



Families of Functions

Families of Functions

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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.

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		Videos that teach how to do the transformations	Page 1 (At the bottom of this page)
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13	$y = f(x)$	Generic piecewise	Page 15

Videos that teach how to do the transformations

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

Code	Expression	Description	Youtube link	Bitly link
V	$f(x) + a$	Vertical shifts	youtu.be/rl-00UfR4vc	bit.ly/TI21fofV
H	$f(x - a)$	Horizontal shifts	youtu.be/v0tY_nnikRE	bit.ly/TI21fofHS
D	$a \cdot f(x)$	Dilations (vertical)	youtu.be/CVUO8yNdofQ	bit.ly/TI21fofD
K	$f(a \cdot x)$	Horizontal stretches/shrinks	youtu.be/MXSGUBEZzF0	bit.ly/TI21fofK
S	$-f(x)$	Opposite of the parent function	youtu.be/tnPN-epV3zs	bit.ly/TI21fofS
N	$f(-x)$	f at opposite of x	youtu.be/ON9PNOrdms	bit.ly/TI21fofN



Families of Functions

$y = x^2$ 01 the squaring function

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

For example, 'bit.ly/TI21fof01VA' 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	youtu.be/7pz244agv1A	bit.ly/TI21fof01P
01Q	$y = x^2$ Quick	N/A	youtu.be/cpT78OD8sHs	bit.ly/TI21fof01Q
01VA	$y = x^2 + 1$	$y = x^2 + 3$	youtu.be/_TMFH0pDWac	bit.ly/TI21fof01VA
01VB	$y = x^2 - 3$	$y = x^2 - 6$	youtu.be/nLsptl8iZCk	bit.ly/TI21fof01VB
01HA	$y = (x + 6)^2$	$y = (x + 4)^2$	youtu.be/sXfKr20MLsk	bit.ly/TI21fof01HA
01HB	$y = (x - 5)^2$	$y = (x - 3)^2$	youtu.be/dGmJNc_GcLk	bit.ly/TI21fof01HB
01D	$y = 2x^2$	$y = \frac{3}{2}x^2$	youtu.be/4dHKeYa8_5Y	bit.ly/TI21fof01D
01DB	$y = \frac{1}{2}x^2$	$y = \frac{1}{3}x^2$	youtu.be/XUNH_z6TR5E	bit.ly/TI21fof01DB
01KA	$y = (3x)^2$	$y = (2x)^2$	youtu.be/7LLMRFem0XE	bit.ly/TI21fof01KA
01KB	$y = \left(\frac{1}{2}x\right)^2$	$y = \left(\frac{1}{3}x\right)^2$	youtu.be/tj8Z9HWa_E0	bit.ly/TI21fof01KB
01S	$y = -x^2$	N/A	youtu.be/tnPN-epV3zs	bit.ly/TI21fof01S
01N	$y = (-x)^2$	N/A	youtu.be/ON9PNOrdmbS	bit.ly/TI21fof01N
01CA	$y = 2x^2 - 3$	$y = \frac{1}{2}x^2 + 1$	youtu.be/P3POCYp8h9U	bit.ly/TI21fof01CA
01CB	$y = -(x + 4)^2 + 1$	$y = -(x - 2)^2 - 3$	youtu.be/0ua9o28ypRs	bit.ly/TI21fof01CB
01CC	$y = -\frac{1}{2}(x - 3)^2 + 4$	$y = -2(x + 4)^2 + 5$	youtu.be/KShf-13c1-E	bit.ly/TI21fof01CC



Families of Functions

$$y = |x| \quad \text{02 absolute value}$$

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

For example, 'bit.ly/TI21fof01VA' 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: 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	youtu.be/9GxROaJWtss	bit.ly/TI21fof02P
02Q	$y = x $ Quick	N/A	youtu.be/rmXI97nzi-M	bit.ly/TI21fof02Q
02VA	$y = x + 2$	$y = x + 5$	youtu.be/x0PF-imxzdA	bit.ly/TI21fof02VA
02VB	$y = x - 4$	$y = x - 3$	youtu.be/PpQ-3JIB1yQ	bit.ly/TI21fof02VB
02HA	$y = x + 4 $	$y = x + 5 $	youtu.be/Rk2CLqI3aUY	bit.ly/TI21fof02HA
02HB	$y = x - 6 $	$y = x - 3 $	youtu.be/FVoLLYQ8NEY	bit.ly/TI21fof02HB
02D	$y = 3 x $	$y = 4 x $	youtu.be/nwbMIO9VnGg	bit.ly/TI21fof02D
02DB	$y = \frac{1}{2} x $	$y = \frac{1}{4} x $	youtu.be/VV8LSBmh78I	bit.ly/TI21fof02DB
02KA	$y = 4x $	$y = 3x $	youtu.be/DH_b6hutXy4	bit.ly/TI21fof02KA
02KB	$y = \left \frac{1}{3}x \right $	$y = \left \frac{1}{2}x \right $	youtu.be/mmU7aQ9QBxQ	bit.ly/TI21fof02KB
02S	$y = - x $	N/A	youtu.be/hoRhT-yOkss	bit.ly/TI21fof02S
02N	$y = -x $	N/A	youtu.be/IV960IwtpLE	bit.ly/TI21fof02N
02CA	$y = \frac{1}{2} x + 3$	$y = 3 x - 4$	youtu.be/0BXcEJwC_d8	bit.ly/TI21fof02CA
02CB	$y = - x - 5 + 1$	$y = - x + 3 - 2$	youtu.be/WmKZYqoLSM4	bit.ly/TI21fof02CB
02CC	$y = \left \frac{1}{2}x + 3 \right - 4$	$y = 2x - 4 - 5$	youtu.be/Hei6kBb-Rns	bit.ly/TI21fof02CC



Families of Functions

$$y = \sqrt{x} \quad \text{03 square root of } x$$

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

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There are two links for each video: [youtu.be](https://www.youtube.com), 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	youtu.be/X8Qzvu-v_RE	bit.ly/TI21fof03P
03Q	$y = \sqrt{x}$ Quick	N/A	youtu.be/VQCkk37S9Mo	bit.ly/FoF21fof03Q
03VA	$y = \sqrt{x} + 3$	$y = \sqrt{x} + 1$	youtu.be/gyu-ABlh0xE	bit.ly/TI21fof03VA
03VB	$y = \sqrt{x} - 5$	$y = \sqrt{x} - 2$	youtu.be/SvyP_EKcZlw	bit.ly/TI21fof03VB
03HA	$y = \sqrt{x + 6}$	$y = \sqrt{x + 3}$	youtu.be/GwSVcLyf17E	bit.ly/TI21fof03HA
03HB	$y = \sqrt{x - 2}$	$y = \sqrt{x - 5}$	youtu.be/tdFR3nDIEO8	bit.ly/TI21fof03HB
03DA	$y = \frac{3}{2}\sqrt{x}$	$y = 3\sqrt{x}$	youtu.be/fjvfV7JrjnE	bit.ly/TI21fof03DA
03DB	$y = \frac{1}{2}\sqrt{x}$	$y = \frac{1}{3}\sqrt{x}$	youtu.be/116oAq89VYE	bit.ly/TI21fof03DB
03KA	$y = \sqrt{4x}$	$y = \sqrt{3x}$	youtu.be/_7P2biPICvl	bit.ly/TI21fof03KA
03KB	$y = \sqrt{\frac{1}{2}x}$	$y = \sqrt{\frac{1}{3}x}$	youtu.be/tlmXgsNyRMs	bit.ly/TI21fof03KB
03S	$y = -\sqrt{x}$	N/A	youtu.be/7yfPCCNCz9w	bit.ly/TI21fof03S
03N	$y = \sqrt{-x}$	N/A	youtu.be/DOvpolqjltM	bit.ly/TI21fof03N
03CA	$y = 2\sqrt{x} + 3$	$y = \frac{3}{2}\sqrt{x} + 2$	youtu.be/E31sZBcqoPI	bit.ly/TI21fof03CA
03CB	$y = \sqrt{2x} - 4$	$y = \sqrt{\frac{1}{2}x} + 2$	youtu.be/PtaV1OtsJ-k	bit.ly/TI21fof03CB
03CC	$y = -\frac{1}{2}\sqrt{x + 6} + 1$	$y = -2\sqrt{x - 3} - 4$	youtu.be/qmG5-gFYnBM	bit.ly/TI21fof03CC



Families of Functions

$$y = \frac{1}{x} \quad \mathbf{04 \text{ reciprocal function}}$$

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(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	youtu.be/SJORO13Dcqk youtu.be/ixw4KxmX-DI	bit.ly/TI21fof04P1 bit.ly/TI21fof04P2
04Q	$y = \frac{1}{x}$ Quick	N/A	youtu.be/tbnJphkaBf8	bit.ly/TI21fof04Q
04VA	$y = \frac{1}{x} + 2$	$y = \frac{1}{x} + 4$	youtu.be/LfPuWxFu_WQ	bit.ly/TI21fof04VA
04VB	$y = \frac{1}{x} - 3$	$y = \frac{1}{x} - 2$	youtu.be/XRUVcjkelnE	bit.ly/TI21fof04VB
04HA	$y = \frac{1}{x+3}$	$y = \frac{1}{x+1}$	youtu.be/9Cmgj5oVXdK	bit.ly/TI21fof04HA
04HB	$y = \frac{1}{x-2}$	$y = \frac{1}{x-4}$	youtu.be/JIFQWmtdN6k	bit.ly/TI21fof04HB
04DA	$y = \frac{3}{x} = 3 \cdot \frac{1}{x}$	$y = \frac{4}{x} = 4 \cdot \frac{1}{x}$	youtu.be/pw3NRWHlgys	bit.ly/TI21fof04DA
04DB	$y = \frac{1}{2x} = \frac{1}{2} \cdot \frac{1}{x}$	$y = \frac{1}{3x} = \frac{1}{3} \cdot \frac{1}{x}$	youtu.be/wsikGPj1bP4	bit.ly/TI21fof04DB
04KA	$y = \frac{1}{(2x)}$	$y = \frac{1}{(3x)}$	youtu.be/llrgFBiKueo	bit.ly/TI21fof04KA
04KB	$y = \frac{1}{\left(\frac{1}{2}x\right)}$	$y = \frac{1}{(3x)}$	youtu.be/exOoEfKh7pg	bit.ly/TI21fof04KB
04S	$y = -\frac{1}{x}$	N/A	youtu.be/sfhll7JeAOM	bit.ly/TI21fof04S
04N	$y = \frac{1}{(-x)}$	N/A	youtu.be/Gm6Ovq4DTEI	bit.ly/TI21fof04N
04CA	$y = \frac{1}{x-1} + 2$	$y = \frac{1}{x+3} - 5$	youtu.be/vLIVM1CqS_Q	bit.ly/TI21fof04CA
04CB	$y = -\frac{6}{x}$	$y = \frac{8}{x}$	youtu.be/BbhBxHCx1J4	bit.ly/TI21fof04CB
04CC	$y = -\frac{1}{x+4} - 2$	$y = -\frac{1}{x-5} + 3$	youtu.be/VY-Vb-VmV8	bit.ly/TI21fof04CC



Families of Functions

$y = x^3$ 05 cubic function

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05P	$y = x^3$ How to	N/A	youtu.be/PkCWOCznBFg	bit.ly/TI21fof05P
05Q	$y = x^3$ Quick	N/A	youtu.be/4GKgnQb4GVg	bit.ly/TI21fof05Q
05VA	$y = x^3 + 1$	$y = x^3 + 2$	youtu.be/kUq41JYRhv0	bit.ly/TI21fof05VA
05VB	$y = x^3 - 2$	$y = x^3 - 4$	youtu.be/oZ3YoL-ca6M	bit.ly/TI21fof05VB
05HA	$y = (x + 3)^3$	$y = (x + 5)^3$	youtu.be/y40TSFKhMow	bit.ly/TI21fof05HA
05HB	$y = (x - 4)^3$	$y = (x - 2)^3$	youtu.be/LHudsWaB3M	bit.ly/TI21fof05HB
05DA	$y = 2x^3$	$y = \frac{3}{2}x^3$	youtu.be/8bJzs2DoS_w	bit.ly/TI21fof05DA
05DB	$y = \frac{1}{2}x^3$	$y = \frac{1}{3}x^3$	youtu.be/5UyZs17tVKQ	bit.ly/TI21fof05DB
05KA	$y = (2x)^3$	$y = (3x)^3$	youtu.be/x-grv65q8mw	bit.ly/TI21fof05KA
05KB	$y = \left(\frac{1}{3}x\right)^3$	$y = \left(\frac{1}{2}x\right)^3$	youtu.be/rGpqr2GxC6A	bit.ly/TI21fof05KB
05S	$y = -x^3$	N/A	youtu.be/OzDf941UFqg	bit.ly/TI21fof05S
05N	$y = (-x)^3$	N/A	youtu.be/TwjQ2DkZsHw	bit.ly/TI21fof05N
05CA	$y = 4 - x^3$	$y = -1 - x^3$	youtu.be/IIUauv-bEYg	bit.ly/TI21fof05CA
05CB	$y = \frac{3}{2}(x + 4)^3$	$y = 2(x - 5)^3$	youtu.be/QmT7VIJpj88	bit.ly/TI21fof05CB
05CC	$y = -\frac{1}{2}(x - 1)^3 + 2$	$y = -\frac{3}{2}(x + 2)^3 - 1$	youtu.be/KezFvyC-S0U	bit.ly/TI21fof05CC



Families of Functions

$$y = \sqrt[3]{x} \quad \mathbf{06 \text{ cube root}}$$

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(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	youtu.be/Rdt1peDFbvk	bit.ly/TI21fof06P
06Q	$y = \sqrt[3]{x}$ Quick	N/A	youtu.be/Snkt8P99xYU	bit.ly/TI21fof06Q
06VA	$y = \sqrt[3]{x} + 4$	$y = \sqrt[3]{x} + 1$	youtu.be/NneFh65vT94	bit.ly/TI21fof06VA
06VB	$y = \sqrt[3]{x} - 5$	$y = \sqrt[3]{x} - 2$	youtu.be/Pf6wB-WGC80	bit.ly/TI21fof06VB
06HA	$y = \sqrt[3]{x + 3}$	$y = \sqrt[3]{x + 2}$	youtu.be/X2NC1WyBPeU	bit.ly/TI21fof06HA
06HB	$y = \sqrt[3]{x - 1}$	$y = \sqrt[3]{x - 2}$	youtu.be/USfR6BPJ0LQ	bit.ly/TI21fof06HB
06DA	$y = 2\sqrt[3]{x}$	$y = \frac{3}{2}\sqrt[3]{x}$	youtu.be/1ByslHCvrws	bit.ly/TI21fof06DA
06DB	$y = \frac{1}{3}\sqrt[3]{x}$	$y = \frac{1}{2}\sqrt[3]{x}$	youtu.be/rf7FcxrqSSk	bit.ly/TI21fof06DB
06KA	$y = \sqrt[3]{3x}$	$y = \sqrt[3]{2x}$	youtu.be/bRKj893III8	bit.ly/TI21fof06KA
06KB	$y = \sqrt[3]{\frac{1}{2}x}$	$y = \sqrt[3]{\frac{1}{3}x}$	youtu.be/WL8mNtfbneM	bit.ly/TI21fof06KB
06S	$y = -\sqrt[3]{x}$	N/A	youtu.be/rXgjkGw8q84	bit.ly/TI21fof06S
06N	$y = \sqrt[3]{-x}$	N/A	youtu.be/Os9-tPs1oRE	bit.ly/TI21fof06N
06CA	$y = 2\sqrt[3]{x - 1}$	$y = \frac{1}{2}\sqrt[3]{x + 3}$	youtu.be/RGUqkUiy_HI	bit.ly/TI21fof06CA
06CB	$y = -\frac{3}{2}\sqrt[3]{x} + 2$	$y = -\sqrt[3]{x} - 3$	youtu.be/82-9X9t-kaM	bit.ly/TI21fof06CB
06CC	$y = 2 - \sqrt[3]{x + 1}$	$y = 3 + \frac{1}{2}\sqrt[3]{x - 2}$	youtu.be/KI5vxyhhfTU	bit.ly/TI21fof06CC



Families of Functions

$$y = 2^x \quad \mathbf{07 \ 2 \ to \ the \ x \ power}$$

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(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	youtu.be/t5lzFjn6AUg	bit.ly/TI21fof07P
07Q	$y = 2^x$ Quick	N/A	youtu.be/O1maqZW6XnY	bit.ly/TI21fof07Q
07VA	$y = 2^x + 1$	$y = 2^x + 3$	youtu.be/FmNQX845g7Y	bit.ly/TI21fof07VA
07VB	$y = 2^x - 2$	$y = 2^x - 4$	youtu.be/8wvQPQc6_4M	bit.ly/TI21fof07VB
07HA	$y = 2^{x+3}$	$y = 2^{x+1}$	youtu.be/kW8XRfQksbg	bit.ly/TI21fof07HA
07HB	$y = 2^{x-4}$	$y = 2^{x-2}$	youtu.be/ZpMbuBDEIHs	bit.ly/TI21fof07HB
07DA	$y = 2 \cdot 2^x$	$y = \frac{3}{2} \cdot 2^x$	youtu.be/Dag8dluycpU	bit.ly/TI21fof07DA
07DB	$y = \frac{1}{3} \cdot 2^x$	$y = \frac{1}{2} \cdot 2^x$	youtu.be/hkiyJxydBaw	bit.ly/TI21fof07DB
07KA	$y = 2^{3x}$	$y = 2^{2x}$	youtu.be/KloRXzyMYQc	bit.ly/TI21fof07KA
07KB	$y = 2^{\frac{1}{2}x}$	$y = 2^{2x}$	youtu.be/xN7ddfkbn8w	bit.ly/TI21fof07KB
07S	$y = -2^x$	N/A	youtu.be/jBYYsvPjp_s	bit.ly/TI21fof07S
07N	$y = 2^{-x}$	N/A	youtu.be/Dt5Rs4fsK0g	bit.ly/TI21fof07N
07CA	$y = 2^{x+1} - 3$	$y = 2^{x-2} + 1$	youtu.be/yiPX2SYfuXg	bit.ly/TI21fof07CA
07CB	$y = 2^{\frac{1}{2}x} + 1$	$y = 2^{2x} - 5$	youtu.be/1Q3tMm9pZ_s	bit.ly/TI21fof07CB
07CC	$y = -2^{x-2} + 4$	$y = -\frac{1}{2} \cdot 2^{x+3} - 1$	youtu.be/Oup-Q6y4k8A	bit.ly/TI21fof07CC



Families of Functions

$$y = \left(\frac{1}{2}\right)^x \quad \text{08 one-half to the x power}$$

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**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
08P	$y = \left(\frac{1}{2}\right)^x$ How to	N/A	youtu.be/ZI96DMHCi28	bit.ly/TI21fof08P
08Q	$y = \left(\frac{1}{2}\right)^x$ Quick	N/A	youtu.be/62XSeM0jFx0	bit.ly/TI21fof08Q
08VA	$y = \left(\frac{1}{2}\right)^x + 2$	$y = \left(\frac{1}{2}\right)^x + 4$	youtu.be/Nv7A9lYSex0	bit.ly/TI21fof08VA
08VB	$y = \left(\frac{1}{2}\right)^x - 1$	$y = \left(\frac{1}{2}\right)^x - 3$	youtu.be/8AO-CixtRhQ	bit.ly/TI21fof08VB
08HA	$y = \left(\frac{1}{2}\right)^{x+5}$	$y = \left(\frac{1}{2}\right)^{x+2}$	youtu.be/cKCUUMrILGg	bit.ly/TI21fof08HA
08HB	$y = \left(\frac{1}{2}\right)^{x-4}$	$y = \left(\frac{1}{2}\right)^{x-1}$	youtu.be/04RXY6kJYr8	bit.ly/TI21fof08HB
08DA	$y = 3\left(\frac{1}{2}\right)^x$	$y = 4\left(\frac{1}{2}\right)^x$	youtu.be/vcyKrZP-4mw	bit.ly/TI21fof08DA
08DB	$y = \frac{1}{4}\left(\frac{1}{2}\right)^x$	$y = \frac{1}{2}\left(\frac{1}{2}\right)^x$	youtu.be/bu9iMtvorKQ	bit.ly/TI21fof08DB
08KA	$y = \left(\frac{1}{2}\right)^{2x}$	$y = \left(\frac{1}{2}\right)^{3x}$	youtu.be/MBDISOhgm1l	bit.ly/TI21fof08KA
08KB	$y = \left(\frac{1}{2}\right)^{\frac{1}{3}x}$	$y = \left(\frac{1}{2}\right)^{\frac{1}{2}x}$	youtu.be/H1EwfjJISBQ	bit.ly/TI21fof08KB
08S	$y = -\left(\frac{1}{2}\right)^x$	N/A	youtu.be/kgiUtoy4juI	bit.ly/TI21fof08S
08N	$y = \left(\frac{1}{2}\right)^{-x}$	N/A	youtu.be/1BD_4hgJp4Y	bit.ly/TI21fof08N



Families of Functions

08CA	$y = \left(\frac{1}{2}\right)^{x-2} + 1$	$y = \left(\frac{1}{2}\right)^{x+3} - 2$	youtu.be/sui5mnQVJ3I	bit.ly/TI21fof08CA
08CB	$y = 3 - \left(\frac{1}{2}\right)^x$	$y = -2\left(\frac{1}{2}\right)^x - 1$	youtu.be/c9YgNh5Cs-U	bit.ly/TI21fof08CB
08CC	$y = \left(\frac{1}{2}\right)^{2x} - 7$	$y = \left(\frac{1}{2}\right)^{\frac{1}{2}x} + 3$	youtu.be/lDsgeO_YFMA	bit.ly/TI21fof08CC



Families of Functions

$y = e^x$ 09 e to the x power

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

For example, 'bit.ly/TI21fof01VA' 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
09P	$y = e^x$ How to	N/A	youtu.be/Wv9GcFc_wCU	bit.ly/TI21fof09P
09Q	$y = e^x$ Quick	N/A	youtu.be/W1js6WbanLI	bit.ly/TI21fof09Q
09VA	$y = e^x + 1$	$y = e^x + 3$	youtu.be/LHkgyj0epqo	bit.ly/TI21fof09VA
09VB	$y = e^x - 3$	$y = e^x - 2$	youtu.be/ITDdNQdLnf0	bit.ly/TI21fof09VB
09HA	$y = e^{x+5}$	$y = e^{x+2}$	youtu.be/66iQylka0uc	bit.ly/TI21fof09HA
09HB	$y = e^{x-1}$	$y = e^{x-4}$	youtu.be/MUF-GChCvY4	bit.ly/TI21fof09HB
09DA	$y = 2 \cdot e^x$	$y = 3 \cdot e^x$	youtu.be/a_Lqj2GfAi8	bit.ly/TI21fof09DA
09DB	$y = \frac{1}{2} \cdot e^x$	$y = \frac{1}{3} \cdot e^x$	youtu.be/IfikZUHBnb0	bit.ly/TI21fof09DB
09KA	$y = e^{2x}$	$y = e^{3x}$	youtu.be/3UoBqeuKgms	bit.ly/TI21fof09KA
09KB	$y = e^{\frac{1}{3}x}$	$y = e^{\frac{1}{2}x}$	youtu.be/xCWcW5VtNyc	bit.ly/TI21fof09KB
09S	$y = -e^x$	N/A	youtu.be/J6mF4iAa8B4	bit.ly/TI21fof09S
09N	$y = e^{-x}$	N/A	youtu.be/04upOPXxVRc	bit.ly/TI21fof09N
09CA	$y = e^{x-2} - 4$	$y = e^{x+3} + 2$	youtu.be/AEsPIY51XA8	bit.ly/TI21fof09CA
09CB	$y = e^{2x} - 1$	$y = e^{\frac{1}{2}x} + 2$	youtu.be/CSGeFiK3DpU	bit.ly/TI21fof09CB
09CC	$y = \frac{1}{2}e^{x-3} + 1$	$y = 2e^{x+4} - 6$	youtu.be/rexpaRvj5AE	bit.ly/TI21fof09CC



Families of Functions

$y = \ln(x)$ 10 natural log

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

For example, 'bit.ly/TI21fof01VA' 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
10P	$y = \ln(x)$ How to	N/A	youtu.be/XdQ68p7qqE8	bit.ly/TI21fof10P
10Q	$y = \ln(x)$ Quick	N/A	youtu.be/qt2RYdPtOAE	bit.ly/TI21fof10Q
10VA	$y = \ln(x) + 2$	$y = \ln(x) + 3$	youtu.be/YC9QMkK5DLI	bit.ly/TI21fof10VA
10VB	$y = \ln(x) - 4$	$y = \ln(x) - 2$	youtu.be/OmeALYL2Eqs	bit.ly/TI21fof10VB
10HA	$y = \ln(x + 4)$	$y = \ln(x + 2)$	youtu.be/UcJH1svHzeA	bit.ly/TI21fof10HA
10HB	$y = \ln(x - 3)$	$y = \ln(x - 1)$	youtu.be/6kIYsOFTJAY	bit.ly/TI21fof10HB
10DA	$y = 3 \ln(x)$	$y = 2 \ln(x)$	youtu.be/CA3lCoc545E	bit.ly/TI21fof10DA
10DB	$y = \frac{1}{3} \ln(x)$	$y = \frac{1}{2} \ln(x)$	youtu.be/qXw0DFMJo0E	bit.ly/TI21fof10DB
10KA	$y = \ln(3x)$	$y = \ln(2x)$	youtu.be/0cP9MbfNxCo	bit.ly/TI21fof10KA
10KB	$y = \ln\left(\frac{1}{2}x\right)$	$y = \ln\left(\frac{1}{3}x\right)$	youtu.be/MbPtEUyFIGM	bit.ly/TI21fof10KB
10S	$y = -\ln(x)$	N/A	youtu.be/1_hpmWYXTQc	bit.ly/TI21fof10S
10N	$y = \ln(-x)$	N/A	youtu.be/HjZF9qrTF5A	bit.ly/TI21fof10N
10CA	$y = 2 \ln(x) - 3$	$y = \frac{1}{2} \ln(x) + 4$	youtu.be/cU3pDFJt-80	bit.ly/TI21fof10CA
10CB	$y = \ln(x + 1) + 2$	$y = \ln(x - 3) - 2$	youtu.be/5wrL7cKuikk	bit.ly/TI21fof10CB
10CC	$y = -\ln\left(\frac{1}{2}x\right)$	$y = 1 - \ln\left(\frac{1}{3}x\right)$	youtu.be/RGM2WkKjZVg	bit.ly/TI21fof10CC



Families of Functions

$$y = \sqrt{r^2 - x^2} \quad \mathbf{11 \text{ semicircle}}$$

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

For example, 'bit.ly/TI21fof01VA' 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
11P	$y = \sqrt{r^2 - x^2}$ How to	Examples: $y = \sqrt{25 - x^2}$ $y = \sqrt{36 - x^2}$ $y = \sqrt{16 - x^2}$	youtu.be/Uh8WGXzCcYI	bit.ly/TI21fof11P
11Q	$y = \sqrt{36 - x^2}$ Quick	N/A	youtu.be/trLJdDUiTEg	bit.ly/TI21fof11Q
11VA	$y = \sqrt{49 - x^2} + 2$	$y = \sqrt{36 - x^2} + 3$	youtu.be/SRA3scrh2t8	bit.ly/TI21fof11VA
11VB	$y = \sqrt{49 - x^2} - 6$	$y = \sqrt{25 - x^2} - 4$	youtu.be/7dL5D7flPHs	bit.ly/TI21fof11VB
11HA	$y = \sqrt{49 - (x + 3)^2}$	$y = \sqrt{64 - (x + 2)^2}$	youtu.be/l_FB2SamXY8	bit.ly/TI21fof11HA
11HB	$y = \sqrt{36 - (x - 4)^2}$	$y = \sqrt{25 - (x - 3)^2}$	youtu.be/6JnZmD8PWzU	bit.ly/TI21fof11HB
11DA	$y = \frac{3}{2}\sqrt{36 - x^2}$	$y = 2\sqrt{25 - x^2}$	youtu.be/4CEUteNfaZA	bit.ly/TI21fof11DA
11DB	$y = \frac{1}{3}\sqrt{81 - x^2}$	$y = \frac{1}{4}\sqrt{64 - x^2}$	youtu.be/dx73ZLppDI4	bit.ly/TI21fof11DB
11KA	$y = \sqrt{36 - (2x)^2}$	$y = \sqrt{36 - (3x)^2}$	youtu.be/YpcU8ZGAfq4	bit.ly/TI21fof11KA
11KB	$y = \sqrt{25 - \left(\frac{1}{3}x\right)^2}$	$y = \sqrt{25 - \left(\frac{1}{2}x\right)^2}$	youtu.be/yc3pLcv5FKo	bit.ly/TI21fof11KB
11S	$y = -\sqrt{49 - x^2}$	N/A	youtu.be/kZs-SXloFWQ	bit.ly/TI21fof11S
11N	$y = \sqrt{36 - (-x)^2}$	N/A	youtu.be/HhNiiUT8eD8	bit.ly/TI21fof11N
11CA	$y = 2\sqrt{25 - x^2} - 3$	$y = 3\sqrt{4 - x^2} + 1$	youtu.be/35e4PYU39pU	bit.ly/TI21fof11CA
11CB	$y = -\sqrt{36 - (x + 2)^2}$	$y = -2\sqrt{9 - (x - 4)^2}$	youtu.be/QKbNlyJ-s60	bit.ly/TI21fof11CB
11CC	$y = \frac{1}{2}\sqrt{64 - (x - 1)^2} + 2$	$y = \frac{3}{2}\sqrt{16 - (x + 2)^2} - 1$	youtu.be/qZmhRLgeDfo	bit.ly/TI21fof11CC



Families of Functions

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

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

For example, 'bit.ly/TI21fof01VA' 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: youtube.be, 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	youtu.be/BZxMJ4EwNO0	bit.ly/TI21fof12P
12Q	$y = [x]$ Quick	N/A	youtu.be/4ABu68N05Es	bit.ly/TI21fof12Q
12VA	$y = [x] + 3$	$y = [x] + 5$	youtu.be/z7hj7Mmj32g	bit.ly/TI21fof12VA
12VB	$y = [x] - 4$	$y = [x] - 2$	youtu.be/1E2AkuWZ16g	bit.ly/TI21fof12VB
12HA	$y = [x + 4]$	$y = [x + 1]$	youtu.be/RMfblEioCVc	bit.ly/TI21fof12HA
12HB	$y = [x - 3]$	$y = [x - 2]$	youtu.be/l7Y7Ke8Oyk8	bit.ly/TI21fof12HB
12DA	$y = 3[x]$	$y = 5[x]$	youtu.be/G1-qCdKnB9U	bit.ly/TI21fof12DA
12DB	$y = \frac{1}{2}[x]$	$y = \frac{1}{3}[x]$	youtu.be/LRLajTVzxil	bit.ly/TI21fof12DB
12KA	$y = [3x]$	$y = [2x]$	youtu.be/666NYPA6N8Q	bit.ly/TI21fof12KA
12KB	$y = \left[\frac{1}{2}x \right]$	$y = \left[\frac{1}{3}x \right]$	youtu.be/x8CJjnY_Xpl	bit.ly/TI21fof12KB
12S	$y = -[x]$	N/A	youtu.be/tXbNhhqhFo0	bit.ly/TI21fof12S
12N	$y = [-x]$	N/A	youtu.be/LroQozmd71l	bit.ly/TI21fof12N
12CA	$y = 2[x] + 1$	$y = \frac{3}{2}[x] - 2$	youtu.be/f3nXCyqZxoA	bit.ly/TI21fof12CA
12CB	$y = -\left[\frac{1}{2}x \right]$	$y = -2\left[\frac{1}{3}x \right]$	youtu.be/OehUZcxFknU	bit.ly/TI21fof12CB
12CC	$y = -\frac{3}{2}[x - 2] + 3$	$y = \frac{5}{2}[x + 1] - 2$	youtu.be/zYHDDw3bfIE	bit.ly/TI21fof12CC



Families of Functions

$y = f(x)$ 13 generic, piecewise function

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

For example, 'bit.ly/TI21fof01VA' 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](https://www.youtube.com), 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	$y = f(x) + 3$	$y = f(x) + 5$	youtu.be/HeHeZMbDNnM	bit.ly/TI21fof13VA
13VB	$y = f(x) - 4$	$y = f(x) - 2$	youtu.be/eDXO4hTVsHA	bit.ly/TI21fof13VB
13HA	$y = f(x + 4)$	$y = f(x + 2)$	youtu.be/-M5g0W4tV-w	bit.ly/TI21fof13HA
13HB	$y = g(x - 5)$	$y = g(x - 3)$	youtu.be/YIBC_0-Kq1w	bit.ly/TI21fof13HB
13DA	$y = 3f(x)$	$y = \frac{3}{2}f(x)$	youtu.be/VQ1W2ZcE1JM	bit.ly/TI21fof13DA
13DB	$y = \frac{1}{3}f(x)$	$y = \frac{1}{2}f(x)$	youtu.be/vmmQnkBTPrg	bit.ly/TI21fof13DB
13KA	$y = f(3x)$	$y = f(2x)$	youtu.be/EM_z56L3r8Q	bit.ly/TI21fof13KA
13KB	$y = f\left(\frac{1}{2}x\right)$	$y = f\left(\frac{1}{3}x\right)$	youtu.be/zCGIAYee1GY	bit.ly/TI21fof13KB
13S	$y = -f(x)$	N/A	youtu.be/BYaE-6N1ewg	bit.ly/TI21fof13S
13NA	$y = f(-x)$	N/A	youtu.be/4ojK3xSg6fM	bit.ly/TI21fof13NA
13CA	$y = 3f(x) + 2$	$y = 2g(x) - 3$	youtu.be/zJ9MjE3gjrI	bit.ly/TI21fof13CA
13CB	$y = -f\left(\frac{1}{2}x\right)$	$y = -f\left(\frac{1}{3}x\right)$	youtu.be/OJYdJUvD4Cs	bit.ly/TI21fof13CB
13CC	$y = 2f(x - 3) - 4$	$y = 3g(x - 4) + 5$	youtu.be/VL6JSC7QHM	bit.ly/TI21fof13CC