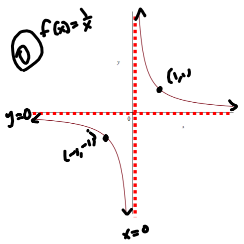
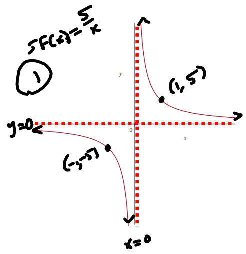
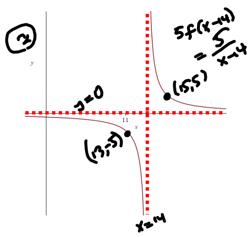
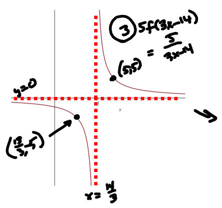
**Method 1**

1. (5 pts) $g(x)=\dfrac{5}{3x-14}-11$ (Use $(1,1)$, and $(-1,-1)$ as the 3 $(x,y)$'s in the 1st graph.). I hope and expect to see 2 asymptotes, clearly shown and labeled.



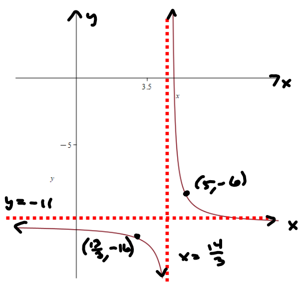




4 $g(x) = 5f(3x-14)-11$

$(x,y) \longmapsto (x, y-11)$

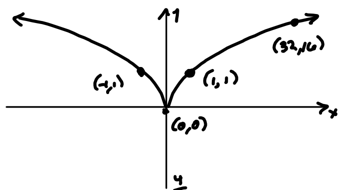


**Method 1**

2. (5 pts) $g(x)=5(7x+21)^{4/5}-8$ (Use $(0,0),(1,1)$, and $(32,16)$ as the 3 points in the 1st graph.)

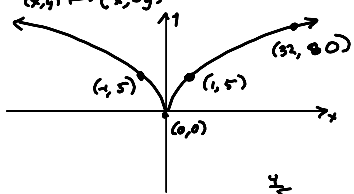
$7x+21 = 7(x+3)$

⓪ $f(x)=x^{\frac{4}{5}}$



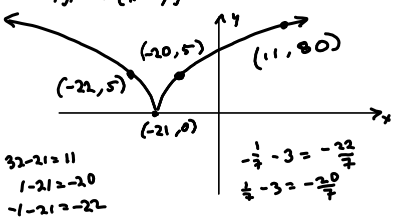

① $5f(x)=5x^{\frac{4}{5}}$

$(x,y)\longmapsto(x,5y)$




② $5f(x+21)=5(x+21)^{\frac{4}{5}}$

$(x,y)\longmapsto(x-21,y)$

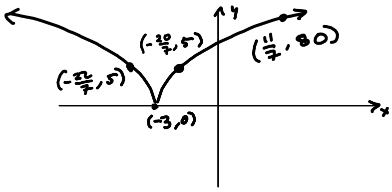



$32-21=11$
$1-21=-20$
$-1-21=-22$

$-\frac{1}{7}-3=-\frac{22}{7}$
$\frac{1}{7}-3=-\frac{20}{7}$

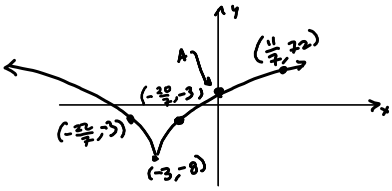
③ $5f(7x+21)=5(7x+21)^{\frac{4}{5}}$

$(x,y)\longmapsto(\frac{1}{7}x,y)$

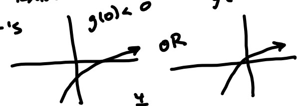



④ $5f(7x+21))-8=5(7x+21))^{\frac{4}{5}}-8=g(x)$

$(x,y)\longmapsto(x,y-8)$




check $g(0)$
to know if
it's



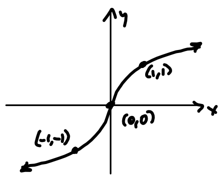

$g(0)=5(7(0)+21)^{\frac{4}{5}}-8$
$=5(21^{\frac{4}{5}})-8$
$\approx 49.11437650 > 0$

$\boxed{A\approx(0,49.11437650)}$

**Method 1**

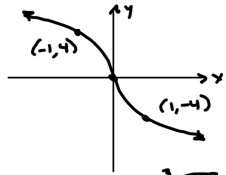
3. (5 pts) $g(x) = -4\sqrt[3]{4x-16}+7$

⓪ $f(x) = \sqrt[3]{x} = x^{\frac{1}{3}}$



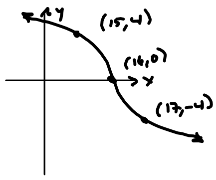

① $-4f(x) = -4\sqrt[3]{x}$

$(x,y) \mapsto (x,-4y)$



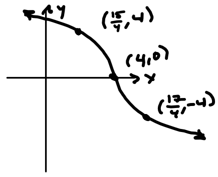

② $-4f(x-16) = -4\sqrt[3]{x-16}$

$(x,y) \mapsto (x+16,y)$



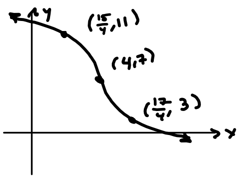

③ $-4\,f(4x-16) = -4\sqrt[3]{4x-16}$

$(x,y) \mapsto (\frac{1}{4}x, y)$




④ $-4\,f(4x-16)+7 = g(x) = -4\sqrt[3]{4x-16}+7$

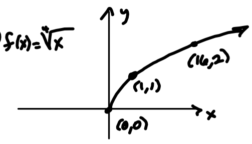
$(x,y) \mapsto (x,y+7)$



**Method 1**

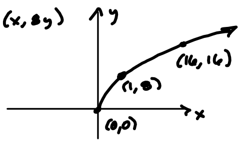
4. (5 pts) $g(x) = 8\sqrt[4]{7x+14} + 11$

⓪ $f(x) = \sqrt[4]{x}$



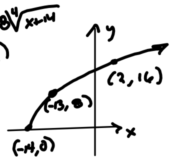

① $8f(x) = 8\sqrt[4]{x}$

$(x,y) \mapsto (x, 8y)$



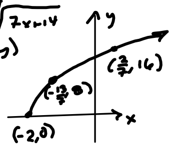

② $8f(x+14) = 8\sqrt[4]{x+14}$

$(x,y) \mapsto (x-14, y)$



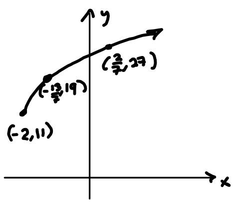

③ $8f(7x+14) = 8\sqrt[4]{7x+14}$

$(x,y) \mapsto (\frac{1}{7}x, y)$




④ $g(x) = 8\sqrt[4]{7x+14} + 11 = 8f(7x+14) + 11$

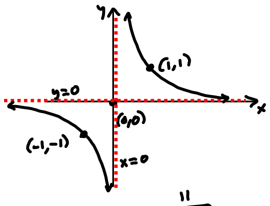
$(x,y) \mapsto (x, y+11)$



**Method 1**

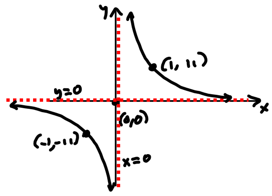
5. (5 pts) $g(x)=\dfrac{11}{(6x-42)^3}+8$

0 $f(x)=\frac{1}{x^3}$



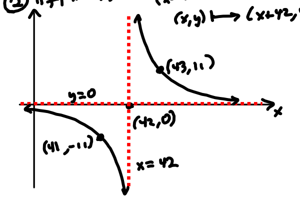

1 $11f(x)=\frac{11}{x^3}$

$(x,y)\mapsto(x,11y)$



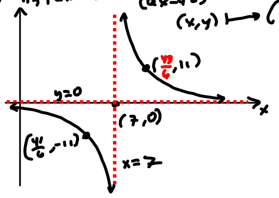

2 $11f(x-42)=\frac{11}{(x-42)^3}$

$(x,y)\mapsto(x+42,y)$



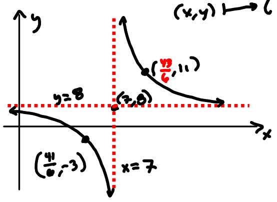

3 $11f(6x-42)=\frac{11}{(6x-42)^3}$

$(x,y)\mapsto(\frac{1}{6}x,y)$




4 $11f(6x-42)+8=\frac{11}{(6x-42)^3}+8$

$(x,y)\mapsto(x,y+8)$

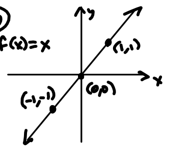


**Method 1**

We treat lines and parabolas a little differently. They come up so often - plus the completing-the-square trick – we sidestep the whole $f(bx)$ issue and just work with $g(x)=a(x-h)^2+k$ and $g(x)=m(x-h)+k=m(x-x_1)+y_1$.

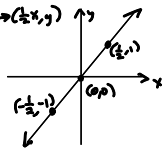
6. (5 pts) $g(x)=2(x-7)+6$

0 $f(x)=x$



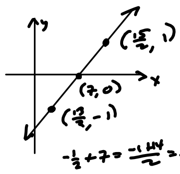

1 $2f(x)=2x$

$(x,y)\longmapsto(\frac{1}{2}x,y)$




2 $2f(x-7)=2(x-7)$

$(x,y)\longmapsto(x+7,y)$

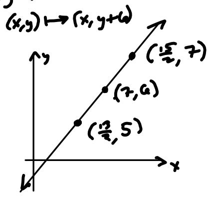



$-\frac{1}{2}+7=\frac{-1+14}{2}=\frac{13}{2}$

$\frac{1}{2}+\frac{14}{2}=\frac{15}{2}$

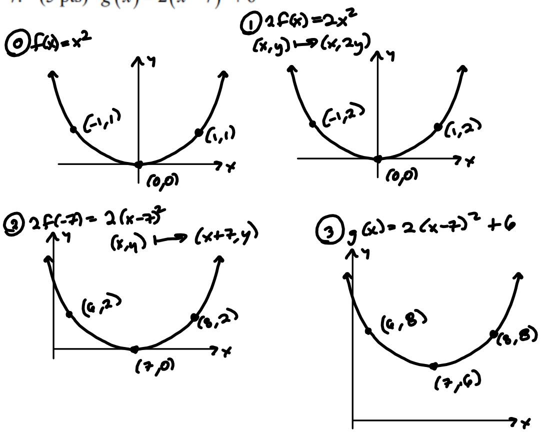
3 $g(x)=2(x-7)+6$

$(x,y)\longmapsto(x,y+6)$



**Method 1**

7. (5 pts) $g(x)=2(x-7)^2+6$

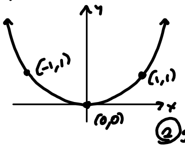


**Method 1**

8. (5 pts) $g(x) = x^2 - 4x - 27 = x^2 - 4x + 2^2 - 27 - 4 = (x-2)^2 - 31$

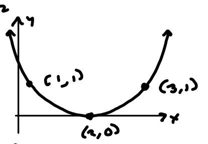
$\frac{4}{2} = 2 \to 2^2 = 4$

0 $f(x) = x^2$

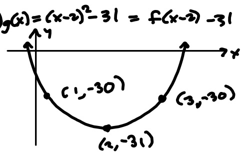



1 $f(x-2) = (x-2)^2$

$x \mapsto x+2$

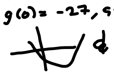



2 $g(x) = (x-2)^2 - 31 = f(x-2) - 31$

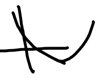



Check

$g(0) = -27$, so



NOT



**Method 1**

9. (5 pts) $g(x) = 2x^2 - 5x + 20$

$= 2(x^2 - \frac{5}{2}x \quad ) + 20$

$\frac{5}{2} \div 2 = \frac{5}{4} \rightarrow (\frac{5}{4})^2 = \frac{25}{16}$

$= \underbrace{2(x^2 - \frac{5}{2}x + (\frac{5}{4})^2)}\ + 20 - 2(\frac{25}{16})$

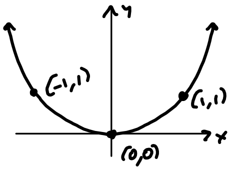
(SCRATCH: $20 - 2(\frac{25}{16}) = 20 - \frac{25}{8} = \frac{160-25}{8} = \frac{135}{8} = 16 + \frac{7}{8}$ )

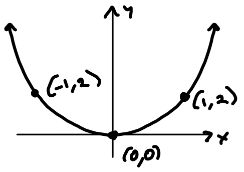
$= 2(x - \frac{5}{4})^2 + \frac{135}{8}$

$= 2(x - \frac{5}{4})^2 + \frac{135}{8}$

① $2f(x) = 2x^2$ $\quad (x,y) \mapsto (x, 2y)$

⓪ $f(x) = x^2$

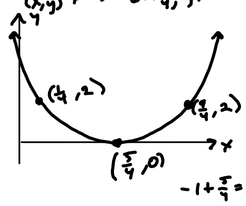


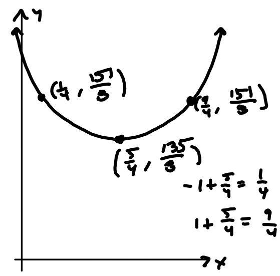

③ $g(x) = 2f(x - \frac{5}{4}) + \frac{135}{8}$

$2 + \frac{135}{8} = \frac{16+135}{8}$
$= \frac{151}{8}$

② $2f(x - \frac{5}{4}) = 2(x - \frac{5}{4})^2$
$(x,y) \mapsto (x + \frac{5}{4}, y)$




$-1 + \frac{5}{4} = \frac{1}{4}$
$1 + \frac{5}{4} = \frac{9}{4}$




$-1 + \frac{5}{4} = \frac{1}{4}$
$1 + \frac{5}{4} = \frac{9}{4}$

**Method 1**

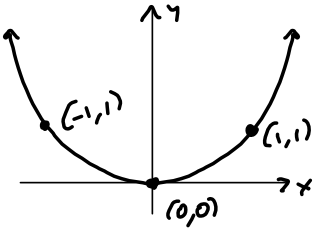
10. (5 pts) $g(x) = 2x^2 - 7x - 20$

$= 2(x^2 - \frac{7}{2}x + (\frac{7}{4})^2) - 20 - 2(\frac{49}{16})$

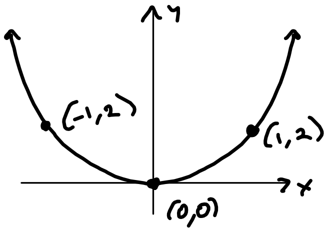
$= 2(x - \frac{7}{4})^2 - \frac{209}{8}$

$-20 - \frac{49}{8} = \frac{-160-49}{8} = \frac{-209}{8}$

0) $f(x) = x^2$

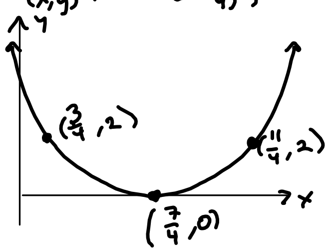



1) $2f(x) = 2x^2$ $\quad (x,y) \mapsto (x, 2y)$




2) $2f(x - \frac{7}{4}) = 2(x - \frac{7}{4})^2$

$(x,y) \mapsto (x + \frac{7}{4}, y)$




$-1 + \frac{7}{4} = \frac{-4+7}{4} = \frac{3}{4}$

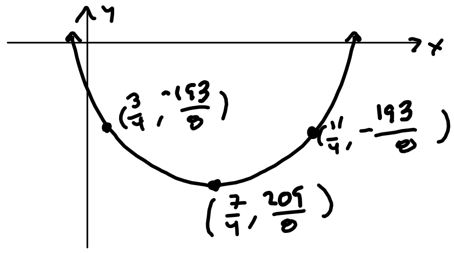
$\frac{4+7}{4} = \frac{11}{4}$

3) $g(x) = 2f(x - \frac{7}{4}) - \frac{209}{8}$

$= 2(x - \frac{7}{4})^2 - \frac{209}{8}$

$2 + \frac{135}{8} = \frac{16+135}{8}$

$= \frac{151}{8}$




$2 - \frac{209}{8} = \frac{16-209}{8} = \frac{-193}{8}$