



## Families of Functions

Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

### Table of Contents

Note: Each parent function has two videos that illustrate how to graph it. The one with 'P' explains in detail how to graph that function. The one with 'Q' is a quick review of how to graph that parent function.

Code	Parent function	Description	Ctrl + Click on page number
		Videos that teach how to do the transformations	<a href="#">Page 2</a>
00	$Ax + By = C$ $y - y_1 = m(x - x_1)$ $x = c$ $y = mx + b$ $y = c$ $m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$	Linear relations	<a href="#">Page 3</a>
		What slope means and its formula	<a href="#">Page 4</a>
01	$y = x^2$	Squaring function	<a href="#">Page 5</a>
02	$y =  x $	Absolute value	<a href="#">Page 6</a>
03	$y = \sqrt{x}$	Square root	<a href="#">Page 7</a>
04	$y = \frac{1}{x}$	Reciprocal	<a href="#">Page 8</a>
05	$y = x^3$	Cubic	<a href="#">Page 9</a>
06	$y = \sqrt[3]{x}$	Cube root	<a href="#">Page 10</a>
07	$y = 2^x$	2 to the x	<a href="#">Page 11</a>
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09	$y = e^x$	e to the x	<a href="#">Page 14</a>
10	$y = \ln(x)$	Natural log of x	<a href="#">Page 15</a>
11	$y = \sqrt{r^2 - x^2}$	Semicircle	<a href="#">Page 16</a>
12	$y = [x]$	Greatest integer, step	<a href="#">Page 17</a>
13	$y = f(x)$	Generic piecewise	<a href="#">Page 18</a>
14	$y = \sin(x)$	Sine	<a href="#">Page 19</a>
15	$y = \cos(x)$	Cosine	<a href="#">Page 21</a>



## Videos that explain how to do the transformations in general

There are two links for each video: [youtu.be](https://youtu.be/), [bit.ly](https://bit.ly/):  
(they are the same video with two different links)

Code	Expression	Description	Youtube link	Bitly link
V	$f(x) + a$	Vertical shifts	<a href="https://youtu.be/rl-00UfR4vc">youtu.be/rl-00UfR4vc</a>	<a href="https://bit.ly/TI21fofV">bit.ly/TI21fofV</a>
HS	$f(x - a)$	Horizontal shifts	<a href="https://youtu.be/v0tY_nnikRE">youtu.be/v0tY_nnikRE</a>	<a href="https://bit.ly/TI21fofHS">bit.ly/TI21fofHS</a>
D	$a \cdot f(x)$	Dilations (vertical)	<a href="https://youtu.be/CVUO8yNdofQ">youtu.be/CVUO8yNdofQ</a>	<a href="https://bit.ly/TI21fofD">bit.ly/TI21fofD</a>
K	$f(a \cdot x)$	Horizontal stretches/shrinks	<a href="https://youtu.be/MXSGUBEZzF0">youtu.be/MXSGUBEZzF0</a>	<a href="https://bit.ly/TI21fofK">bit.ly/TI21fofK</a>
S	$-f(x)$	Opposite of the parent function	<a href="https://youtu.be/tnPN-epV3zs">youtu.be/tnPN-epV3zs</a>	<a href="https://bit.ly/TI21fofS">bit.ly/TI21fofS</a>
N	$f(-x)$	f at the opposite of x	<a href="https://youtu.be/ON9PNOrdmbS">youtu.be/ON9PNOrdmbS</a>	<a href="https://bit.ly/TI21fofN">bit.ly/TI21fofN</a>



$y = f(x)$  **00 Linear relations and Slope** Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, '[bit.ly/TI21fof00MBP](http://bit.ly/TI21fof00MBP)' is the link to the video that *explains how to graph a line using the slope-intercept method.*

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

**There are two links for each video: youtube.be, bit.ly:  
(they are the same video with two different links)**

Code	Example(s)	Now, you try.	Youtube link	Bitly link
00P	$2x + 3y = 18$	$3x - 4y = 24$	<a href="http://youtu.be/aSB7sf5jAyg">youtu.be/aSB7sf5jAyg</a>	<a href="http://bit.ly/TI21fof00P">bit.ly/TI21fof00P</a>
00Q	$x - 4y = 12$	$4x + 3y = 12$	<a href="http://youtu.be/-5T4HYMcr1o">youtu.be/-5T4HYMcr1o</a>	<a href="http://bit.ly/TI21fof00Q">bit.ly/TI21fof00Q</a>
00MBP	$y = \frac{1}{2}x + 3$ $4x + 2y = 10$	$y = -\frac{3}{2}x + 1$ $3x - 5y = 15$ $10x = 4y$	<a href="http://youtu.be/qdvUCT1RUZQ">youtu.be/qdvUCT1RUZQ</a>	<a href="http://bit.ly/TI21fof00MBP">bit.ly/TI21fof00MBP</a> <i>explains how to graph a line using the slope-intercept method</i>
00MBQ	$y = -\frac{2}{5}x + 4$	$y = x - 3$ $3x + 2y = 0$	<a href="http://youtu.be/Cr70fLMu0Wc">youtu.be/Cr70fLMu0Wc</a>	<a href="http://bit.ly/TI21fof00MBQ">bit.ly/TI21fof00MBQ</a>
00PSP	$y - 2 = 3(x - 1)$ $y - 4 = -\frac{1}{2}(x + 3)$ $y + 2 = \frac{3}{5}x$	$y + 3 = -(x + 4)$ $y = \frac{3}{2}(x - 4)$	<a href="http://youtu.be/8Z-pHH2jIS0">youtu.be/8Z-pHH2jIS0</a>	<a href="http://bit.ly/TI21fof00PSP">bit.ly/TI21fof00PSP</a>
00PSQ	$y + 1 = -2(x - 5)$	$y - 4 = \frac{2}{5}(x + 3)$	<a href="http://youtu.be/DwVs_Z5zC98">youtu.be/DwVs_Z5zC98</a>	<a href="http://bit.ly/TI21fof00PSQ">bit.ly/TI21fof00PSQ</a>
00PST	$y = 3(x - 2) + 5$	$y = -\frac{2}{3}(x + 1) - 4$	<a href="http://youtu.be/RROqum87S_8">youtu.be/RROqum87S_8</a>	<a href="http://bit.ly/TI21fof00PST">bit.ly/TI21fof00PST</a>
00XP	$x = 4$ $x = -3$ $x = \frac{5}{2}$	$x = 2$	<a href="http://youtu.be/IORu3ZXBflg">youtu.be/IORu3ZXBflg</a>	<a href="http://bit.ly/TI21fof00XP">bit.ly/TI21fof00XP</a>
00XQ	$x = -\frac{3}{2}$	$x = 0$	<a href="http://youtu.be/PcMdCOflkvo">youtu.be/PcMdCOflkvo</a>	<a href="http://bit.ly/TI21fof00XQ">bit.ly/TI21fof00XQ</a>
00YP	$y = 5$ $y = -6$ $y = -\frac{3}{2}$	$y = 4$	<a href="http://youtu.be/-U8x5l6W3tA">youtu.be/-U8x5l6W3tA</a>	<a href="http://bit.ly/TI21fof00YP">bit.ly/TI21fof00YP</a>
00YQ	$y = \frac{5}{2}$	$y = 0$	<a href="http://youtu.be/20TW8Q8qkE0">youtu.be/20TW8Q8qkE0</a>	<a href="http://bit.ly/TI21fof00YQ">bit.ly/TI21fof00YQ</a>



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updated July 23, 2021 with sin, cos

TI PROFESSIONAL DEVELOPMENT

Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

<b>00CS</b>	$2x - 3y = 12$ $y = \frac{2}{3}x - 4$ $y + 2 = \frac{2}{3}(x - 3)$	n/a	<a href="http://youtu.be/lwgLOjoA2tY">youtu.be/lwgLOjoA2tY</a>	<a href="http://bit.ly/TI21fof00CS">bit.ly/TI21fof00CS</a>
<b>00C5</b>	$x - 4y + 8 = 0$ $y = -\frac{1}{3}(x - 5) - 3$ $2x + 5 = 0$ $y + 5 = \frac{5}{2}x$ $3y = 12$	$y - 3 = -2(x + 1)$ $x + 4y = 8$ $4x + 14 = 2$	<a href="http://youtu.be/LTAmLK2EIHM">youtu.be/LTAmLK2EIHM</a>	<a href="http://bit.ly/TI21fof00C5">bit.ly/TI21fof00C5</a>
	<b>Slope Videos Below</b>			
<b>00M1</b>	What slope means and the 4 “flavors” of slope	n/a	<a href="http://youtu.be/VNcp_CFCMnQ">youtu.be/VNcp_CFCMnQ</a>	<a href="http://bit.ly/TI21fof00M1">bit.ly/TI21fof00M1</a>
<b>00M2</b>	Calculate slope from graphs	n/a	<a href="http://youtu.be/j7-EkkVV3VI">youtu.be/j7-EkkVV3VI</a>	<a href="http://bit.ly/TI21fof00M2">bit.ly/TI21fof00M2</a>
<b>00M3</b>	Calculate slope from tables	n/a	<a href="http://youtu.be/hFxMvVrnmGI">youtu.be/hFxMvVrnmGI</a>	<a href="http://bit.ly/TI21fof00M3">bit.ly/TI21fof00M3</a>
<b>00M4</b>	Derive the slope formula	n/a	<a href="http://youtu.be/VccDvxgctsl">youtu.be/VccDvxgctsl</a>	<a href="http://bit.ly/TI21fof00M4">bit.ly/TI21fof00M4</a>
<b>00M5</b>	Calculate the slope using the slope formula	n/a	<a href="http://youtu.be/VOR22KbmbV8">youtu.be/VOR22KbmbV8</a>	<a href="http://bit.ly/TI21fof00M5">bit.ly/TI21fof00M5</a>
<b>00M6</b>	Draw lines with given slope	n/a	<a href="http://youtu.be/tlvVkxU5rTc">youtu.be/tlvVkxU5rTc</a>	<a href="http://bit.ly/TI21fof00M6">bit.ly/TI21fof00M6</a>



## $y = x^2$ 01 the squaring function    Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, 'bit.ly/TI21fof01VAR' is the link to the video for the squaring function, that does a *vertical (V) shift*.

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

**There are two links for each video:youtu.be, bit.ly:  
(they are the same video with two different links)**

Code	Example	Now, you try one.	Youtube link	Bitly link
01P	$y = x^2$ How to	N/A	<a href="http://youtu.be/7pz244agv1A">youtu.be/7pz244agv1A</a>	<a href="http://bit.ly/TI21fof01P">bit.ly/TI21fof01P</a>
01Qr	$y = x^2$ Quick	N/A	<a href="http://youtube.com/MfWi79ujFus">youtube.com/MfWi79ujFus</a>	<a href="http://bit.ly/TI21fof01Qr">bit.ly/TI21fof01Qr</a>
01VAR	$y = x^2 + 1$	$y = x^2 + 3$	<a href="http://youtube.com/r9-F8ORpg4M">youtube.com/r9-F8ORpg4M</a>	<a href="http://bit.ly/TI21fof01VAR">bit.ly/TI21fof01VAR</a> <b>vertical shift</b>
01VB	$y = x^2 - 3$	$y = x^2 - 6$	<a href="http://youtu.be/nLsptl8iZCk">youtu.be/nLsptl8iZCk</a>	<a href="http://bit.ly/TI21fof01VB">bit.ly/TI21fof01VB</a>
01HA	$y = (x + 6)^2$	$y = (x + 4)^2$	<a href="http://youtu.be/sXfKr20MLsk">youtu.be/sXfKr20MLsk</a>	<a href="http://bit.ly/TI21fof01HA">bit.ly/TI21fof01HA</a>
01HB	$y = (x - 5)^2$	$y = (x - 3)^2$	<a href="http://youtu.be/dGmJNc_GcLk">youtu.be/dGmJNc_GcLk</a>	<a href="http://bit.ly/TI21fof01HB">bit.ly/TI21fof01HB</a>
01D	$y = 2x^2$	$y = \frac{3}{2}x^2$	<a href="http://youtu.be/4dHKeYa8_5Y">youtu.be/4dHKeYa8_5Y</a>	<a href="http://bit.ly/TI21fof01D">bit.ly/TI21fof01D</a>
01DB	$y = \frac{1}{2}x^2$	$y = \frac{1}{3}x^2$	<a href="http://youtu.be/XUNH_z6TR5E">youtu.be/XUNH_z6TR5E</a>	<a href="http://bit.ly/TI21fof01DB">bit.ly/TI21fof01DB</a>
01KA	$y = (3x)^2$	$y = (2x)^2$	<a href="http://youtu.be/7LLMRFem0XE">youtu.be/7LLMRFem0XE</a>	<a href="http://bit.ly/TI21fof01KA">bit.ly/TI21fof01KA</a>
01KB	$y = \left(\frac{1}{2}x\right)^2$	$y = \left(\frac{1}{3}x\right)^2$	<a href="http://youtu.be/tj8Z9HWa_E0">youtu.be/tj8Z9HWa_E0</a>	<a href="http://bit.ly/TI21fof01KB">bit.ly/TI21fof01KB</a>
01S	$y = -x^2$	N/A	<a href="http://youtu.be/tnPN-epV3zs">youtu.be/tnPN-epV3zs</a>	<a href="http://bit.ly/TI21fof01S">bit.ly/TI21fof01S</a>
01N	$y = (-x)^2$	N/A	<a href="http://youtu.be/ON9PNOrdmbS">youtu.be/ON9PNOrdmbS</a>	<a href="http://bit.ly/TI21fof01N">bit.ly/TI21fof01N</a>
01CA	$y = 2x^2 - 3$	$y = \frac{1}{2}x^2 + 1$	<a href="http://youtu.be/P3POCYp8h9U">youtu.be/P3POCYp8h9U</a>	<a href="http://bit.ly/TI21fof01CA">bit.ly/TI21fof01CA</a>
01CB	$y = -(x + 4)^2 + 1$	$y = -(x - 2)^2 - 3$	<a href="http://youtu.be/0ua9o28ypRs">youtu.be/0ua9o28ypRs</a>	<a href="http://bit.ly/TI21fof01CB">bit.ly/TI21fof01CB</a>
01CC	$y = -\frac{1}{2}(x - 3)^2 + 4$	$y = -2(x + 4)^2 + 5$	<a href="http://youtu.be/KShf-13c1-E">youtu.be/KShf-13c1-E</a>	<a href="http://bit.ly/TI21fof01CC">bit.ly/TI21fof01CC</a>



$y = |x|$  **02 absolute value** Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, 'bit.ly/TI21fof02HA' is the link to the video for the absolute value function, that does a *horizontal (H) shift*.

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

**There are two links for each video: youtube.be, bit.ly:  
(they are the same video with two different links)**

Code	Example	Now, you try one.	Youtube link	Bitly link
02P	$y =  x $ How to	N/A	<a href="http://youtu.be/9GxROaJWtss">youtu.be/9GxROaJWtss</a>	<a href="http://bit.ly/TI21fof02P">bit.ly/TI21fof02P</a>
02Q	$y =  x $ Quick	N/A	<a href="http://youtu.be/rmXI97nzi-M">youtu.be/rmXI97nzi-M</a>	<a href="http://bit.ly/TI21fof02Q">bit.ly/TI21fof02Q</a>
02VA	$y =  x  + 2$	$y =  x  + 5$	<a href="http://youtu.be/x0PF-imxzdA">youtu.be/x0PF-imxzdA</a>	<a href="http://bit.ly/TI21fof02VA">bit.ly/TI21fof02VA</a>
02VB	$y =  x  - 4$	$y =  x  - 3$	<a href="http://youtu.be/PpQ-3JIB1yQ">youtu.be/PpQ-3JIB1yQ</a>	<a href="http://bit.ly/TI21fof02VB">bit.ly/TI21fof02VB</a>
02HA	$y =  x + 4 $	$y =  x + 5 $	<a href="http://youtu.be/Rk2CLqI3aUY">youtu.be/Rk2CLqI3aUY</a>	<a href="http://bit.ly/TI21fof02HA">bit.ly/TI21fof02HA</a> <b>horizontal shift</b>
02HB	$y =  x - 6 $	$y =  x - 3 $	<a href="http://youtu.be/FVoLLYQ8NEY">youtu.be/FVoLLYQ8NEY</a>	<a href="http://bit.ly/TI21fof02HB">bit.ly/TI21fof02HB</a>
02D	$y = 3 x $	$y = 4 x $	<a href="http://youtu.be/nwbMIO9VnGg">youtu.be/nwbMIO9VnGg</a>	<a href="http://bit.ly/TI21fof02D">bit.ly/TI21fof02D</a>
02DB	$y = \frac{1}{2} x $	$y = \frac{1}{4} x $	<a href="http://youtu.be/VV8LSBmh78I">youtu.be/VV8LSBmh78I</a>	<a href="http://bit.ly/TI21fof02DB">bit.ly/TI21fof02DB</a>
02KAr	$y =  4x $	$y =  3x $	<a href="http://youtube.com/EhYC-j-QABM">youtube.com/EhYC-j-QABM</a>	<a href="http://bit.ly/TI21fof02KAr">bit.ly/TI21fof02KAr</a>
02KBr	$y = \left  \frac{1}{3}x \right $	$y = \left  \frac{1}{2}x \right $	<a href="http://youtube.com/V-BQyPyqUbg">youtube.com/V-BQyPyqUbg</a>	<a href="http://bit.ly/TI21fof02KBr">bit.ly/TI21fof02KBr</a>
02S	$y = - x $	N/A	<a href="http://youtu.be/hoRhT-yOkss">youtu.be/hoRhT-yOkss</a>	<a href="http://bit.ly/TI21fof02S">bit.ly/TI21fof02S</a>
02N	$y =  -x $	N/A	<a href="http://youtu.be/IV960lwtpLE">youtu.be/IV960lwtpLE</a>	<a href="http://bit.ly/TI21fof02N">bit.ly/TI21fof02N</a>
02CA	$y = \frac{1}{2} x  + 3$	$y = 3 x  - 4$	<a href="http://youtu.be/0BXcEJwC_d8">youtu.be/0BXcEJwC_d8</a>	<a href="http://bit.ly/TI21fof02CA">bit.ly/TI21fof02CA</a>
02CB	$y = - x - 5  + 1$	$y = - x + 3  - 2$	<a href="http://youtu.be/WmKZYqoLSM4">youtu.be/WmKZYqoLSM4</a>	<a href="http://bit.ly/TI21fof02CB">bit.ly/TI21fof02CB</a>
02CC	$y = \left  \frac{1}{2}x + 3 \right  - 4$	$y =  2x - 4  - 5$	<a href="http://youtu.be/Hei6kBb-Rns">youtu.be/Hei6kBb-Rns</a>	<a href="http://bit.ly/TI21fof02CC">bit.ly/TI21fof02CC</a>



$y = \sqrt{x}$  **03 square root of x** Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, 'bit.ly/TI21fof03DA' is the link to the video for the square root function, that does a *dilation (D)* or *vertical stretch*.

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

**There are two links for each video:youtu.be, bit.ly:  
(they are the same video with two different links)**

Code	Example	Now, you try one.	Youtube link	Bitly link
03P	$y = \sqrt{x}$ How to	N/A	<a href="http://youtu.be/X8Qzvu-v_RE">youtu.be/X8Qzvu-v_RE</a>	<a href="http://bit.ly/TI21fof03P">bit.ly/TI21fof03P</a>
03Q	$y = \sqrt{x}$ Quick	N/A	<a href="http://youtu.be/VQCkk37S9Mo">youtu.be/VQCkk37S9Mo</a>	<a href="http://bit.ly/FoF21fof03Q">bit.ly/FoF21fof03Q</a>
03VA	$y = \sqrt{x} + 3$	$y = \sqrt{x} + 1$	<a href="http://youtu.be/gyu-ABlh0xE">youtu.be/gyu-ABlh0xE</a>	<a href="http://bit.ly/TI21fof03VA">bit.ly/TI21fof03VA</a>
03VB	$y = \sqrt{x} - 5$	$y = \sqrt{x} - 2$	<a href="http://youtu.be/SvyP_EKcZlw">youtu.be/SvyP_EKcZlw</a>	<a href="http://bit.ly/TI21fof03VB">bit.ly/TI21fof03VB</a>
03HA	$y = \sqrt{x+6}$	$y = \sqrt{x+3}$	<a href="http://youtu.be/GwSVcLyf17E">youtu.be/GwSVcLyf17E</a>	<a href="http://bit.ly/TI21fof03HA">bit.ly/TI21fof03HA</a>
03HB	$y = \sqrt{x-2}$	$y = \sqrt{x-5}$	<a href="http://youtu.be/tdFR3nDIEO8">youtu.be/tdFR3nDIEO8</a>	<a href="http://bit.ly/TI21fof03HB">bit.ly/TI21fof03HB</a>
03DA	$y = \frac{3}{2}\sqrt{x}$	$y = 3\sqrt{x}$	<a href="http://youtu.be/fjvfV7JrjnE">youtu.be/fjvfV7JrjnE</a>	<a href="http://bit.ly/TI21fof03DA">bit.ly/TI21fof03DA</a> <b>dilation</b>
03DB	$y = \frac{1}{2}\sqrt{x}$	$y = \frac{1}{3}\sqrt{x}$	<a href="http://youtu.be/116oAg89VYE">youtu.be/116oAg89VYE</a>	<a href="http://bit.ly/TI21fof03DB">bit.ly/TI21fof03DB</a>
03KAr	$y = \sqrt{4x}$	$y = \sqrt{3x}$	<a href="http://youtube.com/cv6Vo0A3qyg">youtube.com/cv6Vo0A3qyg</a>	<a href="http://bit.ly/TI21fof03KAr">bit.ly/TI21fof03KAr</a>
03KBr	$y = \sqrt{\frac{1}{2}x}$	$y = \sqrt{\frac{1}{3}x}$	<a href="http://youtube.com/HqmGetSac6Q">youtube.com/HqmGetSac6Q</a>	<a href="http://bit.ly/TI21fof03KBr">bit.ly/TI21fof03KBr</a>
03S	$y = -\sqrt{x}$	N/A	<a href="http://youtu.be/7yfPCCNCz9w">youtu.be/7yfPCCNCz9w</a>	<a href="http://bit.ly/TI21fof03S">bit.ly/TI21fof03S</a>
03N	$y = \sqrt{-x}$	N/A	<a href="http://youtu.be/DOvpolqiltM">youtu.be/DOvpolqiltM</a>	<a href="http://bit.ly/TI21fof03N">bit.ly/TI21fof03N</a>
03CA	$y = 2\sqrt{x} + 3$	$y = \frac{3}{2}\sqrt{x} + 2$	<a href="http://youtu.be/E31sZBcqoPI">youtu.be/E31sZBcqoPI</a>	<a href="http://bit.ly/TI21fof03CA">bit.ly/TI21fof03CA</a>
03CB	$y = \sqrt{2x} - 4$	$y = \sqrt{\frac{1}{2}x} + 2$	<a href="http://youtu.be/PtaV1OtsJ-k">youtu.be/PtaV1OtsJ-k</a>	<a href="http://bit.ly/TI21fof03CB">bit.ly/TI21fof03CB</a>
03CC	$y = -\frac{1}{2}\sqrt{x+6} + 1$	$y = -2\sqrt{x-3} - 4$	<a href="http://youtu.be/qmG5-gFYnBM">youtu.be/qmG5-gFYnBM</a>	<a href="http://bit.ly/TI21fof03CC">bit.ly/TI21fof03CC</a>



$y = \frac{1}{x}$  **04 reciprocal function** Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, 'bit.ly/TI21fof04S' is the link to the video for graphing the *opposite (S) of the reciprocal function*.

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

**There are two links for each video: youtu.be, bit.ly: (they are the same video with two different links)**

Code	Example	Now, you try one.	Youtube link	Bitly link
04P	$y = \frac{1}{x}$ (1 & 2) How to	N/A	<a href="http://youtu.be/SJORO13Dcqk">youtu.be/SJORO13Dcqk</a> <a href="http://youtu.be/ixw4KxmX-DI">youtu.be/ixw4KxmX-DI</a>	<a href="http://bit.ly/TI21fof04P1">bit.ly/TI21fof04P1</a> <a href="http://bit.ly/TI21fof04P2">bit.ly/TI21fof04P2</a>
04Q	$y = \frac{1}{x}$ Quick	N/A	<a href="http://youtu.be/tbnJphkaBf8">youtu.be/tbnJphkaBf8</a>	<a href="http://bit.ly/TI21fof04Q">bit.ly/TI21fof04Q</a>
04VA	$y = \frac{1}{x} + 2$	$y = \frac{1}{x} + 4$	<a href="http://youtu.be/LfPuWxFu_WQ">youtu.be/LfPuWxFu_WQ</a>	<a href="http://bit.ly/TI21fof04VA">bit.ly/TI21fof04VA</a>
04VB	$y = \frac{1}{x} - 3$	$y = \frac{1}{x} - 2$	<a href="http://youtu.be/XRUJvcjkelnE">youtu.be/XRUJvcjkelnE</a>	<a href="http://bit.ly/TI21fof04VB">bit.ly/TI21fof04VB</a>
04HA	$y = \frac{1}{x+3}$	$y = \frac{1}{x+1}$	<a href="http://youtu.be/9Cmgj5oVXdk">youtu.be/9Cmgj5oVXdk</a>	<a href="http://bit.ly/TI21fof04HA">bit.ly/TI21fof04HA</a>
04HB	$y = \frac{1}{x-2}$	$y = \frac{1}{x-4}$	<a href="http://youtu.be/JIFQWmtdN6k">youtu.be/JIFQWmtdN6k</a>	<a href="http://bit.ly/TI21fof04HB">bit.ly/TI21fof04HB</a>
04DA	$y = \frac{3}{x} = 3 \cdot \frac{1}{x}$	$y = \frac{4}{x} = 4 \cdot \frac{1}{x}$	<a href="http://youtu.be/pw3NRWHlgys">youtu.be/pw3NRWHlgys</a>	<a href="http://bit.ly/TI21fof04DA">bit.ly/TI21fof04DA</a>
04DB	$y = \frac{1}{2x} = \frac{1}{2} \cdot \frac{1}{x}$	$y = \frac{1}{3x} = \frac{1}{3} \cdot \frac{1}{x}$	<a href="http://youtu.be/wsiKGPj1bP4">youtu.be/wsiKGPj1bP4</a>	<a href="http://bit.ly/TI21fof04DB">bit.ly/TI21fof04DB</a>
04KAr	$y = \frac{1}{(2x)}$	$y = \frac{1}{(3x)}$	<a href="http://youtube.com/1tPK13dUyZg">youtube.com/1tPK13dUyZg</a>	<a href="http://bit.ly/TI21fof04KAr">bit.ly/TI21fof04KAr</a>
04KBr	$y = \frac{1}{\left(\frac{1}{2}x\right)}$	$y = \frac{1}{\left(\frac{1}{3}x\right)}$	<a href="http://youtube.com/NAGWGv34_ZM">youtube.com/NAGWGv34_ZM</a>	<a href="http://bit.ly/TI21fof04KBr">bit.ly/TI21fof04KBr</a>
04S	$y = -\frac{1}{x}$	N/A	<a href="http://youtu.be/sfhll7JeAOM">youtu.be/sfhll7JeAOM</a>	<a href="http://bit.ly/TI21fof04S">bit.ly/TI21fof04S</a> <b>opposite of function</b>
04N	$y = \frac{1}{(-x)}$	N/A	<a href="http://youtu.be/Gm6Ovq4DTEI">youtu.be/Gm6Ovq4DTEI</a>	<a href="http://bit.ly/TI21fof04N">bit.ly/TI21fof04N</a>
04CAr2	$y = \frac{1}{x-1} + 2$	$y = \frac{1}{x+3} - 5$	<a href="http://youtube.com/xMOPE_tF9zc">youtube.com/xMOPE_tF9zc</a>	<a href="http://bit.ly/TI21fof04CAr2">bit.ly/TI21fof04CAr2</a>
04CB	$y = -\frac{6}{x}$	$y = \frac{8}{x}$	<a href="http://youtu.be/BbhBXHCx1J4">youtu.be/BbhBXHCx1J4</a>	<a href="http://bit.ly/TI21fof04CB">bit.ly/TI21fof04CB</a>
04CCr	$y = -\frac{1}{x+4} - 2$	$y = -\frac{1}{x-5} + 3$	<a href="http://youtube.com/X-52xWfFsQQ">youtube.com/X-52xWfFsQQ</a>	<a href="http://bit.ly/TI21fof04CCr">bit.ly/TI21fof04CCr</a>





## $y = x^3$ 05 cubic function    Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, '[bit.ly/TI21fof05N](http://bit.ly/TI21fof05N)' is the link to the video for how to *graph the cubic function at the opposite of x (N)*. We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

**There are two links for each video: yououtu.be, bit.ly:  
(they are the same video with two different links)**

Code	Example	Now, you try one.	Youtube link	Bitly link
05P	$y = x^3$ How to	N/A	<a href="http://youtu.be/PkCWOCzBFg">youtu.be/PkCWOCzBFg</a>	<a href="http://bit.ly/TI21fof05P">bit.ly/TI21fof05P</a>
05Q	$y = x^3$ Quick	N/A	<a href="http://youtu.be/4GKgnQb4GVg">youtu.be/4GKgnQb4GVg</a>	<a href="http://bit.ly/TI21fof05Q">bit.ly/TI21fof05Q</a>
05VA	$y = x^3 + 1$	$y = x^3 + 2$	<a href="http://youtu.be/kUq41JYRhv0">youtu.be/kUq41JYRhv0</a>	<a href="http://bit.ly/TI21fof05VA">bit.ly/TI21fof05VA</a>
05VB	$y = x^3 - 2$	$y = x^3 - 4$	<a href="http://youtu.be/oZ3YoL-ca6M">youtu.be/oZ3YoL-ca6M</a>	<a href="http://bit.ly/TI21fof05VB">bit.ly/TI21fof05VB</a>
05HA	$y = (x + 3)^3$	$y = (x + 5)^3$	<a href="http://youtu.be/y40TSFKhMow">youtu.be/y40TSFKhMow</a>	<a href="http://bit.ly/TI21fof05HA">bit.ly/TI21fof05HA</a>
05HB	$y = (x - 4)^3$	$y = (x - 2)^3$	<a href="http://youtu.be/_LHudsWaB3M">youtu.be/_LHudsWaB3M</a>	<a href="http://bit.ly/TI21fof05HB">bit.ly/TI21fof05HB</a>
05DA	$y = 2x^3$	$y = \frac{3}{2}x^3$	<a href="http://youtu.be/8bJzs2DoS_w">youtu.be/8bJzs2DoS_w</a>	<a href="http://bit.ly/TI21fof05DA">bit.ly/TI21fof05DA</a>
05DB	$y = \frac{1}{2}x^3$	$y = \frac{1}{3}x^3$	<a href="http://youtu.be/5UyZsl7tVKQ">youtu.be/5UyZsl7tVKQ</a>	<a href="http://bit.ly/TI21fof05DB">bit.ly/TI21fof05DB</a>
05KA	$y = (2x)^3$	$y = (3x)^3$	<a href="http://youtu.be/x-grv65q8mw">youtu.be/x-grv65q8mw</a>	<a href="http://bit.ly/TI21fof05KA">bit.ly/TI21fof05KA</a>
05KBr	$y = \left(\frac{1}{3}x\right)^3$	$y = \left(\frac{1}{2}x\right)^3$	<a href="http://youtube.com/uUcnZlIRyWU">youtube.com/uUcnZlIRyWU</a>	<a href="http://bit.ly/TI21fof05KBr">bit.ly/TI21fof05KBr</a>
05S	$y = -x^3$	N/A	<a href="http://youtu.be/OzDf941UFgg">youtu.be/OzDf941UFgg</a>	<a href="http://bit.ly/TI21fof05S">bit.ly/TI21fof05S</a>
05N	$y = (-x)^3$	N/A	<a href="http://youtu.be/TwjQ2DkZsHw">youtu.be/TwjQ2DkZsHw</a>	<a href="http://bit.ly/TI21fof05N">bit.ly/TI21fof05N</a> <b>opposite of x</b>
05CA	$y = 4 - x^3$	$y = -1 - x^3$	<a href="http://youtu.be/IIUauv-bEYg">youtu.be/IIUauv-bEYg</a>	<a href="http://bit.ly/TI21fof05CA">bit.ly/TI21fof05CA</a>
05CBr	$y = \frac{3}{2}(x + 4)^3$	$y = 2(x - 5)^3$	<a href="http://youtube.com/YME2_neZ-FU">youtube.com/YME2_neZ-FU</a>	<a href="http://bit.ly/TI21fof05CBr">bit.ly/TI21fof05CBr</a>
05CC	$y = -\frac{1}{2}(x - 1)^3 + 2$	$y = -\frac{3}{2}(x + 2)^3 - 1$	<a href="http://youtu.be/KezFvyC-S0U">youtu.be/KezFvyC-S0U</a>	<a href="http://bit.ly/TI21fof05CC">bit.ly/TI21fof05CC</a>



$y = \sqrt[3]{x}$  **06 cube root** Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, 'bit.ly/TI21fof06VA' is the link to the video for the cubing function, that does a *vertical (V) shift*.

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

There are two links for each video: [youtu.be](http://youtu.be), [bit.ly](http://bit.ly):  
(they are the same video with two different links)

Code	Example	Now, you try one.	Youtube link	Bitly link
06P	$y = \sqrt[3]{x}$ How to	N/A	<a href="http://youtu.be/Rdt1peDFbvk">youtu.be/Rdt1peDFbvk</a>	<a href="http://bit.ly/TI21fof06P">bit.ly/TI21fof06P</a>
06Q	$y = \sqrt[3]{x}$ Quick	N/A	<a href="http://youtu.be/Snkt8P99xYU">youtu.be/Snkt8P99xYU</a>	<a href="http://bit.ly/TI21fof06Q">bit.ly/TI21fof06Q</a>
06VA	$y = \sqrt[3]{x} + 4$	$y = \sqrt[3]{x} + 1$	<a href="http://youtu.be/NneFh65vT94">youtu.be/NneFh65vT94</a>	<a href="http://bit.ly/TI21fof06VA">bit.ly/TI21fof06VA</a> <b>vertical shift</b>
06VB	$y = \sqrt[3]{x} - 5$	$y = \sqrt[3]{x} - 2$	<a href="http://youtu.be/Pf6wB-WGC80">youtu.be/Pf6wB-WGC80</a>	<a href="http://bit.ly/TI21fof06VB">bit.ly/TI21fof06VB</a>
06HA	$y = \sqrt[3]{x+3}$	$y = \sqrt[3]{x+2}$	<a href="http://youtu.be/X2NC1WyBPeU">youtu.be/X2NC1WyBPeU</a>	<a href="http://bit.ly/TI21fof06HA">bit.ly/TI21fof06HA</a>
06HB	$y = \sqrt[3]{x-1}$	$y = \sqrt[3]{x-2}$	<a href="http://youtu.be/USfR6BPJ0LQ">youtu.be/USfR6BPJ0LQ</a>	<a href="http://bit.ly/TI21fof06HB">bit.ly/TI21fof06HB</a>
06DA	$y = 2\sqrt[3]{x}$	$y = \frac{3}{2}\sqrt[3]{x}$	<a href="http://youtu.be/1ByslHcVrws">youtu.be/1ByslHcVrws</a>	<a href="http://bit.ly/TI21fof06DA">bit.ly/TI21fof06DA</a>
06DB	$y = \frac{1}{3}\sqrt[3]{x}$	$y = \frac{1}{2}\sqrt[3]{x}$	<a href="http://youtu.be/rf7FcxrqSSk">youtu.be/rf7FcxrqSSk</a>	<a href="http://bit.ly/TI21fof06DB">bit.ly/TI21fof06DB</a>
06KAr	$y = \sqrt[3]{3x}$	$y = \sqrt[3]{2x}$	<a href="http://youtube.com/MGdXARSURMQ">youtube.com/MGdXARSURMQ</a>	<a href="http://bit.ly/TI21fof06KAr">bit.ly/TI21fof06KAr</a>
06KBr	$y = \sqrt[3]{\frac{1}{2}x}$	$y = \sqrt[3]{\frac{1}{3}x}$	<a href="http://youtube.com/1k-lyeMDpvY">youtube.com/1k-lyeMDpvY</a>	<a href="http://bit.ly/TI21fof06KBr">bit.ly/TI21fof06KBr</a>
06S	$y = -\sqrt[3]{x}$	N/A	<a href="http://youtu.be/rXgjKgw8q84">youtu.be/rXgjKgw8q84</a>	<a href="http://bit.ly/TI21fof06S">bit.ly/TI21fof06S</a>
06N	$y = \sqrt[3]{-x}$	N/A	<a href="http://youtu.be/Os9-tPs1oRE">youtu.be/Os9-tPs1oRE</a>	<a href="http://bit.ly/TI21fof06N">bit.ly/TI21fof06N</a>
06CAr2	$y = 2\sqrt[3]{x-1}$	$y = \frac{1}{2}\sqrt[3]{x+3}$	<a href="http://youtu.be/6KKVjJ9SQOI">youtu.be/6KKVjJ9SQOI</a>	<a href="http://bit.ly/TI21fof06CAr2">bit.ly/TI21fof06CAr2</a>
06CBr	$y = -\frac{3}{2}\sqrt[3]{x} + 2$	$y = -\sqrt[3]{x} - 3$	<a href="http://youtube.com/mP7gHSVyl2c">youtube.com/mP7gHSVyl2c</a>	<a href="http://bit.ly/TI21fof06CBr">bit.ly/TI21fof06CBr</a>
06CCr	$y = 2 - \sqrt[3]{x+1}$	$y = 3 + \frac{1}{2}\sqrt[3]{x-2}$	<a href="http://youtube.com/j9P2qmYiRhs">youtube.com/j9P2qmYiRhs</a>	<a href="http://bit.ly/TI21fof06CCr">bit.ly/TI21fof06CCr</a>



$y = 2^x$  **07 2 to the x power** Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, '[bit.ly/TI21fof07CA](http://bit.ly/TI21fof07CA)' is the link to the video for the 2 to the x function, that does a *combination of transformations (CA)*.

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

**There are two links for each video:youtu.be, bit.ly:  
(they are the same video with two different links)**

Code	Example	Now, you try one.	Youtube link	Bitly link
07P	$y = 2^x$ How to	N/A	<a href="http://youtu.be/t5IzFjn6AUg">youtu.be/t5IzFjn6AUg</a>	<a href="http://bit.ly/TI21fof07P">bit.ly/TI21fof07P</a>
07Qr	$y = 2^x$ Quick	N/A	<a href="http://youtube.com/qlWs3YiYv-A">youtube.com/qlWs3YiYv-A</a>	<a href="http://bit.ly/TI21fof07Qr">bit.ly/TI21fof07Qr</a>
07VA	$y = 2^x + 1$	$y = 2^x + 3$	<a href="http://youtu.be/FmNQX845g7Y">youtu.be/FmNQX845g7Y</a>	<a href="http://bit.ly/TI21fof07VA">bit.ly/TI21fof07VA</a>
07VB	$y = 2^x - 2$	$y = 2^x - 4$	<a href="http://youtu.be/8wvQPQc6_4M">youtu.be/8wvQPQc6_4M</a>	<a href="http://bit.ly/TI21fof07VB">bit.ly/TI21fof07VB</a>
07HA	$y = 2^{x+3}$	$y = 2^{x+1}$	<a href="http://youtu.be/kW8XRfQksbg">youtu.be/kW8XRfQksbg</a>	<a href="http://bit.ly/TI21fof07HA">bit.ly/TI21fof07HA</a>
07HB	$y = 2^{x-4}$	$y = 2^{x-2}$	<a href="http://youtu.be/ZpMbuBDEIHs">youtu.be/ZpMbuBDEIHs</a>	<a href="http://bit.ly/TI21fof07HB">bit.ly/TI21fof07HB</a>
07DA	$y = 2 \cdot 2^x$	$y = \frac{3}{2} \cdot 2^x$	<a href="http://youtu.be/Dag8dluycpU">youtu.be/Dag8dluycpU</a>	<a href="http://bit.ly/TI21fof07DA">bit.ly/TI21fof07DA</a>
07DB	$y = \frac{1}{3} \cdot 2^x$	$y = \frac{1}{2} \cdot 2^x$	<a href="http://youtu.be/hkiyJxydBaw">youtu.be/hkiyJxydBaw</a>	<a href="http://bit.ly/TI21fof07DB">bit.ly/TI21fof07DB</a>
07KAr	$y = 2^{3x}$	$y = 2^{2x}$	<a href="http://youtube.com/KW1i7rjIE24">youtube.com/KW1i7rjIE24</a>	<a href="http://bit.ly/TI21fof07KAr">bit.ly/TI21fof07KAr</a>
07KBr	$y = 2^{\frac{1}{2}x}$	$y = 2^{\frac{1}{3}x}$	<a href="http://youtube.com/2HDFzLNrp-w">youtube.com/2HDFzLNrp-w</a>	<a href="http://bit.ly/TI21fof07KBr">bit.ly/TI21fof07KBr</a>
07S	$y = -2^x$	N/A	<a href="http://youtu.be/jBYysvPjp_s">youtu.be/jBYysvPjp_s</a>	<a href="http://bit.ly/TI21fof07S">bit.ly/TI21fof07S</a>
07N	$y = 2^{-x}$	N/A	<a href="http://youtu.be/Dt5Rs4fsK0g">youtu.be/Dt5Rs4fsK0g</a>	<a href="http://bit.ly/TI21fof07N">bit.ly/TI21fof07N</a>
07CA	$y = 2^{x+1} - 3$	$y = 2^{x-2} + 1$	<a href="http://youtu.be/yiPX2SYfuXg">youtu.be/yiPX2SYfuXg</a>	<a href="http://bit.ly/TI21fof07CA">bit.ly/TI21fof07CA</a> <b>combination of transformations</b>
07CB	$y = 2^{\frac{1}{2}x} + 1$	$y = 2^{2x} - 5$	<a href="http://youtu.be/1Q3tMm9pZ_s">youtu.be/1Q3tMm9pZ_s</a>	<a href="http://bit.ly/TI21fof07CB">bit.ly/TI21fof07CB</a>
07CC	$y = -2^{x-2} + 4$	$y = -\frac{1}{2} \cdot 2^{x+3} - 1$	<a href="http://youtu.be/Oup-Q6y4k8A">youtu.be/Oup-Q6y4k8A</a>	<a href="http://bit.ly/TI21fof07CC">bit.ly/TI21fof07CC</a>



$$y = \left(\frac{1}{2}\right)^x$$

**08 one-half to the x power**

Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, 'bit.ly/TI21fof08KA' is the link to the video for the one-half to the x function, that does a *horizontal shrink (K)*.

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

**There are two links for each video: youtu.be, bit.ly:  
(they are the same video with two different links)**

Code	Example	Now, you try one.	Youtube link	Bitly link
08P	$y = \left(\frac{1}{2}\right)^x$ How to	N/A	<a href="http://youtu.be/ZI96DMHCi28">youtu.be/ZI96DMHCi28</a>	<a href="http://bit.ly/TI21fof08P">bit.ly/TI21fof08P</a>
08Q	$y = \left(\frac{1}{2}\right)^x$ Quick	N/A	<a href="http://youtu.be/62XSeM0jFx0">youtu.be/62XSeM0jFx0</a>	<a href="http://bit.ly/TI21fof08Q">bit.ly/TI21fof08Q</a>
08VA	$y = \left(\frac{1}{2}\right)^x + 2$	$y = \left(\frac{1}{2}\right)^x + 4$	<a href="http://youtu.be/Nv7A9lYSex0">youtu.be/Nv7A9lYSex0</a>	<a href="http://bit.ly/TI21fof08VA">bit.ly/TI21fof08VA</a>
08VB	$y = \left(\frac{1}{2}\right)^x - 1$	$y = \left(\frac{1}{2}\right)^x - 3$	<a href="http://youtu.be/8AO-CIxtRhQ">youtu.be/8AO-CIxtRhQ</a>	<a href="http://bit.ly/TI21fof08VB">bit.ly/TI21fof08VB</a>
08HA	$y = \left(\frac{1}{2}\right)^{x+5}$	$y = \left(\frac{1}{2}\right)^{x+2}$	<a href="http://youtu.be/cKCUUMrILGg">youtu.be/cKCUUMrILGg</a>	<a href="http://bit.ly/TI21fof08HA">bit.ly/TI21fof08HA</a>
08HB	$y = \left(\frac{1}{2}\right)^{x-4}$	$y = \left(\frac{1}{2}\right)^{x-1}$	<a href="http://youtu.be/04RXY6kJYr8">youtu.be/04RXY6kJYr8</a>	<a href="http://bit.ly/TI21fof08HB">bit.ly/TI21fof08HB</a>
08DA	$y = 3\left(\frac{1}{2}\right)^x$	$y = 4\left(\frac{1}{2}\right)^x$	<a href="http://youtu.be/vcyKrZP-4mw">youtu.be/vcyKrZP-4mw</a>	<a href="http://bit.ly/TI21fof08DA">bit.ly/TI21fof08DA</a>
08DB	$y = \frac{1}{4}\left(\frac{1}{2}\right)^x$	$y = \frac{1}{2}\left(\frac{1}{2}\right)^x$	<a href="http://youtu.be/bu9iMtvorKQ">youtu.be/bu9iMtvorKQ</a>	<a href="http://bit.ly/TI21fof08DB">bit.ly/TI21fof08DB</a>
08KA	$y = \left(\frac{1}{2}\right)^{2x}$	$y = \left(\frac{1}{2}\right)^{3x}$	<a href="http://youtu.be/MBDISOhgm1I">youtu.be/MBDISOhgm1I</a>	<a href="http://bit.ly/TI21fof08KA">bit.ly/TI21fof08KA</a> <i>horizontal shrink</i>
08KB	$y = \left(\frac{1}{2}\right)^{\frac{1}{3}x}$	$y = \left(\frac{1}{2}\right)^{\frac{1}{2}x}$	<a href="http://youtu.be/H1EwfjJISBQ">youtu.be/H1EwfjJISBQ</a>	<a href="http://bit.ly/TI21fof08KB">bit.ly/TI21fof08KB</a>
08S	$y = -\left(\frac{1}{2}\right)^x$	N/A	<a href="http://youtu.be/kgiUtoy4jul">youtu.be/kgiUtoy4jul</a>	<a href="http://bit.ly/TI21fof08S">bit.ly/TI21fof08S</a>
08N	$y = \left(\frac{1}{2}\right)^{-x}$	N/A	<a href="http://youtu.be/1BD_4hgJp4Y">youtu.be/1BD_4hgJp4Y</a>	<a href="http://bit.ly/TI21fof08N">bit.ly/TI21fof08N</a>



# Families of Functions

updated July 23, 2021 with sin, cos

TI PROFESSIONAL DEVELOPMENT

Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

<b>08CA</b>	$y = \left(\frac{1}{2}\right)^{x-2} + 1$	$y = \left(\frac{1}{2}\right)^{x+3} - 2$	<a href="https://youtu.be/sui5mnQVJ3I">youtu.be/sui5mnQVJ3I</a>	<a href="http://bit.ly/TI21fof08CA">bit.ly/TI21fof08CA</a>
<b>08CB</b>	$y = 3 - \left(\frac{1}{2}\right)^x$	$y = -2\left(\frac{1}{2}\right)^x - 1$	<a href="https://youtu.be/c9YgNh5Cs-U">youtu.be/c9YgNh5Cs-U</a>	<a href="http://bit.ly/TI21fof08CB">bit.ly/TI21fof08CB</a>
<b>08CC</b>	$y = \left(\frac{1}{2}\right)^{2x} - 7$	$y = \left(\frac{1}{2}\right)^{\frac{1}{2}x} + 3$	<a href="https://youtu.be/ldsgEO_YFMA">youtu.be/ldsgEO_YFMA</a>	<a href="http://bit.ly/TI21fof08CC">bit.ly/TI21fof08CC</a>



$y = e^x$  **09 e to the x power** Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, '[bit.ly/TI21fof09HAr](http://bit.ly/TI21fof09HAr)' is the link to the video for the exponential e function, that does a *horizontal (H) shift*.

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

**There are two links for each video: youtu.be, bit.ly:  
(they are the same video with two different links)**

Code	Example	Now, you try one.	Youtube link	Bitly link
09P	$y = e^x$ How to	N/A	<a href="http://youtu.be/Wv9GcFc_wCU">youtu.be/Wv9GcFc_wCU</a>	<a href="http://bit.ly/TI21fof09P">bit.ly/TI21fof09P</a>
09Q	$y = e^x$ Quick	N/A	<a href="http://youtu.be/W1js6WbanLI">youtu.be/W1js6WbanLI</a>	<a href="http://bit.ly/TI21fof09Q">bit.ly/TI21fof09Q</a>
09VA	$y = e^x + 1$	$y = e^x + 3$	<a href="http://youtu.be/LHkgyj0epqo">youtu.be/LHkgyj0epqo</a>	<a href="http://bit.ly/TI21fof09VA">bit.ly/TI21fof09VA</a>
09VB	$y = e^x - 3$	$y = e^x - 2$	<a href="http://youtu.be/ITDdNQdLnf0">youtu.be/ITDdNQdLnf0</a>	<a href="http://bit.ly/TI21fof09VB">bit.ly/TI21fof09VB</a>
09HAr	$y = e^{x+5}$	$y = e^{x+2}$	<a href="http://youtube.com/kYr5HXLiYwY">youtube.com/kYr5HXLiYwY</a>	<a href="http://bit.ly/TI21fof09HAr">bit.ly/TI21fof09HAr</a> <i>horizontal shift</i>
09HBr	$y = e^{x-1}$	$y = e^{x-4}$	<a href="http://youtube.com/vOpQvH1iZU4">youtube.com/vOpQvH1iZU4</a>	<a href="http://bit.ly/TI21fof09HBr">bit.ly/TI21fof09HBr</a>
09DA	$y = 2 \cdot e^x$	$y = 3 \cdot e^x$	<a href="http://youtu.be/a_Lqj2GfAi8">youtu.be/a_Lqj2GfAi8</a>	<a href="http://bit.ly/TI21fof09DA">bit.ly/TI21fof09DA</a>
09DB	$y = \frac{1}{2} \cdot e^x$	$y = \frac{1}{3} \cdot e^x$	<a href="http://youtu.be/fikZUHBnb0">youtu.be/fikZUHBnb0</a>	<a href="http://bit.ly/TI21fof09DB">bit.ly/TI21fof09DB</a>
09KA	$y = e^{2x}$	$y = e^{3x}$	<a href="http://youtu.be/3UoBqeuKgms">youtu.be/3UoBqeuKgms</a>	<a href="http://bit.ly/TI21fof09KA">bit.ly/TI21fof09KA</a>
09KB	$y = e^{\frac{1}{3}x}$	$y = e^{\frac{1}{2}x}$	<a href="http://youtu.be/xCWcW5VtNyc">youtu.be/xCWcW5VtNyc</a>	<a href="http://bit.ly/TI21fof09KB">bit.ly/TI21fof09KB</a>
09Sr	$y = -e^x$	N/A	<a href="http://youtube.com/3-ewqeKMmgs">youtube.com/3-ewqeKMmgs</a>	<a href="http://bit.ly/TI21fof09Sr">bit.ly/TI21fof09Sr</a>
09N	$y = e^{-x}$	N/A	<a href="http://youtu.be/04upOPXxVRc">youtu.be/04upOPXxVRc</a>	<a href="http://bit.ly/TI21fof09N">bit.ly/TI21fof09N</a>
09CA	$y = e^{x-2} - 4$	$y = e^{x+3} + 2$	<a href="http://youtu.be/AEsPIY51XA8">youtu.be/AEsPIY51XA8</a>	<a href="http://bit.ly/TI21fof09CA">bit.ly/TI21fof09CA</a>
09CB	$y = e^{2x} - 1$	$y = e^{\frac{1}{2}x} + 2$	<a href="http://youtu.be/CSGeFiK3DpU">youtu.be/CSGeFiK3DpU</a>	<a href="http://bit.ly/TI21fof09CB">bit.ly/TI21fof09CB</a>
09CC	$y = \frac{1}{2}e^{x-3} + 1$	$y = 2e^{x+4} - 6$	<a href="http://youtu.be/rexpaRvj5AE">youtu.be/rexpaRvj5AE</a>	<a href="http://bit.ly/TI21fof09CC">bit.ly/TI21fof09CC</a>



$$y = \ln(x) \quad \mathbf{10 \text{ natural log}} \quad \text{Go to this website: } [bit.ly/fofTI](http://bit.ly/fofTI)$$

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, '[bit.ly/TI21fof10P](http://bit.ly/TI21fof10P)' is the link to the video that explains *how to graph (P) the natural logarithm function*.

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

**There are two links for each video: youtu.be, bit.ly:  
(they are the same video with two different links)**

Code	Example	Now, you try one.	Youtube link	Bitly link
10P	$y = \ln(x)$ How to	N/A	<a href="http://youtu.be/XdQ68p7qqE8">youtu.be/XdQ68p7qqE8</a>	<a href="http://bit.ly/TI21fof10P">bit.ly/TI21fof10P</a> <i>how to graph</i>
10Q	$y = \ln(x)$ Quick	N/A	<a href="http://youtu.be/qt2RYdPtOAE">youtu.be/qt2RYdPtOAE</a>	<a href="http://bit.ly/TI21fof10Q">bit.ly/TI21fof10Q</a>
10VA	$y = \ln(x) + 2$	$y = \ln(x) + 3$	<a href="http://youtu.be/YC9QMkK5DLI">youtu.be/YC9QMkK5DLI</a>	<a href="http://bit.ly/TI21fof10VA">bit.ly/TI21fof10VA</a>
10VB	$y = \ln(x) - 4$	$y = \ln(x) - 2$	<a href="http://youtu.be/OmeALYL2Eqs">youtu.be/OmeALYL2Eqs</a>	<a href="http://bit.ly/TI21fof10VB">bit.ly/TI21fof10VB</a>
10HAr	$y = \ln(x + 4)$	$y = \ln(x + 2)$	<a href="http://youtube.com/UcJH1svHzeA">youtube.com/UcJH1svHzeA</a>	<a href="http://bit.ly/TI21fof10HAr">bit.ly/TI21fof10HAr</a>
10HB	$y = \ln(x - 3)$	$y = \ln(x - 1)$	<a href="http://youtu.be/6klYsOFTJAY">youtu.be/6klYsOFTJAY</a>	<a href="http://bit.ly/TI21fof10HB">bit.ly/TI21fof10HB</a>
10DAr	$y = 3\ln(x)$	$y = 2\ln(x)$	<a href="http://youtube.com/npnsR-KHUu4">youtube.com/npnsR-KHUu4</a>	<a href="http://bit.ly/TI21fof10DAr">bit.ly/TI21fof10DAr</a>
10DB	$y = \frac{1}{3}\ln(x)$	$y = \frac{1}{2}\ln(x)$	<a href="http://youtu.be/qXw0DFMJo0E">youtu.be/qXw0DFMJo0E</a>	<a href="http://bit.ly/TI21fof10DB">bit.ly/TI21fof10DB</a>
10KA	$y = \ln(3x)$	$y = \ln(2x)$	<a href="http://youtu.be/0cP9MbfNxCo">youtu.be/0cP9MbfNxCo</a>	<a href="http://bit.ly/TI21fof10KA">bit.ly/TI21fof10KA</a>
10KB	$y = \ln\left(\frac{1}{2}x\right)$	$y = \ln\left(\frac{1}{3}x\right)$	<a href="http://youtu.be/MbPtEUyFIGM">youtu.be/MbPtEUyFIGM</a>	<a href="http://bit.ly/TI21fof10KB">bit.ly/TI21fof10KB</a>
10S	$y = -\ln(x)$	N/A	<a href="http://youtu.be/1_hpmWYXTQc">youtu.be/1_hpmWYXTQc</a>	<a href="http://bit.ly/TI21fof10S">bit.ly/TI21fof10S</a>
10N	$y = \ln(-x)$	N/A	<a href="http://youtu.be/HjZF9qrTF5A">youtu.be/HjZF9qrTF5A</a>	<a href="http://bit.ly/TI21fof10N">bit.ly/TI21fof10N</a>
10CAr	$y = 2\ln(x) - 3$	$y = \frac{1}{2}\ln(x) + 4$	<a href="http://youtube.com/ek9PJiADDDo">youtube.com/ek9PJiADDDo</a>	<a href="http://bit.ly/TI21fof10CAr">bit.ly/TI21fof10CAr</a>
10CB	$y = \ln(x + 1) + 2$	$y = \ln(x - 3) - 2$	<a href="http://youtu.be/5wrL7cKuikk">youtu.be/5wrL7cKuikk</a>	<a href="http://bit.ly/TI21fofCB">bit.ly/TI21fofCB</a>
10CC	$y = -\ln\left(\frac{1}{2}x\right)$	$y = 1 - \ln\left(\frac{1}{3}x\right)$	<a href="http://youtu.be/RGM2WkKjZVg">youtu.be/RGM2WkKjZVg</a>	<a href="http://bit.ly/TI21fof10CC">bit.ly/TI21fof10CC</a>



$$y = \sqrt{r^2 - x^2} \quad \mathbf{11 \text{ semicircle}} \quad \text{Go to this website: } \a href="http://bit.ly/fofTI">bit.ly/fofTI$$

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, 'bit.ly/TI21fof11DA' is the link to the video for the semicircle function that does a *dilation* (D).

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

**There are two links for each video: youtu.be, bit.ly: (they are the same video with two different links)**

Code	Example	Now, you try one.	Youtube link	Bitly link
11P	$y = \sqrt{r^2 - x^2}$ How to	Examples: $y = \sqrt{25 - x^2}$ $y = \sqrt{36 - x^2}$ $y = \sqrt{16 - x^2}$	<a href="http://youtu.be/Uh8WGXzCcYI">youtu.be/Uh8WGXzCcYI</a>	<a href="http://bit.ly/TI21fof11P">bit.ly/TI21fof11P</a>
11Q	$y = \sqrt{36 - x^2}$ Quick	N/A	<a href="http://youtu.be/trLJdDUiTEg">youtu.be/trLJdDUiTEg</a>	<a href="http://bit.ly/TI21fof11Q">bit.ly/TI21fof11Q</a>
11VA	$y = \sqrt{49 - x^2} + 2$	$y = \sqrt{36 - x^2} + 3$	<a href="http://youtu.be/SRA3scrh2t8">youtu.be/SRA3scrh2t8</a>	<a href="http://bit.ly/TI21fof11VA">bit.ly/TI21fof11VA</a>
11VB	$y = \sqrt{49 - x^2} - 6$	$y = \sqrt{25 - x^2} - 4$	<a href="http://youtu.be/7dL5D7flPHs">youtu.be/7dL5D7flPHs</a>	<a href="http://bit.ly/TI21fof11VB">bit.ly/TI21fof11VB</a>
11HA	$y = \sqrt{49 - (x + 3)^2}$	$y = \sqrt{64 - (x + 2)^2}$	<a href="http://youtu.be/l_FB2SamXY8">youtu.be/l_FB2SamXY8</a>	<a href="http://bit.ly/TI21fof11HA">bit.ly/TI21fof11HA</a>
11HB	$y = \sqrt{36 - (x - 4)^2}$	$y = \sqrt{25 - (x - 3)^2}$	<a href="http://youtu.be/6JnZmD8PWzU">youtu.be/6JnZmD8PWzU</a>	<a href="http://bit.ly/TI21fof11HB">bit.ly/TI21fof11HB</a>
11DA	$y = \frac{3}{2}\sqrt{36 - x^2}$	$y = 2\sqrt{25 - x^2}$	<a href="http://youtu.be/4CEUteNfaZA">youtu.be/4CEUteNfaZA</a>	<a href="http://bit.ly/TI21fof11DA">bit.ly/TI21fof11DA</a> <b>dilation</b>
11DB	$y = \frac{1}{3}\sqrt{81 - x^2}$	$y = \frac{1}{4}\sqrt{64 - x^2}$	<a href="http://youtu.be/dx73ZLppDI4">youtu.be/dx73ZLppDI4</a>	<a href="http://bit.ly/TI21fof11DB">bit.ly/TI21fof11DB</a>
11KA	$y = \sqrt{36 - (2x)^2}$	$y = \sqrt{36 - (3x)^2}$	<a href="http://youtu.be/YpcU8ZGAfq4">youtu.be/YpcU8ZGAfq4</a>	<a href="http://bit.ly/TI21fof11KA">bit.ly/TI21fof11KA</a>
11KB	$y = \sqrt{25 - \left(\frac{1}{3}x\right)^2}$	$y = \sqrt{25 - \left(\frac{1}{2}x\right)^2}$	<a href="http://youtu.be/yc3pLcv5FKo">youtu.be/yc3pLcv5FKo</a>	<a href="http://bit.ly/TI21fof11KB">bit.ly/TI21fof11KB</a>
11S	$y = -\sqrt{49 - x^2}$	N/A	<a href="http://youtu.be/kZs-SXloFWQ">youtu.be/kZs-SXloFWQ</a>	<a href="http://bit.ly/TI21fof11S">bit.ly/TI21fof11S</a>
11N	$y = \sqrt{36 - (-x)^2}$	N/A	<a href="http://youtu.be/HhNliUT8eD8">youtu.be/HhNliUT8eD8</a>	<a href="http://bit.ly/TI21fof11N">bit.ly/TI21fof11N</a>
11CA	$y = 2\sqrt{25 - x^2} - 3$	$y = 3\sqrt{4 - x^2} + 1$	<a href="http://youtu.be/35e4PYU39pU">youtu.be/35e4PYU39pU</a>	<a href="http://bit.ly/TI21fof11CA">bit.ly/TI21fof11CA</a>
11CB	$y = -\sqrt{36 - (x + 2)^2}$	$y = -2\sqrt{9 - (x - 4)^2}$	<a href="http://youtu.be/QKbNlyJ-s60">youtu.be/QKbNlyJ-s60</a>	<a href="http://bit.ly/TI21fof11CB">bit.ly/TI21fof11CB</a>
11CC	$y = \frac{1}{2}\sqrt{64 - (x - 1)^2} + 2$	$y = \frac{3}{2}\sqrt{16 - (x + 2)^2} - 1$	<a href="http://youtu.be/qZmhRLgeDfo">youtu.be/qZmhRLgeDfo</a>	<a href="http://bit.ly/TI21fof11CC">bit.ly/TI21fof11CC</a>





## $y = [x]$ 12 greatest integer (step) function

Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, '[bit.ly/TI21fof12Q](http://bit.ly/TI21fof12Q)' is the link to the video for the greatest integer function, that *reviews how to graph this function quickly* (Q).

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

There are two links for each video: [youtu.be](http://youtu.be), [bit.ly](http://bit.ly):  
(they are the same video with two different links)

Code	Example	Now, you try one.	Youtube link	Bitly link
12P	$y = [x]$ How to	N/A	<a href="http://youtu.be/BZxMJ4EwNO0">youtu.be/BZxMJ4EwNO0</a>	<a href="http://bit.ly/TI21fof12P">bit.ly/TI21fof12P</a>
12Q	$y = [x]$ Quick	N/A	<a href="http://youtu.be/4ABu68N05Es">youtu.be/4ABu68N05Es</a>	<a href="http://bit.ly/TI21fof12Q">bit.ly/TI21fof12Q</a> <i>quick review</i>
12VA	$y = [x] + 3$	$y = [x] + 5$	<a href="http://youtu.be/z7hj7Mmj32g">youtu.be/z7hj7Mmj32g</a>	<a href="http://bit.ly/TI21fof12VA">bit.ly/TI21fof12VA</a>
12VB	$y = [x] - 4$	$y = [x] - 2$	<a href="http://youtu.be/1E2AkuWZ16g">youtu.be/1E2AkuWZ16g</a>	<a href="http://bit.ly/TI21fof12VB">bit.ly/TI21fof12VB</a>
12HA	$y = [x + 4]$	$y = [x + 1]$	<a href="http://youtu.be/RMfblEioCVc">youtu.be/RMfblEioCVc</a>	<a href="http://bit.ly/TI21fof12HA">bit.ly/TI21fof12HA</a>
12HB	$y = [x - 3]$	$y = [x - 2]$	<a href="http://youtu.be/l7Y7Ke8Oyk8">youtu.be/l7Y7Ke8Oyk8</a>	<a href="http://bit.ly/TI21fof12HB">bit.ly/TI21fof12HB</a>
12DA	$y = 3[x]$	$y = 5[x]$	<a href="http://youtu.be/G1-qCdKnB9U">youtu.be/G1-qCdKnB9U</a>	<a href="http://bit.ly/TI21fof12DA">bit.ly/TI21fof12DA</a>
12DB	$y = \frac{1}{2}[x]$	$y = \frac{1}{3}[x]$	<a href="http://youtu.be/LRLajTVzxil">youtu.be/LRLajTVzxil</a>	<a href="http://bit.ly/TI21fof12DB">bit.ly/TI21fof12DB</a>
12KA	$y = [3x]$	$y = [2x]$	<a href="http://youtu.be/666NYP6N8Q">youtu.be/666NYP6N8Q</a>	<a href="http://bit.ly/TI21fof12KA">bit.ly/TI21fof12KA</a>
12KB	$y = \left[ \frac{1}{2}x \right]$	$y = \left[ \frac{1}{3}x \right]$	<a href="http://youtu.be/x8CJjnY_Xpl">youtu.be/x8CJjnY_Xpl</a>	<a href="http://bit.ly/TI21fof12KB">bit.ly/TI21fof12KB</a>
12S	$y = -[x]$	N/A	<a href="http://youtu.be/tXbNhhqhFo0">youtu.be/tXbNhhqhFo0</a>	<a href="http://bit.ly/TI21fof12S">bit.ly/TI21fof12S</a>
12N	$y = [-x]$	N/A	<a href="http://youtu.be/LroQozmd71l">youtu.be/LroQozmd71l</a>	<a href="http://bit.ly/TI21fof12N">bit.ly/TI21fof12N</a>
12CA	$y = 2[x] + 1$	$y = \frac{3}{2}[x] - 2$	<a href="http://youtu.be/f3nXCyqZxoA">youtu.be/f3nXCyqZxoA</a>	<a href="http://bit.ly/TI21fof12CA">bit.ly/TI21fof12CA</a>
12CB	$y = -\left[ \frac{1}{2}x \right]$	$y = -2\left[ \frac{1}{3}x \right]$	<a href="http://youtu.be/OehUZcxFknU">youtu.be/OehUZcxFknU</a>	<a href="http://bit.ly/TI21fof12CB">bit.ly/TI21fof12CB</a>
12CC	$y = -\frac{3}{2}[x - 2] + 3$	$y = \frac{5}{2}[x + 1] - 2$	<a href="http://youtu.be/zYHDDw3bfIE">youtu.be/zYHDDw3bfIE</a>	<a href="http://bit.ly/TI21fof12CC">bit.ly/TI21fof12CC</a>



$y = f(x)$  **13 generic, piecewise function** Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, '[bit.ly/TI21fof13S](http://bit.ly/TI21fof13S)' is the link to the video for a *generic piecewise function, that graphs its opposite (S)*.

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

**There are two links for each video: youtube.be, bit.ly:  
(they are the same video with two different links)**

Code	Example	Now, you try one.	Youtube link	Bitly link
13P	N/A	N/A		
13Q	N/A	N/A		
13VA	$y = f(x) + 3$	$y = f(x) + 5$	<a href="http://youtu.be/HeHeZMbDNnM">youtu.be/HeHeZMbDNnM</a>	<a href="http://bit.ly/TI21fof13VA">bit.ly/TI21fof13VA</a>
13VB	$y = f(x) - 4$	$y = f(x) - 2$	<a href="http://youtu.be/eDXO4hTVsHA">youtu.be/eDXO4hTVsHA</a>	<a href="http://bit.ly/TI21fof13VB">bit.ly/TI21fof13VB</a>
13HA	$y = f(x + 4)$	$y = f(x + 2)$	<a href="http://youtu.be/-M5g0W4tV-w">youtu.be/-M5g0W4tV-w</a>	<a href="http://bit.ly/TI21fof13HA">bit.ly/TI21fof13HA</a>
13HB	$y = g(x - 5)$	$y = g(x - 3)$	<a href="http://youtu.be/YIBC_0-Kq1w">youtu.be/YIBC_0-Kq1w</a>	<a href="http://bit.ly/TI21fof13HB">bit.ly/TI21fof13HB</a>
13DA	$y = 3f(x)$	$y = \frac{3}{2}f(x)$	<a href="http://youtu.be/VQ1W2ZcE1JM">youtu.be/VQ1W2ZcE1JM</a>	<a href="http://bit.ly/TI21fof13DA">bit.ly/TI21fof13DA</a>
13DB	$y = \frac{1}{3}f(x)$	$y = \frac{1}{2}f(x)$	<a href="http://youtu.be/vmmQnkBTPrg">youtu.be/vmmQnkBTPrg</a>	<a href="http://bit.ly/TI21fof13DB">bit.ly/TI21fof13DB</a>
13KA	$y = f(3x)$	$y = f(2x)$	<a href="http://youtu.be/EM_z56L3r8Q">youtu.be/EM_z56L3r8Q</a>	<a href="http://bit.ly/TI21fof13KA">bit.ly/TI21fof13KA</a>
13KB	$y = f\left(\frac{1}{2}x\right)$	$y = f\left(\frac{1}{3}x\right)$	<a href="http://youtu.be/zCGIAYee1GY">youtu.be/zCGIAYee1GY</a>	<a href="http://bit.ly/TI21fof13KB">bit.ly/TI21fof13KB</a>
13S	$y = -f(x)$	N/A	<a href="http://youtu.be/BYaE-6N1ewg">youtu.be/BYaE-6N1ewg</a>	<a href="http://bit.ly/TI21fof13S">bit.ly/TI21fof13S</a> <b>opposite</b>
13NA	$y = f(-x)$	N/A	<a href="http://youtu.be/4ojK3xSg6fM">youtu.be/4ojK3xSg6fM</a>	<a href="http://bit.ly/TI21fof13NA">bit.ly/TI21fof13NA</a>
13CA	$y = 3f(x) + 2$	$y = 2g(x) - 3$	<a href="http://youtu.be/zJ9MjE3gjrl">youtu.be/zJ9MjE3gjrl</a>	<a href="http://bit.ly/TI21fof13CA">bit.ly/TI21fof13CA</a>
13CB	$y = -f\left(\frac{1}{2}x\right)$	$y = -f\left(\frac{1}{3}x\right)$	<a href="http://youtu.be/OJYdJUvD4Cs">youtu.be/OJYdJUvD4Cs</a>	<a href="http://bit.ly/TI21fof13CB">bit.ly/TI21fof13CB</a>
13CC	$y = 2f(x - 3) - 4$	$y = 3g(x - 4) + 5$	<a href="http://youtu.be/VIL6JSC7QHM">youtu.be/VIL6JSC7QHM</a>	<a href="http://bit.ly/TI21fof13CC">bit.ly/TI21fof13CC</a>



$y = \sin(x)$  **14 The sine function** Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, '[bit.ly/TI21fof14HA](http://bit.ly/TI21fof14HA)' is the link to the video for a *horizontal shift (H)* of the sine function.

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

**There are two links for each video: youtu.be, bit.ly:  
(they are the same video with two different links)**

Code	Example	Now, you try one.	Youtube link	Bitly link
14P	$y = \sin(x)$ How to	n/a	<a href="http://youtu.be/7grdc5MNIU">youtu.be/7grdc5MNIU</a>	<a href="http://bit.ly/TI21fof14P">bit.ly/TI21fof14P</a>
14Q	$y = \sin(x)$ Quick	n/a	<a href="http://youtu.be/NXpHckaoOs4">youtu.be/NXpHckaoOs4</a>	<a href="http://bit.ly/TI21fof14Q">bit.ly/TI21fof14Q</a>
14VA	$y = \sin(x) + 1$	$y = \sin(x) + 2$	<a href="http://youtu.be/Des52ojvwz0">youtu.be/Des52ojvwz0</a>	<a href="http://bit.ly/TI21fof14VA">bit.ly/TI21fof14VA</a>
14VB	$y = \sin(x) - 3$	$y = \sin(x) - 1$	<a href="http://youtu.be/9ODPdoAmWnc">youtu.be/9ODPdoAmWnc</a>	<a href="http://bit.ly/TI21fof14VB">bit.ly/TI21fof14VB</a>
14H A	$y = \sin\left(x + \frac{\pi}{4}\right)$	$y = \sin\left(x + \frac{\pi}{3}\right)$	<a href="http://youtu.be/s3wqPXi3dTc">youtu.be/s3wqPXi3dTc</a>	<a href="http://bit.ly/TI21fof14HA">bit.ly/TI21fof14HA</a> <b>horizontal shift</b>
14H B	$y = \sin\left(x - \frac{2\pi}{3}\right)$	$y = \sin\left(x - \frac{3\pi}{4}\right)$	<a href="http://youtu.be/dsbbik-TayA">youtu.be/dsbbik-TayA</a>	<a href="http://bit.ly/TI21fof14HB">bit.ly/TI21fof14HB</a>
14D A	$y = \frac{5}{2}\sin(x)$	$y = 4\sin(x)$	<a href="http://youtu.be/msYTaRydBlc">youtu.be/msYTaRydBlc</a>	<a href="http://bit.ly/TI21fof14DA">bit.ly/TI21fof14DA</a>
14D B	$y = \frac{2}{3}\sin(x)$	$y = \frac{1}{2}\sin(x)$	<a href="https://youtu.be/h6zY4mauyIY">https://youtu.be/h6zY4mauyIY</a>	<a href="http://bit.ly/TI21fof14DB">bit.ly/TI21fof14DB</a>
14K A	$y = \sin(3x)$	$y = \sin(4x)$	<a href="http://youtu.be/NWcUKjEzljM">youtu.be/NWcUKjEzljM</a>	<a href="http://bit.ly/TI21fof14KA">bit.ly/TI21fof14KA</a>
14K B	$y = \sin\left(\frac{1}{2}x\right)$	$y = \sin\left(\frac{1}{3}x\right)$	<a href="http://youtu.be/wqO74p5SpIM">youtu.be/wqO74p5SpIM</a>	<a href="http://bit.ly/TI21fof14KB">bit.ly/TI21fof14KB</a>
14K C	$y = \sin\left(\frac{\pi}{2}x\right)$	$y = \sin\left(\frac{\pi}{3}x\right)$	<a href="http://youtu.be/tcQd6Oyrw9s">youtu.be/tcQd6Oyrw9s</a>	<a href="http://bit.ly/TI21fof14KC">bit.ly/TI21fof14KC</a>
14S	$y = -\sin(x)$	$y = \pm 3\sin(x) - 1$ $y = \pm \frac{3}{2}\sin(x) + 2$	<a href="http://youtu.be/dlSo2WkZIUo">youtu.be/dlSo2WkZIUo</a>	<a href="http://bit.ly/TI21fof14S">bit.ly/TI21fof14S</a>
14N	$y = \sin(-x)$	N/A	<a href="http://youtu.be/uCpK8hR_Eyk">youtu.be/uCpK8hR_Eyk</a>	<a href="http://bit.ly/TI21fof14N">bit.ly/TI21fof14N</a>
14C A	$y = \pm \frac{5}{2}\sin(x) - 2$	$y = \pm 3\sin(x) + 1$	<a href="http://youtu.be/onBp2vvTIO4">youtu.be/onBp2vvTIO4</a>	<a href="http://bit.ly/TI21fof14CA">bit.ly/TI21fof14CA</a>



# Families of Functions

updated July 23, 2021 with sin, cos

TI PROFESSIONAL DEVELOPMENT

Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

<b>14C B</b>	$y = \sin\left(2x - \frac{\pi}{3}\right)$	$y = \sin\left(\frac{1}{3}x + \frac{\pi}{6}\right)$	<a href="http://youtu.be/4r5a5cu3Pyw">youtu.be/4r5a5cu3Pyw</a>	<a href="http://bit.ly/TI21fof14C">bit.ly/TI21fof14C</a> <a href="#">B</a>
<b>14C C</b>	$y = \frac{3}{2}\sin\left(\frac{1}{3}x - \frac{\pi}{2}\right) - 1$	$y = 3\sin\left(2x + \frac{\pi}{4}\right) + 1$	<a href="http://youtu.be/kwhnl9b3nWE">youtu.be/kwhnl9b3nWE</a>	<a href="http://bit.ly/TI21fof14C">bit.ly/TI21fof14C</a> <a href="#">C</a>
<b>14C D</b>	$y = -2\sin\left(\frac{\pi}{2}x + \frac{\pi}{4}\right) + 1$	$y = -3\sin\left(\pi x - \frac{\pi}{2}\right) - 2$	<a href="http://youtu.be/oo-Ezvl4ILM">youtu.be/oo-Ezvl4ILM</a>	<a href="http://bit.ly/TI21fof14C">bit.ly/TI21fof14C</a> <a href="#">D</a>



$y = \cos(x)$  **15 The cosine function** Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

All the bit.ly links begin with 'bit.ly/TI21fof' followed by the Code in the table below.

For example, '[bit.ly/TI21fof15VA](http://bit.ly/TI21fof15VA)' is the link to the video for a *vertical shift (V) of the cosine function*.

We suggest that you assign the videos using the 'Code' below, as long as students know that the beginning of each link is 'bit.ly/TI21fof'.

**There are two links for each video: youtu.be, bit.ly:  
(they are the same video with two different links)**

Code	Example	Now, you try one.	Youtube link	Bitly link
15P	$y = \cos(x)$ How to	n/a	<a href="http://youtu.be/MxFwexnOk3w">youtu.be/MxFwexnOk3w</a>	<a href="http://bit.ly/TI21fof15P">bit.ly/TI21fof15P</a>
15Q	$y = \cos(x)$ Quick	n/a	<a href="http://youtu.be/fJ8GB7Jc6mg">youtu.be/fJ8GB7Jc6mg</a>	<a href="http://bit.ly/TI21fof15Q">bit.ly/TI21fof15Q</a>
15VA	$y = \cos(x) + 2$	$y = \cos(x) + 3$	<a href="http://youtu.be/eB69cvqO8qo">youtu.be/eB69cvqO8qo</a>	<a href="http://bit.ly/TI21fof15VA">bit.ly/TI21fof15VA</a> <b>vertical shift</b>
15VB	$y = \cos(x) - 3$	$y = \cos(x) - 1$	<a href="http://youtu.be/yAZFe4cJcyg">youtu.be/yAZFe4cJcyg</a>	<a href="http://bit.ly/TI21fof15VB">bit.ly/TI21fof15VB</a>
15HA	$y = \cos\left(x + \frac{\pi}{3}\right)$	$y = \cos\left(x + \frac{\pi}{4}\right)$	<a href="http://youtu.be/6i_R8GfMapc">youtu.be/6i_R8GfMapc</a>	<a href="http://bit.ly/TI21fof15HA">bit.ly/TI21fof15HA</a>
15HB	$y = \cos\left(x - \frac{\pi}{4}\right)$	$y = \cos\left(x - \frac{\pi}{3}\right)$	<a href="http://youtu.be/Ybbd64fNuUw">youtu.be/Ybbd64fNuUw</a>	<a href="http://bit.ly/TI21fof15HB">bit.ly/TI21fof15HB</a>
15DA	$y = 3\cos(x)$	$y = \frac{3}{2}\cos(x)$	<a href="http://youtu.be/F0bS5IKW4dk">youtu.be/F0bS5IKW4dk</a>	<a href="http://bit.ly/TI21fof15DA">bit.ly/TI21fof15DA</a>
15DB	$y = \frac{1}{2}\cos(x)$	$y = \frac{3}{4}\cos(x)$	<a href="https://youtu.be/hT7e0YVPkDE">https://youtu.be/hT7e0YVPkDE</a>	<a href="http://bit.ly/TI21fof15DB">bit.ly/TI21fof15DB</a>
15KA	$y = \cos(3x)$	$y = \cos(2x)$	<a href="http://youtu.be/H19R3RFWX6U">youtu.be/H19R3RFWX6U</a>	<a href="http://bit.ly/TI21fof15KA">bit.ly/TI21fof15KA</a>
15KB	$y = \cos\left(\frac{1}{2}x\right)$	$y = \cos\left(\frac{1}{3}x\right)$	<a href="http://youtu.be/WxwoDYVEEO0">youtu.be/WxwoDYVEEO0</a>	<a href="http://bit.ly/TI21fof15KB">bit.ly/TI21fof15KB</a>
15KC	$y = \cos(\pi x)$	$y = \cos\left(\frac{\pi}{3}x\right)$	<a href="http://youtu.be/w1iW7a4VaYU">youtu.be/w1iW7a4VaYU</a>	<a href="http://bit.ly/TI21fof15KC">bit.ly/TI21fof15KC</a>
15S	$y = -\cos(x)$	$y = \pm \cos(x) - 2$ $y = \pm 2\cos(x) - 1$ $y = \pm 3\cos(x) + 1$	<a href="http://youtu.be/z7rexQA113c">youtu.be/z7rexQA113c</a>	<a href="http://bit.ly/TI21fof15S">bit.ly/TI21fof15S</a>
15N	$y = \cos(-x)$	n/a	<a href="http://youtu.be/oyt-X00litQ">youtu.be/oyt-X00litQ</a>	<a href="http://bit.ly/TI21fof15N">bit.ly/TI21fof15N</a>
15CA	$y = \pm 3\cos(x) - 1$	$y = \pm 2\cos(x) + 3$	<a href="http://youtu.be/wK93d0D4eSY">youtu.be/wK93d0D4eSY</a>	<a href="http://bit.ly/TI21fof15CA">bit.ly/TI21fof15CA</a>
15CB	$y = -4\cos(3x) + 1$	$y = \pm 3\cos\left(\frac{1}{2}x\right) - 1$	<a href="http://youtu.be/AXq1K1bH4LI">youtu.be/AXq1K1bH4LI</a>	<a href="http://bit.ly/TI21fof15CB">bit.ly/TI21fof15CB</a>



# Families of Functions

updated July 23, 2021 with sin, cos

TI PROFESSIONAL DEVELOPMENT

Go to this website: [bit.ly/fofTI](http://bit.ly/fofTI)

<b>15CC</b>	$y = 3\cos\left(\frac{1}{2}x + \frac{\pi}{3}\right) + 2$	$y = 2\cos\left(3x - \frac{\pi}{4}\right) - 3$	<a href="https://youtu.be/zrkhQQbshp4">youtu.be/zrkhQQbshp4</a>	<a href="http://bit.ly/TI21fof15CC">bit.ly/TI21fof15CC</a>
<b>15CD</b>	$y = \frac{5}{2}\cos\left(\frac{\pi}{3}x + \pi\right) - 1$	$y = 3\cos\left(\frac{\pi}{4}x - \frac{\pi}{2}\right) + 2$	<a href="https://youtu.be/WwgTuuvvecw">youtu.be/WwgTuuvvecw</a>	<a href="http://bit.ly/TI21fof15CD">bit.ly/TI21fof15CD</a>