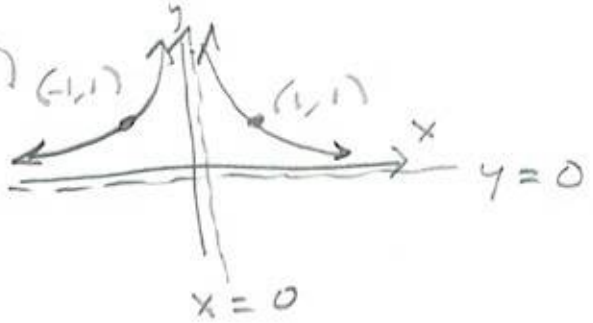
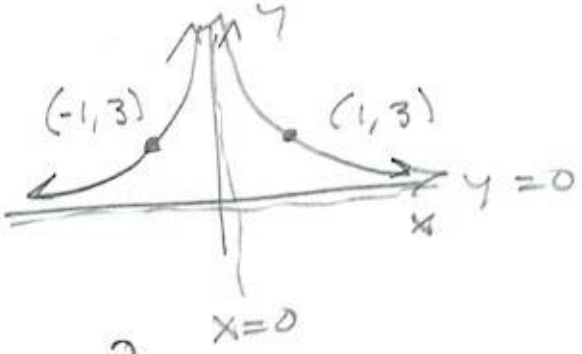
WRITING PROJECT #2 FALL '20

(1) $\frac{3}{(5x-15)^2} - 6 = \frac{3}{(5(x-3))^2} - 6$

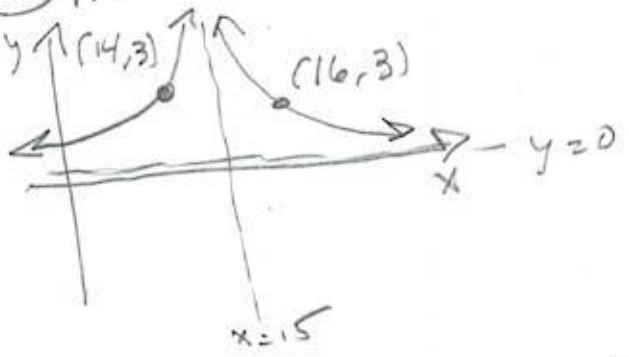
(0) $\frac{1}{x^2} = f(x)$



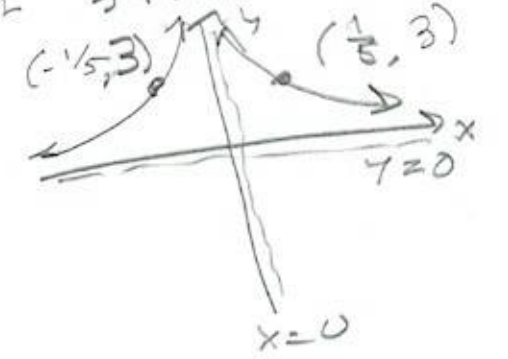
(1) $3f(x) = \frac{3}{x^2}$



(2) m1 $3f(x-15) = \frac{3}{(x-15)^2}$



m2 $3f(5x) = \frac{3}{(5x)^2}$

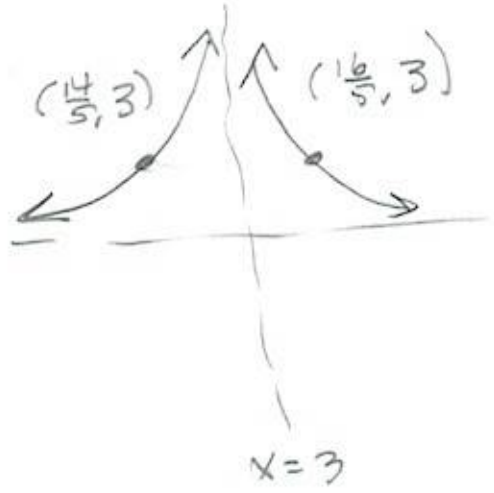


(3) $3f(5x-15) = 3f(5(x-3))$

m1 $x \mapsto \frac{1}{5}x$ m2 $x \mapsto x+3$

m1: $(14,3) \mapsto (\frac{14}{5},3)$ $(-\frac{1}{5},3) \mapsto (\frac{14}{5},0)$

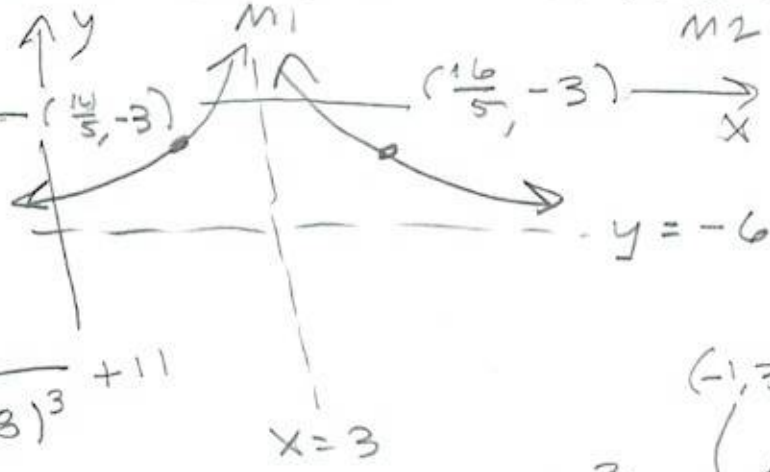
$-\frac{1}{5}+3 = \frac{-1+15}{5} = \frac{14}{5}$



#1 Cntd STEP 4: $3f(5x-15)-6 = 3f(5(x-3))-6$

$y \longmapsto y-6$

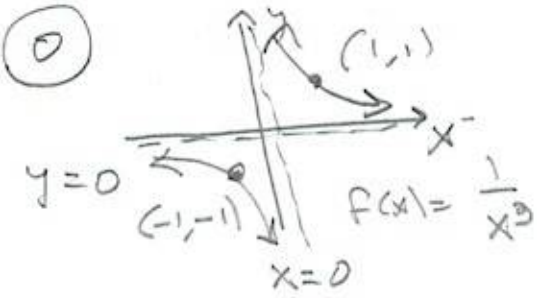
$(\frac{14}{5}, 3) \longmapsto (\frac{14}{5}, -3)$



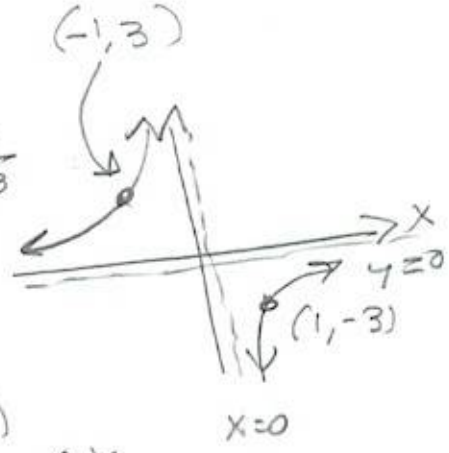
$x = 3$

(2) $g(x) = \dfrac{-3}{(7x-28)^3} + 11$

(0)

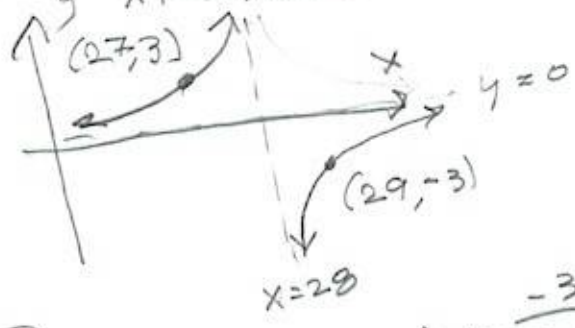


(1) $-3f(x) = \dfrac{-3}{x^3}$



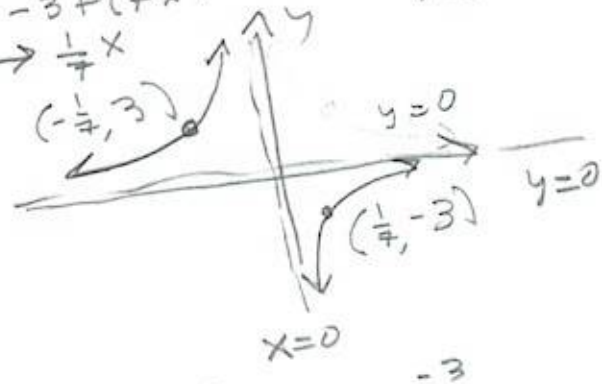
(2) $M1: -3f(x-28)$

$x \longmapsto x+28$



(2) $M2: -3f(7x)$

$x \longmapsto \frac{1}{7}x$



(3) $M1: -3f(7x-28) = \dfrac{-3}{(7x-28)^3}$

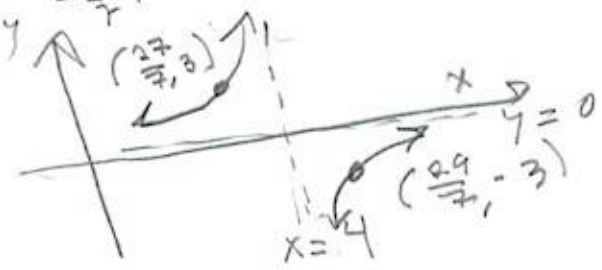
$x \longmapsto \frac{1}{7}x$

$27 \longmapsto \frac{27}{7}$

$M2: -3f(7(x-4)) = \dfrac{-3}{(7(x-4))^3}$

$x \longmapsto x+4$

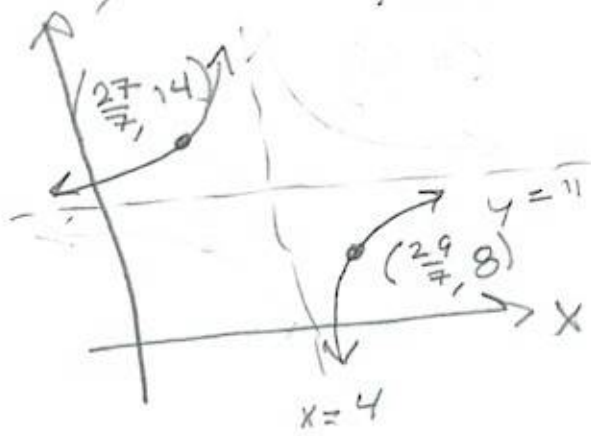
$-\frac{1}{7} + 4 = \frac{-1+28}{7} = \frac{27}{7}$



(4) $g(x) = \dfrac{-3}{(7x-28)^3} + 11$

$= \dfrac{-3}{(7(x-4))^3} + 11$

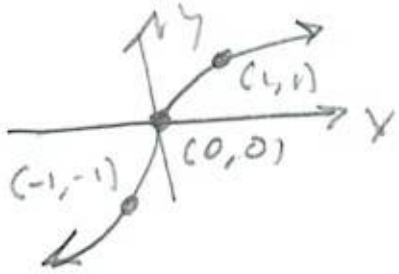
$y \longmapsto y+11$



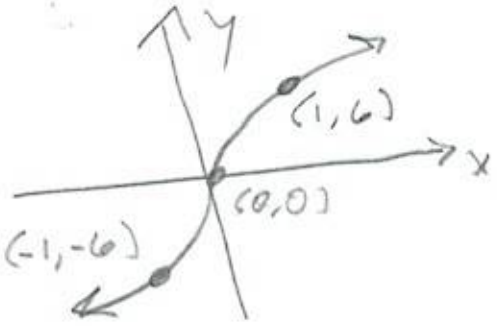
(3) $g(x) = 6(4x+8)^{3/5} - 11 = 6(4(x+2))^{3/5} - 11$

m1 m2

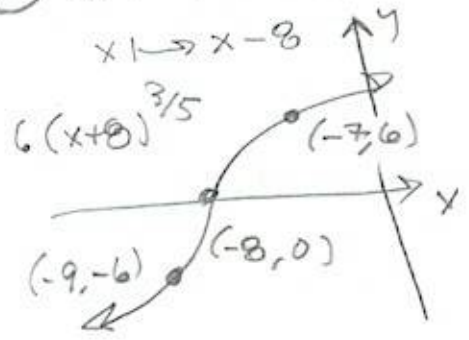
(0) $f(x) = x^{\frac{3}{5}}$



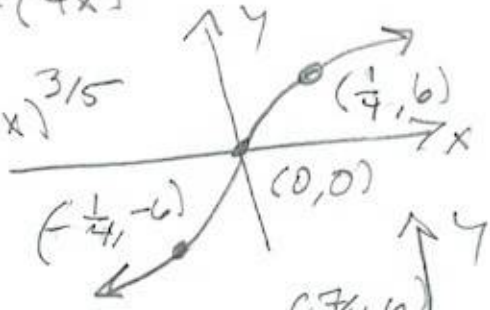
(1) $6f(x)$ = $y \mapsto 6y$



(2) m1 $6f(x+8)$ $x \mapsto x-8$ $6(x+8)^{3/5}$



m2 $6f(4x)$ $x \mapsto \frac{1}{4}x$ $6(4x)^{3/5}$



m1

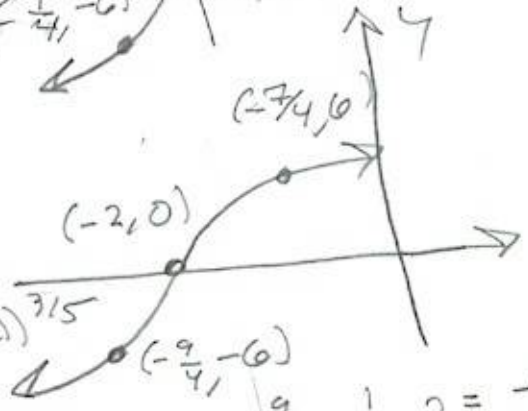
(3) $6f(4x+8) = 6f(4(x+2))$ $x \mapsto x-2$

$x \mapsto \frac{1}{4}x$

$(-9,-6) \mapsto (-\frac{9}{4},-6)$

$(-8,0) \mapsto (-2,0)$

$(-7,6) \mapsto (-\frac{7}{4},6)$

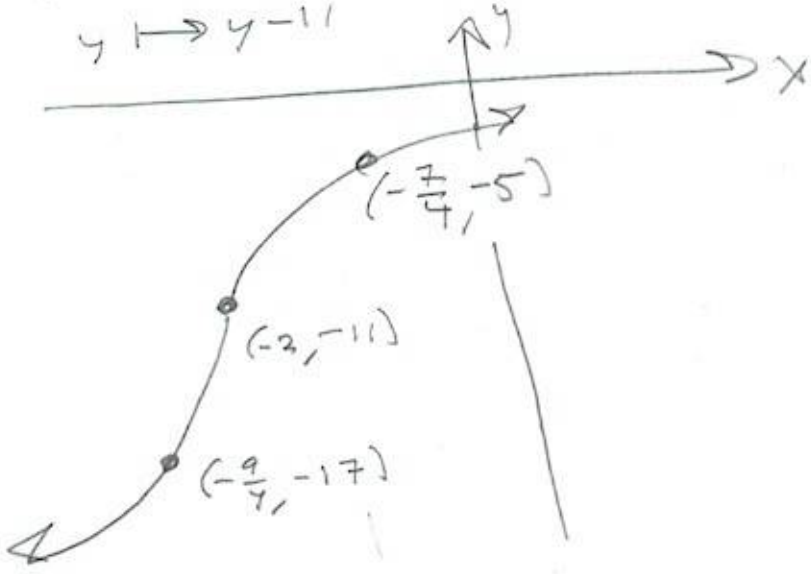


$6(4(x+2))^{3/5}$

$-\frac{1}{4}-2 = -\frac{9}{4}$, $\frac{1}{4}-2 = -\frac{7}{4}$

(4) $g(x) = 6(4x+8)^{3/5} - 11 = 6\left(4(x+2)\right)^{3/5} - 11$

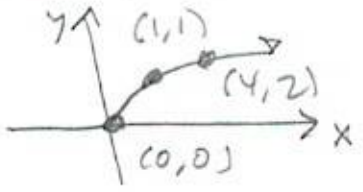
$y \mapsto y-11$



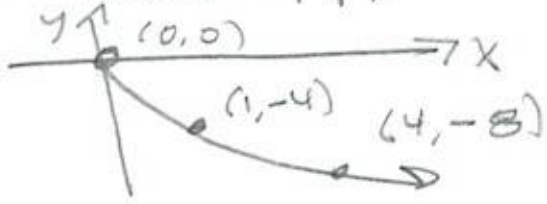
(4)

(4) $g(x) = -4\sqrt{5x+20} - 20 = -4\sqrt{5(x+4)} - 20$

(0) $f(x) = \sqrt{x}$



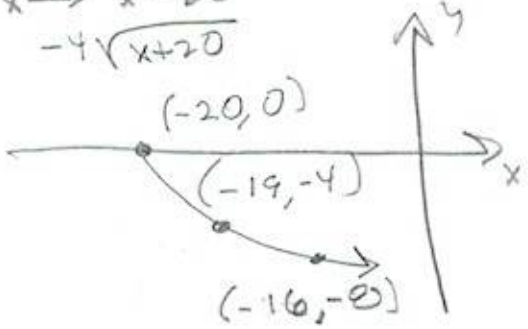
(1) $-4f(x) = -4\sqrt{x}$



(2) M1 $-4f(x+20)$

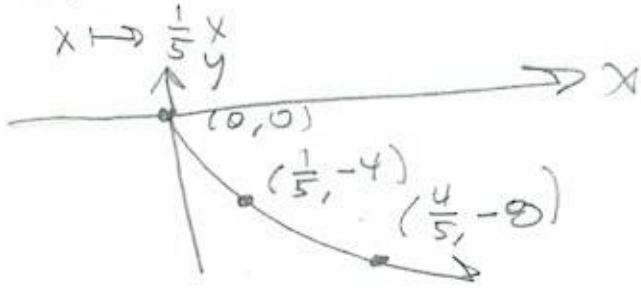
$x \to x-20$

$-4\sqrt{x+20}$



(2) M2 $-4f(5x) = -4\sqrt{5x}$

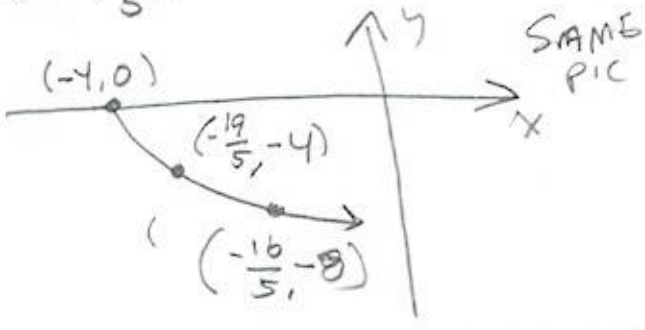
$x \mapsto \frac{1}{5}x$



(3) M1 $-4f(5x+20)$

$x \mapsto \frac{1}{5}x$

$-4\sqrt{5x+20}$



SAME PIC

M2 $-4f(5(x+4)) = -4\sqrt{5(x+4)}$

$x \mapsto x-4$

$(\frac{1}{5}, -4) \mapsto (\frac{1}{5}-4, -4)$

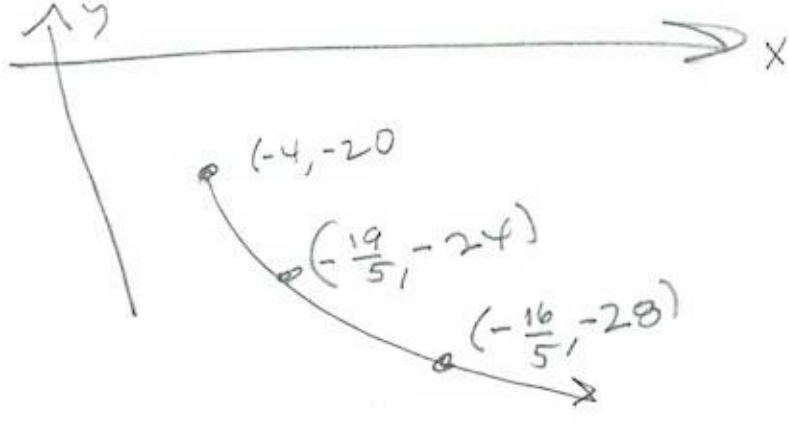
$= (\frac{19}{5}, -4)$

$\frac{1}{5} - 4 = -\frac{16}{5}$

(4) $-4f(5x+20) - 20 = -4f(5(x+4)) - 20$

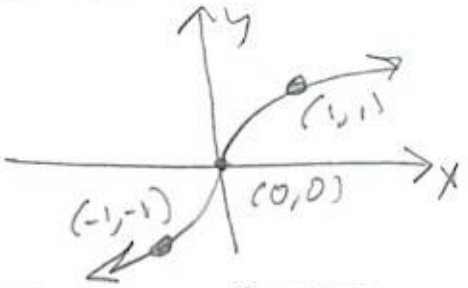
$= -4\sqrt{5x+20} - 20 = -4\sqrt{5(x+4)} - 20$

$y \to y-20$

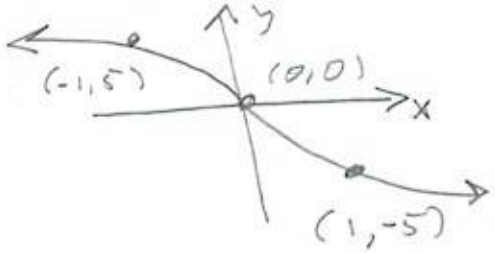


(5) $g(x) = -5\sqrt[3]{3x-12} + 7 = -5\sqrt{3(x-4)} + 7$
M1 M2

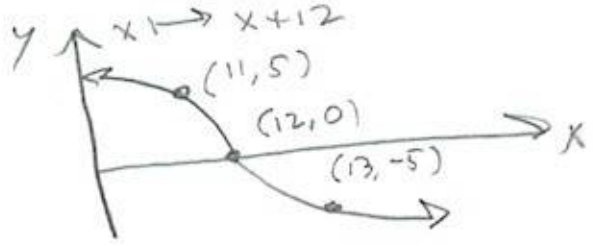
(0) $f(x) = \sqrt[3]{x}$



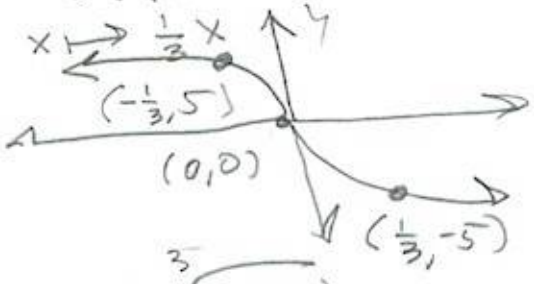
(1) $-5f(x) = -5\sqrt[3]{x}$



(2) M1: $-5\sqrt[3]{x-12}$

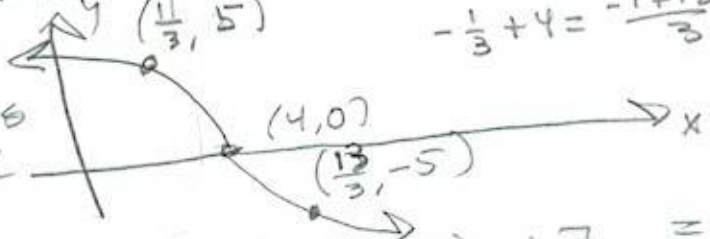


M2: $-5f(3x) = -5\sqrt[3]{3x}$



(3) M1: $-5\sqrt[3]{3x-12}$

x ⟼ ⅓x
11 ⟼ 11/3
SAME PIC

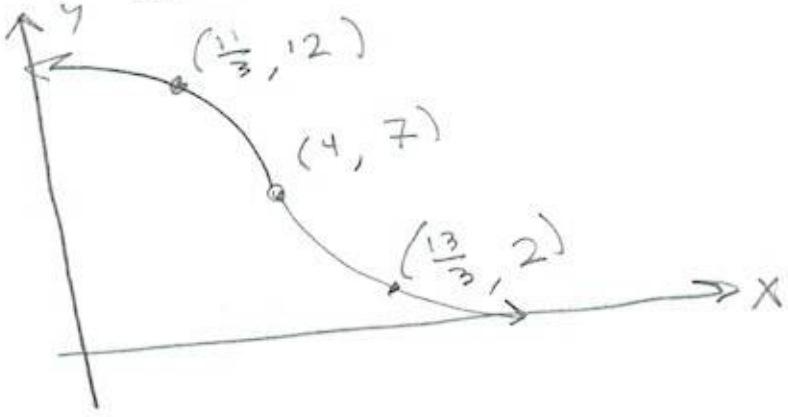


M2: $-5\sqrt[3]{3(x-4)}$

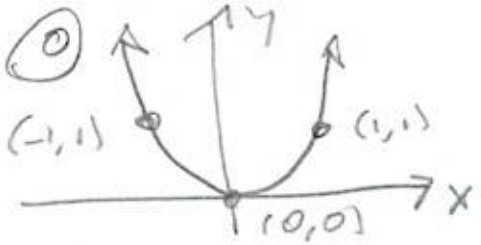
$-\frac{1}{3} + 4 = \frac{-1+12}{3} = \frac{11}{3}$

$= g(x)$

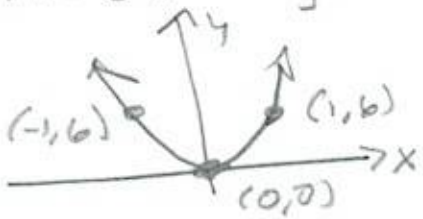
(4) $-5f(3x-12) + 7 = -5f(3(x-4)) + 7$
M1 SAME PIC M2

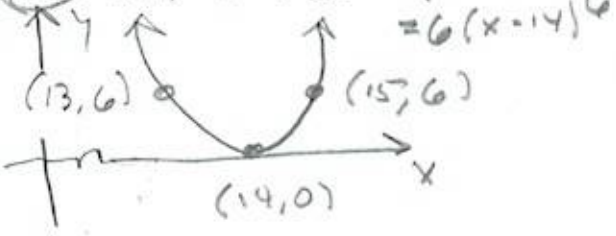


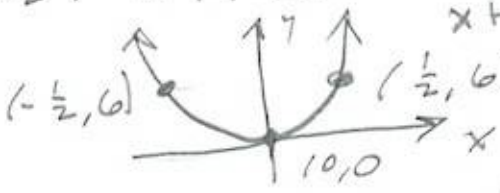
(6) $g(x) = 6(2x-14)^6 + 5 = 6(2(x-7))+5$
M1 M2

(0)


$f(x) = x^6$

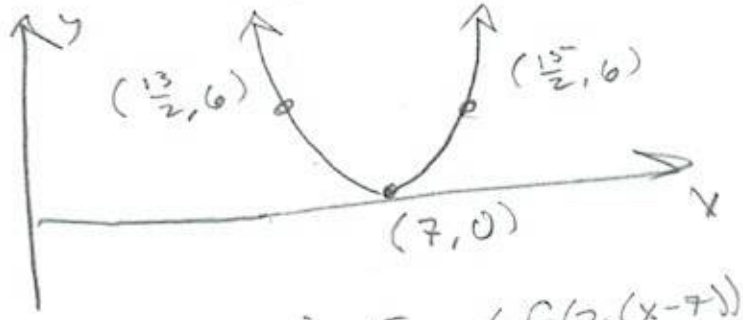
(1) $6f(x) = 6x^6$ $y \mapsto 6y$


(2) M1: $6f(x-14) = 6(x-14)^6$


M2: $6f(2x) = 6(2x)^6$ $x \mapsto \frac{1}{2}x$


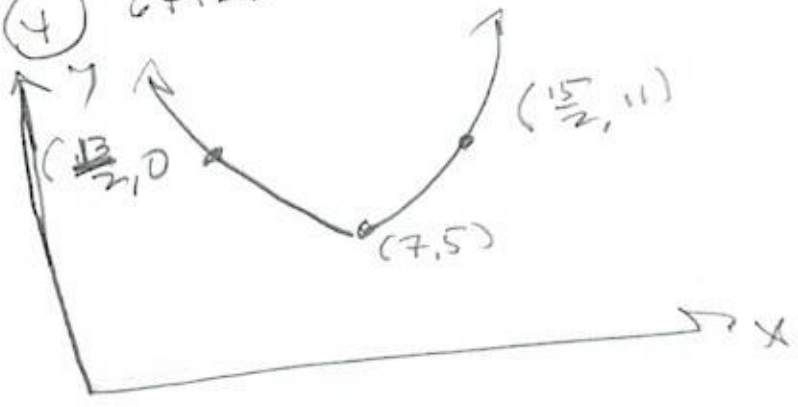
(3) M1: $6f(2x-14)$ $= 6(2x-14)^6$
$x \to \frac{1}{2}x$
$13 \mapsto \frac{13}{2}$, $15 \mapsto \frac{15}{2}$

M2: $6(2(x-7))^6$ $x \mapsto x+7$
SAME PIC
$-\frac{1}{2}+7 = \frac{-1+14}{2} = \frac{13}{2}$
$\frac{1}{2}+7 = \frac{1+14}{2} = \frac{15}{2}$



$y \mapsto y+5$ UP 5

(4) $6f(2x-14)+5 = 6f(2(x-7))+5 = g(x)$



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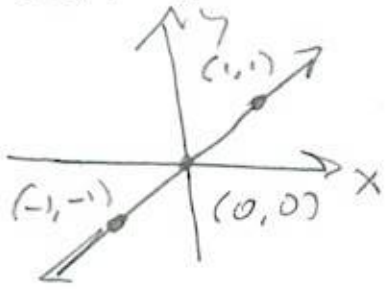
WP #2

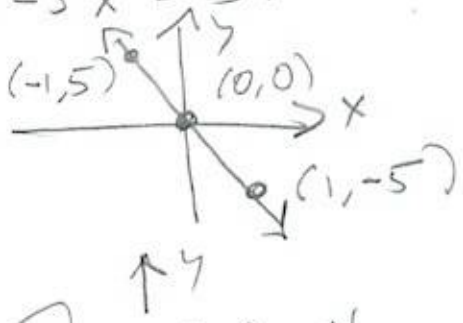
(7) $g(x) = -5(x+3) - 4$

(7)

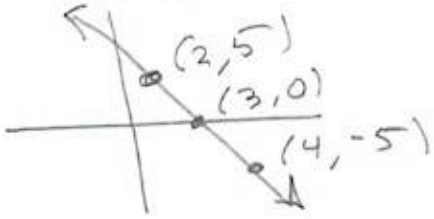
(0) $f(x) = x$



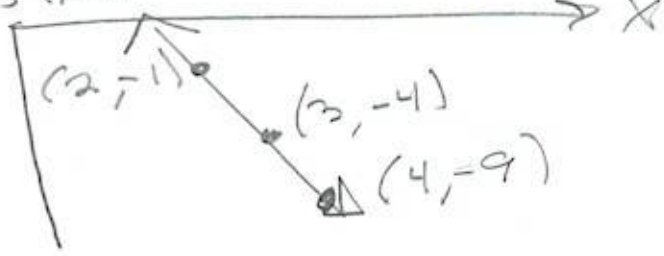
(1) $-5x = -5f(x)$



(2) $-5(x+3)$

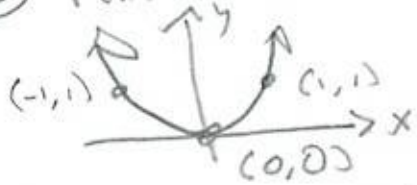


(3) $-5(x+3) - 4$

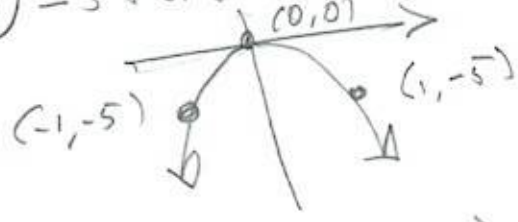


(8) $g(x) = -5(x+3)^2 - 8$

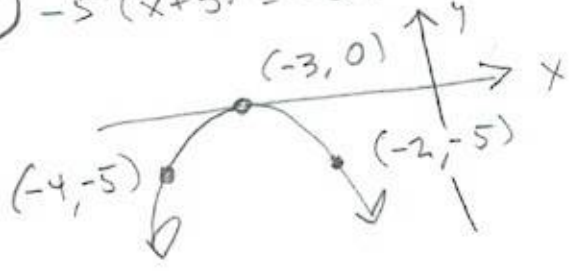
(0) $f(x) = x^2$



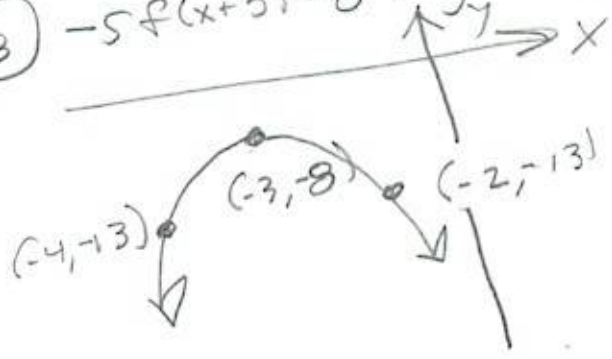
(1) $-5f(x) = -5x^2$



(2) $-5(x+3)^2 = -5f(x+3)$



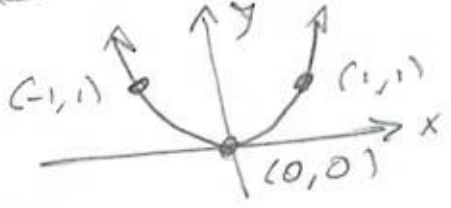
(3) $-5f(x+3) - 8 = g(x)$



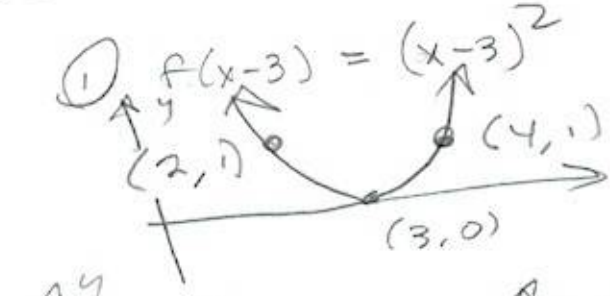
(9) $g(x) = x^2 - 6x - 11 = x^2 - 6x + 3^2 - 9 - 11$

$= (x-3)^2 - 20$

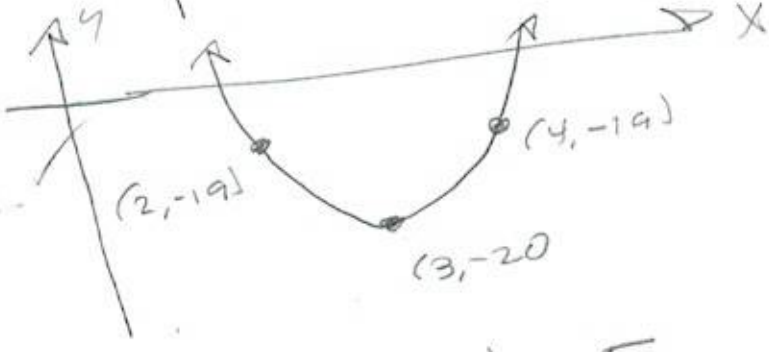
(0) $f(x) = x^2$



(1) $f(x-3) = (x-3)^2$



(2) $f(x-3) - 20$



$22^2 = (2(11))^2$

$= 4(11)^2$

(10) $g(x) = 11x^2 + 7x + 5 = 11\left(x^2 + \frac{7}{11}x\ \right) + 5$

$= 11\left(x^2 + \frac{7}{11}x + \left(\frac{7}{22}\right)^2\right) - 11\left(\frac{49}{4(11)^2}\right) + 5$

$= 11\left(x + \frac{7}{22}\right)^2 - \frac{49}{4(11)} + \frac{5}{1}\cdot\frac{44}{44} =$ $\frac{-49+220}{44}$

$= \frac{171}{44}$

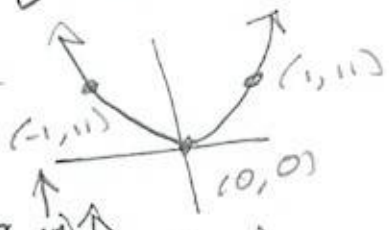
$= 11\left(x + \frac{7}{22}\right)^2 + \frac{171}{44}$

$1 - \frac{7}{22} = \frac{22-7}{22} = \frac{15}{22}$

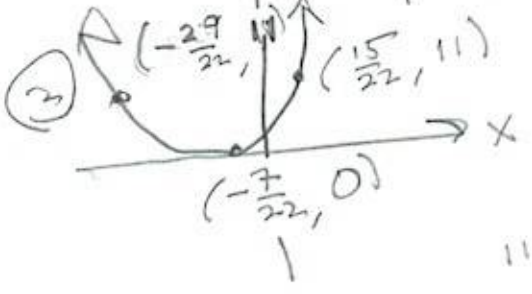
$-1 - \frac{7}{22} = \frac{-22-7}{22} = \frac{-29}{22}$

(0) x^2 ✓ See above

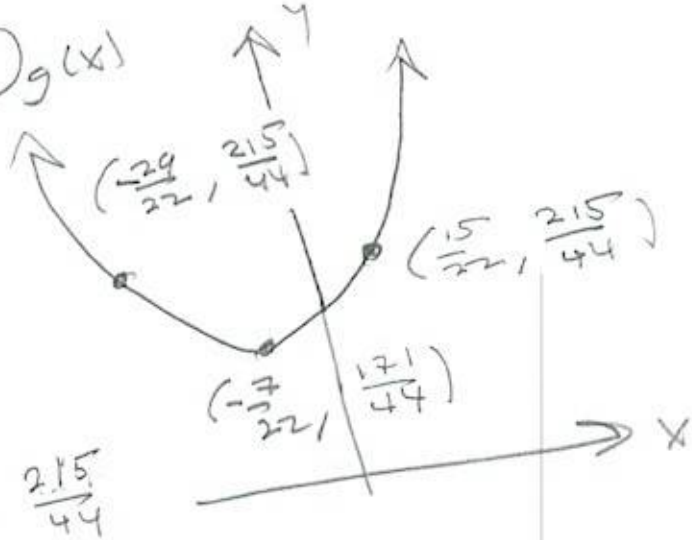
(1) $11x^2$



(2)



(3) $g(x)$



$11 + \frac{171}{44}$

$= \frac{44+171}{44} = \frac{215}{44}$