheet answer key. Y x 3 2 10. Transformations of square functions multiple choice identify the choice that best completes the statement or answers the question. Describe transformations of square functions. Square equation word problems worksheet with answers. This collection of well-researched spreadsheets is designed to help students strengthen their understanding of the transformation of square functions that transform the graphs that find the transformational function gx from parental function fx and identify the different types of shifts. Using transformations into graph square. Formula description of transformation in word domain area ii. Square transformations worksheet doc square transformations worksheet pdf. Fx 2x. Write equations of lines review worksheet with answers. Unit 2 relationships between quantity notes doc. Reflect on the x axis shift down 1 12. Describing transformations of square functions a square function is a function that can be written in the form fx ax h2 k where a 0. Locate the domain site and describe each transformation for square function. Write transformations of square functions. Spreadsheets provided in this section will be much useful for students who want to practice solving word problems on square equations. Square equation word problems worksheet with answer problems. 17 best ideas about quadratic feature on Pinterest Michael and jessica - Home Transformation of Square Function Spreadsheet Transformation of Square Function Spreadsheet Transformation of Square Function Worksheet Quadratic / Parabola Function Graph Transformations - Notes Transformations of Square Functions Spreadsheet Transformation of Square Function Worksheets That I Am - Quadratics | mrmillermath Transformation of square function worksheet graphs square functions in standard form worksheet worksheet transformations of square functions the best transformations of square graphs worksheets with answers transform square functions - YouTube by square function worksheet Quiz & Worksheet - Transformations of Square Functions Transformation of Square Function Worksheet Transformations by Square Functions Answer Worksheet : Transformations of Square Functions | Books Square Transformations Worksheets - FREE Printable Transformations of Square Graphs Worksheets with Answers Square Transformations Worksheet - FREE Printable Chapter 1 - Ms. Orban's Class Side Transformations of Square Features Spreadsheet Square Transformations Puzzle by Winning in Mathematics | TpT Square Function Transformations (Guided Notes Square / Parabola Function Graph Transformation by Square Function Worksheet Math Plane - Identifying Square Equations from Points Cazoom Mathematics Worksheets - Square and Cubic Functions Transformation of Square Function Worksheets Graphs Square Functions Worksheets Answer Key 3.1 Transformations of Square Functions - 3.1 y x2 y x At the end of this section, you will be able to: Graph square functions of the form f(x)=x2+kf(x)=x2+k Graph square functions of the form f(x)=(x−h)2f(x)=(x−h)2 Graph quadratic functions of the form f(x)=ax2f(x)x=ax2 Graph square functions using transformations Find a square function from graph before you get started, take this emergency quiz. Graph function f(x)=x2f(x)=x2 by plotting points. If you've missed this issue, see example example 3.54. Factor hero: y2-14y +49.y2-14y+49. If you've missed this issue, see example 6.24. Factor completely: 2x2−16x+32.2x2−16x+32. If you missed this issue, see Example 6.26. In the last part, we learned to graph square functions using their properties. Another method involves starting with the basic graph of f(x)=x2f(x)=x2 and 'moving' it according to information given in the functional equation. We call this graphing square functions using transformations. In the first example, we will graph square function f(x)=x2f(x)=x2 by plotting points. Then we will see what effect to add a constant, k, to the equation will have on the graph of the new function f(x) = x2 + k.f(x) = x2 + k. Graph f(x)=x2,g(x)=x2+2,f(x)=x2,g(x)=x2+2 and h(x)=x2−2h(x)=x2−2 on the same rectangular coordinate system. Describe what effect adding a constant to the function has on the basic dish. Plotting points will help us see the effect of the constants on basic f(x) = x2f(x) = x2 graph. We fill in the chart for all three features. The G(x) values are two more than the f(x) values. The H(x) values are also two smaller than the f(x) values. Now we will graph all three functions on the same rectangular coordinate system. The graph of g(x)=x2+2g(x)=x2+2 is the same as the graph of f(x)=x2f(x)=x2, but shifted 2 units. The graph of h(x)=x2−2h(x)=x2−2 is the same as the graph of f(x)=x2f(x)=x2, but shifted down 2 units. (a) (a) f(x)=x2,g(x)=x2+1,f(x)=x2,g(x)=x2+1 og h(x)=x2−1t(x)=x2−1 på samme rektangulære koordinatsystem. (b) Beskriv hvilken effekt det å legge til en konstant i funksjonen har på den grunnleggende parabelen. (a) Graf f(x)=x2,g(x)=x2+6,f(x)=x2,g(x)=x2+6 og h(x)=x2−x2-6h(x)=x2−6 på samme rektangulære koordinatsystem. (b) Beskriv hvilken effekt det å legge til en konstant i funksjonen har på den grunnleggende parabelen. Det siste eksemplet viser oss at for å grafere en kvadratisk funksjon av skjemaet f(x)=x2+k,f(x)=x2+k, tar vi den grunnleggende parabolagrafen til f(x)=x2f(x)=x2 og flytter den vertikalt opp (k>0) (k>0) eller flytter den ned (k <> <0). this= transformation= is= called= a= vertical= shift.= the= graph= of= f(x)=x2+kf(x)=x2+k shifts= the= graph= of= f(x)=x2f(x)=x2 vertically= k= units.= if= k=> 0, skift parabolaen vertikalt opp k enheter. Hvis < 0, shift the parabola vertically down |k|| k| units. Now that we have seen the effect of the constant, k, it is easy to graph functions of the form f(x)=x2+k.f(x)=x2+k. We just start with the basic parabola of f(x)=x2f(x)=x2 and then shift it up or down. It may be helpful to practice sketching f(x)=x2f(x)=x2 quickly. We know the values and can sketch the graph from there. Once we know this parabola, it will be easy to apply the transformations. The next example will require a vertical shift. Graph f(x)=x2−3f(x)=x2−3 using a vertical shift. We first draw the graph of f(x)=x2f(x)=x2 onthe grid. Determine kk. Shift the graph f(x)=x2f(x)=x2 down 3. Graph f(x)=x2−5f(x)=x2−5 using a vertical shift. Graph f(x)=x2+7f(x)=x2+7 using a vertical shift. In the first example, we graphed the quadratic function f(x)=x2f(x)=x2 by plotting points and then saw the effect of adding a constant k to the function had on the resulting graph of the new function f(x)=x2+k.f(x)=x2+k. We will now explore the effect of subtracting a constant, h, from x has on the resulting graph of the new function f(x)=(x−h)2.f(x)=(x−h)2. Graph f(x)=x2,g(x)=(x−1)2,f(x)=x2,g(x)=(x−1)2, and h(x)=(x+1)2h(x)=(x+1)2 on the same rectangular coordinate system. Describe what effect adding a constant to the function has on the basic parabola. Plotting points will help us see the effect of the constants on the basic f(x)=x2f(x)=x2 graph. We fill in the chart for all three functions. The g(x) values and the h(x) values share the common numbers 0, 1, 4, 9, and 16, but are shifted. ⓐ Graph f(x)=x2,g(x)=(x+2)2,f(x)=x2,g(x)=(x+2)2, and h(x)=(x−2)2h(x)=(x−2)2 on the same rectangular coordinate system.ⓑ Describe what effect adding a constant to the function has on the basic parabola. ⓐ Graph f(x)=x2,g(x)=x2+5,f(x)=x2,g(x)=x2+5, and h(x)=x2−5h(x)=x2−5 on the same rectangular coordinate system.ⓑ Describe what effect adding a constant to the function has on the basic parabola. The last example shows us that to graph a quadratic function of the form we take the basic 0,= shift= the= parabola= vertically= down= |k|| k|= units.= now= that= we= have= seen= the= effect= of= the= constant,= k,= it= is= easy= to= graph= functions= of= the= form= f(x)=x2+k.f(x)=x2+k. we= just= start= with= the= basic= parabola= of= f(x)=x2f(x)=x2 and= then= shift= it= up= or= down.= it= may= be= helpful= to= practice= sketching= f(x)=x2f(x)=x2 quickly.= we= know= the= values= and= can= sketch= the= graph= from= there.= once= we= know= this= parabola,= it= will= be= easy= to= apply= the= transformations.= the= next= example= will= require= a= vertical= shift.= graph= f(x)=x2−3f(x)=x2−3 using= a= vertical= shift.= we= first= draw= the= graph= of= f(x)=x2f(x)=x2 onthe= grid.= determine= kk.= shift= the= graph= f(x)=x2f(x)=x2 down= 3.= graph= f(x)=x2−5f(x)=x2−5 using= a= vertical= shift.= graph= f(x)=x2+7f(x)=x2+7 using= a= vertical= shift.= in= the= first= example ,= we= graphed= the= quadratic= function= f(x)=x2f(x)=x2 by= plotting= points= and= then= saw= the= effect= of= adding= a= constant= k= to= the= function= had= on= the= resulting= graph= of= the= new= function= f(x)=x2+k.f(x)=x2+k. we= will= now= explore= the= effect= of= subtracting= a= constant,= h,= from= x= has= on= the= resulting= graph= of= the= new= function= f(x)=(x−h)2.f(x)=(x−h)2. graph= f(x)=x2,g(x)=(x−1)2,f(x)=x2,g(x)=(x−1)2, and= h(x)=(x+1)2h(x)=(x+1)2 on= the= same= rectangular= coordinate= system.= describe= what= effect= adding= a= constant= to= the= function= has= on= the= basic= parabola.= plotting= points= will= help= us= see= the= effect= of= the= constants= on= the= basic= f(x)=x2f(x)=x2 graph.= we= fill= in= the= chart= for= all= three= functions.= the= g(x)= values= and= the= h(x)= values= share= the= common= numbers= 0,= 1,= 4,= 9,= and= 16,= but= are= shifted.= ⓐ= graph= f(x)=x2,g(x)=(x+2)2,f(x)=x2,g(x)=(x+2)2, and= h(x)=(x−2)2h(x)=(x−2)2 on= the= same= rectangular= coordinate= system.ⓑ= describe= what= effect= adding= a= constant= to= the= function= has= on= the= basic= parabola.= ⓐ= graph= f(x)=x2 ,g(x)=x2+5,f(x)=x2,g(x)=x2+5, and= h(x)=x2−5h(x)=x2−5 on= the= same= rectangular= coordinate= system.ⓑ= describe= what= effect= adding= a= constant= to= the= function= has= on= the= basic= parabola.= the= last= example= shows= us= that= to= graph= a= quadratic= function= of= the= form= f(x)=(x−h)2,f(x)=(x−h)2, we= take= the= basic=></ 0, shift the parabola vertically down |k|| k| units. Now that we have seen the effect of the constant, k, it is easy to graph functions of the form f(x)=x2+k.f(x)=x2+k. We just start with the basic parabola of f(x)=x2f(x)=x2 and then shift it up or down. It may be helpful to practice sketching f(x)=x2f(x)=x2 quickly. We know the values and can sketch the graph from there. Once we know this parabola, it will be easy to apply the transformations. The next example will require a vertical shift. Graph using a vertical shift. We first draw the graph of f(x)=x2f(x)=x2 onthe grid. Determine kk. Shift the graph f(x)=x2f(x)=x2 down 3. Graph f(x)=x2−5f(x)=x2−5 using a vertical shift. Graph f(x)=x2+7f(x)=x2+7 using a vertical shift. In the first example, we graphed the quadratic function f(x)=x2f(x)=x2 by plotting points and then saw the effect of adding a constant k to the function had on the resulting graph of the new function f(x)=x2+k.f(x)=x2+k. We will now explore the effect of subtracting a constant, h, from x has on the resulting graph of the new function f(x)=(x−h)2.f(x)=(x−h)2. Graph f(x)=x2,g(x)=(x−1)2,f(x)=x2,g(x)=(x−1)2, and h(x)=(x+1)2h(x)=(x+1)2 on the same rectangular coordinate system. Describe what effect adding a constant to the function has on the basic parabola. Plotting points will help us see the effect of the constants on the basic f(x)=x2f(x)=x2 graph. We fill in the chart for all three functions. The g(x) values and the h(x) values share the common numbers 0, 1, 4, 9, and 16, but are shifted. ⓐ Graph f(x)=x2,g(x)=(x+2)2,f(x)=x2,g(x)=(x+2)2, and h(x)=(x−2)2h(x)=(x−2)2 on the same rectangular coordinate system.ⓑ Describe what effect adding a constant to the function has on the basic parabola. ⓐ Graph f(x)=x2,g(x)=x2+5,f(x)=x2,g(x)=x2+5, and h(x)=x2−5h(x)=x2−5 on the same rectangular coordinate system.ⓑ Describe what effect adding a constant to the function has on the basic parabola. The last example shows us that to graph a quadratic function of the form f(x)=(x−h)2,f(x)=(x−h)2, we take the basic > k</0).> k</0).> grafen f(x)=x2f(x)=x2 og forskyve den til venstre (h > 0) eller forskyve den til høyre (t < 0).= this= transformation= is= called= a= horizontal= shift.= the= graph= of= f(x)=(x−h)2f(x)=(x−h)2 shifts= the= graph= of= f(x)=x2f(x)=x2 horizontally= hh= units.= if= h=> 0, skift parabolaen horisontalt til venstre h-enheter. Hvis t < 0,= shift= the= parabola= horizontally= right= |h|| h|= units.= now= that= we= have= seen= the= effect= of= the= constant,= h,= it= is= easy= to= graph= functions= of= the= form= f(x)=(x−h)2.f(x)=(x−h)2. we= just= start= with= the= basic= parabola= of= f(x)=x2f(x)=x2 and= then= shift= it= left= or= right.= the= next= example= will= require= a= horizontal= shift.= graph= f(x)=(x−6)2f(x)=(x−6)2 using= a= horizontal= shift.= we= first= draw= the= graph= of= f(x)=x2f(x)=x2 onthe= grid.= determine= h.= shift= the= graph= f(x)=x2f(x)=x2 to= the= right= 6= units.= graph= f(x)=(x−4)2f(x)=(x−4)2 using= a= horizontal= shift.= graph= f(x)=(x+6)2f(x)=(x+6)2 using= a= horizontal= shift.= now= that= we= know= the= effect= of= the= constants= h= and= k,= we= will= graph= a= quadratic= function= of= the= form= f(x)=(x−h)2+kf(x)=(x−h)2+k by= first= drawing= the= basic= parabola= and= then= making= a= horizontal= shift= followed= by= a= vertical= shift.= we= could= do= the= vertical= shift= followed= by= the= horizontal= shift ,= but= most= students= prefer= the= horizontal= shift= followed= by= the= vertical.= graph= f(x)=(x+1)2−2f(x)=(x+1)2−2 using= transformations.= this= function= will= involve= two= transformations= and= we= need= a= plan.= let's= first= identify= the= constants= h,= k.= the= h= constant= gives= us= a= horizontal= shift= and= the= k= gives= us= a= vertical= shift.= we= first= draw= the= graph= of= f(x)=x2f(x)=x2 on= the= grid.= graph= f(x)=(x+2)2−3f(x)=(x+2) 2−3 using= transformations.= graph= f(x)=(x−3)2+1f(x)=(x−3)2+1 using= transformations.= so= far= we= graphed= the= quadratic= function= f(x)=x2f(x)=x2 and= then= saw= the= effect= of= including= a= constant= h= or= k= in= the= equation= had= on= the= resulting= graph= of= the= new= function.= we= will= now= explore= the= effect= of= the= coefficient= a= on= the= resulting= graph= of= the= new= function= f(x)=ax2.f(x)=ax2. if= we= graph= these= functions,= we= can= see= the= effect= of= the= constant= a,= assuming= a=> 0. For å tegne en funksjon med konstant er det enklest å velge noen punkter på f(x)=x2f(x)=x2 og multiplisere y-verdiene med a. Koeffisienten a i funksjonen f(x)=ax2f(x)=ax2 påvirker grafen til f(x)=x2f(x)=x2 ved å strekke eller komprimere den. Hvis 0 <> <> <> <1, the= graph= of= f(x)=ax2f(x)=ax2 will= be= "wider"= than= the= graph= of= f(x)=x2.f(x)=x2. if= |a|=>1|a|>1, vil grafen til f(x)=ax2f(x)=ax2 være skinnier enn grafen til f(x)=x2.f(x)=x2. Vi vil graf funksjonene f (x) = x2f (x) = x2 og g (x) = 3x2g (x) = on the same grid. We will select some points on f(x)=x2f(x)=x2 and then multiply the y values by 3 to get the points for g(x)=3x2.g(x)=3x2. Graph f(x)=−3x2.f(x)=−3x2. We have learned how the constants a, h and k in functions, f(x)=x2+k,f(x)=(x−h)2,f(x)=x2+k,f(x)=(x−h)2 and f(x)=ax2f(x)=ax2 affects</1,> affects</1,> Graphs. We can now put this together and graph square functions f(x)=ax2+bx+cf(x)=ax2+bx+c by first inserting them into the form f(x)=a(x−h)2+kf(x)=a(x−h)2+k by filling in the square. This form is sometimes known as the vertex form or the default form. We need to be careful to both add and pull the number to the same side of the function to complete the square. We can't add the number on both sides like we did when we finished the space with square equations. When we complete the space in a function with a coefficient of x2 that is not one, we need to factor the coefficient from only the x-terms. We do not take it into account from the constant term. It is often useful to move constant visibility slightly to the right to make it easier to focus only on x-terms. When we get the constant we want to finish the space, we must remember to multiply it with the coefficient before we subtract it. Rewrite f(x)=−3x2−6x−1f(x)=−3x2−6x−1 in f(x)=a(x−h)2+kf(x)=a(x−h)2+k shape by filling in the square. Separate the x-terms from the constant. Factor coefficient of x2x2, -3-3. Prepare to finish the space. Take half of 2 and then square it to finish square. (12·2)2=1(12·2)2=1 Constant 1 completes the square in parentheses, but the parentheses are multiplied by−3−3. So we really add −3−3 We then need to add 3 so as not to change the value of the function. Rewrite the trinome as a square and pull fraconstants. The function is now in f(x)=a(x−h)2+kf(x)=a(x−h)2+kform. Rewrite f(x)=−4x2−8x+1f(x)=−4x2−8x+1 in f(x)=a(x−h)2+kf(x)=a(x−h)2+k form by filling out the square. Rewrite f(x)=2x2−8x+3f(x)=2x2−8x+3 in f(x)=a(x−h)2+kf(x)=a(x−h)2+k form by filling in the square. When we insert the function into the f(x)=(x−h)2+kf(x)=(x−h)2+k form, we can then apply the transformations as we did in the last few problems. The next example will show us how to do this. Graph f(x)=x2+6x+5f(x)=x2+6x+5 using transformations. Step 1. Rewrite the function in f(x)=a(x−h)2+kf(x)=a(x−h)2+k vertex by filling in the square. Separate the x-terms from the constant. Take half of 6 and then square it to finish the square. (12·6)2=9(12·6)2=9 We both add 9 and subtract 9 so as not to change the value of the function. Rewrite trinomial as a square and draw the constants. The function is now in the f(x)=(x−h)2+kf(x)=(x−h)2+k form. Step 2: Graph the feature using transformations. Looking at h, k values, we see the graph will take the graph of f (x) = x2f (x) = x2 and move it to the left 3 units and down 4 units. We first draw the graph of f(x)=x2f(x)=x2 on the grid. Graph f(x)=x2+2x−3f(x)=x2+2x−3 using transformations. Graph f(x)=x2−8x+12f(x)=x2−8x+12 using transformations. We show the steps to draw a square function using transformations here. Step 1. Rewrite f(x)=a(x−h)2+kf(x)=a(x−h)2+k form by filling in the square. Step 2. Graph the function using transformations. Graph f(x)=−2x2−4x+2f(x)=−2x2−4x+2 using transformations. Step 1. Rewrite the function in f(x)=a(x−h)2+kf(x)=a(x−h)2+k vertex by filling in the square. Separate the x-terms from the constant. We need the coefficient of x2x2 to be one. We factor −2−2 from the x-terms. Take half of 2 and then square it to finish the square. (12·2)2=1(12·2)2=1 We add 1 to finish the space in the parentheses, but the parentheses are multiplied by −2−2. Look we really add −2−2. In order not to change the value of the function we add 2. Rewrite trinomial as a square and draw the constants. The function is now in the f(x)=a(x−h)2+kf(x)=a(x−h)2+k form. Step 2. Graph the function using transformations. We first draw the graph of f(x)=x2f(x)=x2 on the grid. Graph f(x)=−3x2+12x−4f(x)=−3x2+12x−4 using transformations. Graph f(x)=−2x2+12x−9f(x)=−2x2+12x−9 using transformations. Now that we have completed the square to set a square function in f(x)=a(x−h)2+kf(x)=a(x−h)2+k shape, we can also use this technique to graph the function using the properties as in the previous section. If we look back at the latest examples, we see that the vertex is related to the constants h and k. In each case, the vertex (h, k) is related. Also, the symmetry axis is the line x = h. We rewr over our steps to draw a square function using properties for when the function is in f(x)=a(x−h)2+kf(x)=a(x−h)2+k form. Step 1. Rewrite the function in f(x)=a(x−h)2+kf(x)=a(x−h)2+k form. Step 2. Determine whether the parabola opens upwards, a > 0, or down, a < 0. Step 3. Locate the symmetry axis, x = h. Step 4. Find the vertex, (h, k). Step 5. Find the y interception. Find the point symmetrical to y-interception over the symmetry axis. Step 6. Find x-intercepts. Step 7. Graphs the parabola. (a) Rewrite f(x)=2x2+4x+5f(x)=2x2+4x+5 in f(x)=a(x−h)2+kf(x)=a(x−h)2+k shape and (b) graphs function using properties. Rewrite the function in f(x)=a(x−h)2+kf(x)=a(x−h)2+kform by filling in the square. f(x)=2x2+4x+5f(x)=2x2+4x+5 f(x)=2(x2+2x)+5f(x)=2(x2+2x)+5 f(x)=5 2(x2+2x+1)+5−2f(x)=2(x2+)=2(x2+2x+1)+5−2f(x)=2(x2+2+2(x2+2+2(x2+2x+2x+2x+2x+2x+2x;x)=2(x2+2x)=2(x2+2x+2x+2x+2x+2x+2x +2x+2x+2x+2x+2x+2x+2(x)=2(x2+2x)=2(x2+2x+2(x2+2x+2x+2x+ 2x+2x+2x+2x;x)=2(x2+2x+1)+5−2 f(x)=2(x+1)2+3f(x)=2(x+1)2+3 Identify the constants a,h,k.a,h,k. a=2h=−1k=3a=2h=−1k=3 Since a=2a=2, the parabola opens upwards. The symmetry axis is x=hx=h. The symmetry axis is x=−1x=−1. The vertex is (h,k)(h,k). The vertex is (−1.3)(−1.3). Find y-intercept by finding f(0)f(0). f(0)=2)02+4-0+5f(0)=2.02+4-0+5 f(0)=5f (0)=5 y-intercept (0.5)(0.5) Find the point symmetrical to (0.5)(0.5) above symmetry. (−2,5) (−2,5) Find x-intercepts. The discriminatory negative, so it's no x-intercepts. Graphs the parabola. Rewrite f(x)=3x2−6x+5f(x)=3x2−6x+5 twice form and (b) graph function using properties. (a) Rewrite f(x)=−2x2+8x−7f(x)=−2x2+8x−7 in f(x)=a(x−h)2+kf(x)=a(x−h)2+k shape and (b) graphs function using properties. So far we have started with a function and then found the graph. Now we're going to reverse the process. Starting with the graph we will find the function. Determine the square function that shows the graph. Since it is square, we start with f(x)=a(x−h)2+kform. The vertex,(h,k),ice(−2, −1)soh=−2andk=−1.f(x)=a(x−(−2))2−1 To find it, we use de-intercept,(0,7). Sof(0)=7,7=a(0+2)2−1 Fix for a.7=4a−1 8=4a 2=a Type function.f(x)=a(x−h)2 +k Replacement inh=−2,k=−1anda=2.f(x)=2(x+2)2−1 Since it is square, we start with f(x)=a(x−h)2+kform. The vertex,(h,k),ice(−2,−1)soh=−2andk=−1.f(x)=a(x−(−2))2−1 To find it, we use de-intercept,(0,7). Sof(0)=7,7=a(0+2)1 Fix for a.7=4a−1 8=4a 2=a Type function.f(x)=a(x−h)2+k Replacement inh=−2 2 2,k=−1anda=2.f(x)=2(x+2)2−1 Type the square function in f(x)=a(x−h)2+kf(x)=a(x−h)2+k-shape with graph shown. Determine the square function that shows the graph. Section 9.7 Exercises Graf square functions of the form f(x)=x2+kf(x)=x2+k In the following exercises, (a) graph the square functions of the same rectangular coordinate system and (b) describe what effect add a constant, k, to the function has on the basic parabola. 293. f(x)=x2,g(x)=x2+4,f(x)=x2,g(x)=x2+4 and h(x)=x2−4.h(x)=x2−4. 294. f(x)=x2,g(x)=x2+7,f(x)=x2,g(x)=x2+7 and h(x)=x2−7.h(x)=x2−7. In the following exercises, each function graphs using a vertical shift. Graph square functions in the form f(x)=(x−h)2f(x)=(x−h)2 In the following exercises (a), the square functions on the same rectangular coordinate system graph and (b) describe the effect that adds a constant, hh, inside the parentheses have 301. f(x)=x2,g(x)=(x−3)2,f(x)=x2,g(x)=(x−3)2 and h(x)=(x+3)2.h(x)=(x+3)2. f(x)=x2 ,g(x)=(x+4)2,f(x)=x2,g(x)=(x+4)2 and h(x)=(x−4)2.h(x)=(x−4)2. In the following exercises, each function graphs using a horizontal shift. 303. 304. 305. 306. 307. 308. In the following exercises, each function graphs using transformations. 309. f(x)=(x+2)2+1f(x)=(x+2)2+1 310. f(x)=(x+4)2+2f(x)=(x+4)2+2,311. f(x)=(x−1)2+5f(x)=(x−1)2+5 312. f(x)=(x−3)2+4f(x)=(x−3)2+4,313. f(x)=(x+3)2−1f(x)=(x+3)2−1 314. f(x)=(x+5)2−2f(x)=(x+5)2−2 5. f(x)=(x−4)2−3f(x)=(x−4)2−3 316. f(x)=(x−6)2−2f(x)=(x−6)2−2 Graph square functions in the form f(x)=ax2f(x)=ax2 In the following exercises, graph each function. 324. Graph square functions using transformations In the following exercises, rewrite each function in the f(x)=a(x−h)2+kf(x)=a(x−h)2+k form by filling out the square. 325. f(x)=−3x2−12x−5f(x)=−3x2−12x−5 326. f(x)=2x2−12x+7f(x)=2x2−12x+7,327. 328. f(x)=−4x2−16x−9f(x)=−4x2−16x−9 In the following exercises, write (a) rewrite each function of f(x)=a(x−h)2+kf(x)=a(x−h)2+k shape and (b) graph it using transformations. 329. 330. f(x)=x2+4x−12f(x)=x2+4x−12 331. 332. 333. f(x)=x2−6x+15f(x)=x2−6x+15 334. f(x)=x2+8x+10f(x)=x2+8x+10 335. f(x)=−x2+8x−16f(x)=−x2+8x−16 336. f(x)=−x2+2x−7f(x)=−x2+2x−7 337. f(x)=−x2−4x+2f(x)=−x2−4x+2 338. f(x)=−x2+4x−5f(x)=−x2+4x−5 339. f(x)=5x2−10x+8f(x)=5x2−10x+8 340. f(x)=3x2+18x+20f(x)=3x2+18x+20 341. f(x)=2x2−4x+1f(x)=2x2−4x+1,342. f(x)=3x2−6x−1f(x)=3x2−6x−1 343. f(x)=−2x2+8x−10f(x)=−2x2+8x−10,344. f(x)=−3x2+6x+1f(x)=−3x2+6x+1 In the following exercises, type (a) about each function of f(x)=a(x−h)2+kf(x)=a(x−h)2+k-shape and (b) graph it using properties. 345. f(x)=2x2+4x+6f(x)=2x2+4x+6 346. f(x)=3x2−12x+7f(x)=3x2−12x+7 347. f(x)=−x2+2x−4f(x)=−x2+2x−4 348. f(x)=−2x2−4x−5f(x)=−2x2−4x−5 Matching In the following exercises, the graphs to one of the following functions: (a) f(x)=x2+4f(x)=x2+4 (b) f(x)=x2−4f(x)=x2−4 (c) f(x)=(x+4)2f(x)=(x+1 4)2(d) f(x)=(x−4)2f(x)=(x −4)2(e) f(x)=(x+4)2−4f(x)=(x+4)2−4 (f) f(x)=(x+4)2+4f(x)=(x+4)2+4 (g) f(x)=(x −4)2−4f(x)=(x−4) 2−4 (h) f(x)=(x−4)2+4f(x)=(x−4)2+4 349. 350. 351. 352. 353. 354. 355. 356. Find a square function from the graph In the following exercises, type the square function in f(x)=a(x−h)2+kf(x)=a(x−h)2+k shape with graph displayed. 357. 358. 359. 360. 361. Graph quadratic function f(x) = x2 + 4x + 5f(x) = x2 + 4x + 5 first using the properties that we did in the last part, and then graph it using transformations. Which method do you prefer? Why? 362. Graph quadratic function f(x)=2x2−4x−3f(x)=2x2−4x−3 first using the properties that we did in the last part, and then graph it using transformations. Which method do you prefer? Why? (a) After completing the exercises, use this checklist to evaluate the mastery of the goals for this section. (b) After looking at the checklist, do you think you are well prepared for the next paragraph? Why or why not? Not?

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