re- alculus
emester 1 Final Review

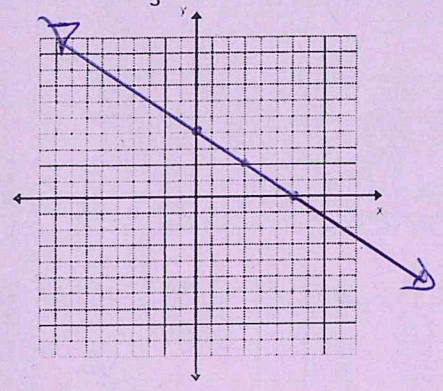
Name:
Date: Key

For each Learning Target, rate yourself. For each problem, show your work.

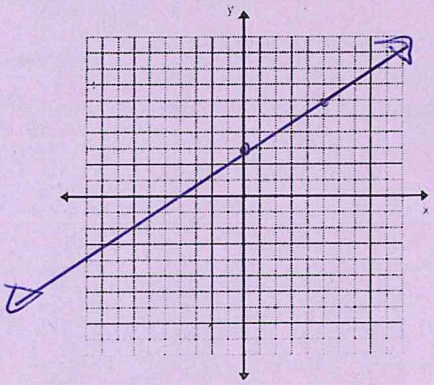
I can do all things linear.	4	3	2	1

Graph the function.

1) $y = -\frac{2}{3}x + 4$



2) $-3x + 5y = 15$ $y = \frac{3}{5}x + 3$



Find the equation described.

3) Find the equation of the line passing through the points (6,8) and (-12, 4).

$m = \frac{8-4}{6+12} = \frac{4}{18} = \frac{2}{9}$

$y - 8 = \frac{2}{9}(x - 6)$

4) Find the equation of the line passing through the point (-3, 5) and parallel to $-5x - 4y = 12$ $+5x$

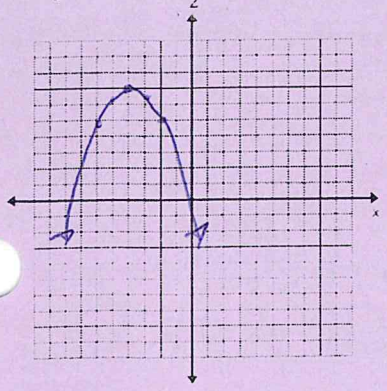
$y = -3 - \frac{5}{4}x$

$y - 5 = -\frac{5}{4}(x + 3)$

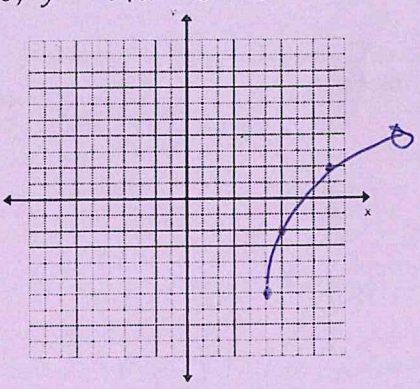
I can graph transformations of parent functions.	4	3	2	1

Graph each function.

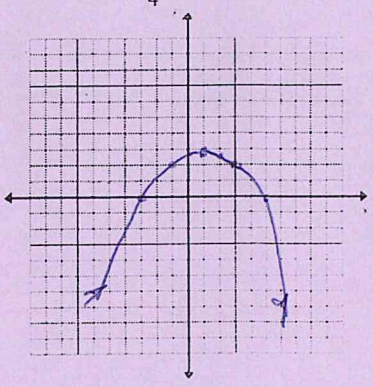
5) $f(x) = -\frac{1}{2}(x + 4)^2 + 7$



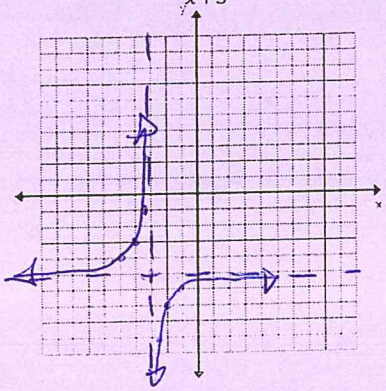
6) $y = 4\sqrt{x - 5} - 6$



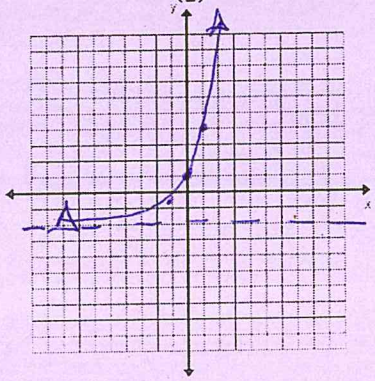
7) $h(x) = \frac{1}{4}(x - 1)^2 + 3$



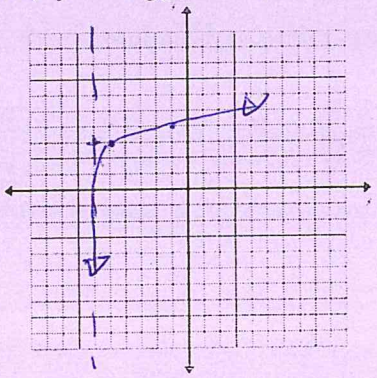
8) $f(x) = -\frac{2}{x+3} - 5$



9) $f(x) = 3\left(\frac{1}{2}\right)^{-x} - 2$



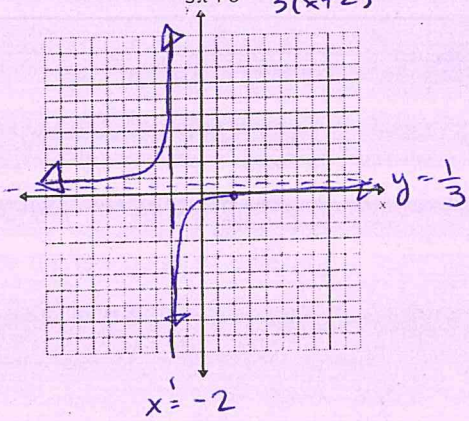
10) $y = \log_5(x+6) + 3$



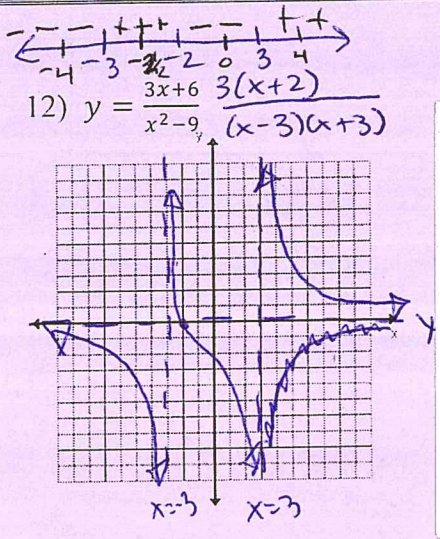
I can graph other functions.	4	3	2	1

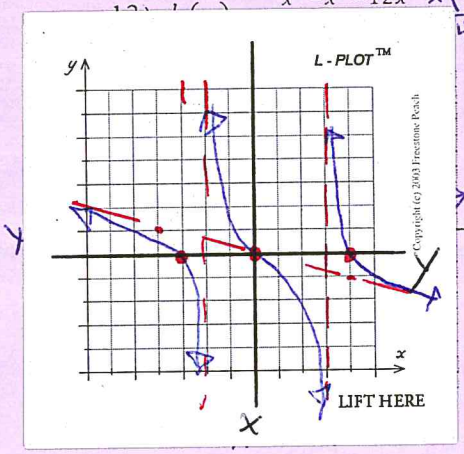
Graph each function.

11) $f(x) = \frac{x-4}{3x+6} = \frac{x-4}{3(x+2)}$



12) $y = \frac{3x+6}{x^2-9} \quad \frac{3(x+2)}{(x-3)(x+3)}$





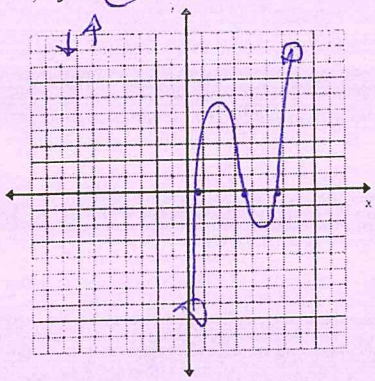
$x^3 - x^2 - 12x \quad x(x-4)(x+3)$

$4(x^2+x+-6)$

$\frac{x(x-4)(x+3)}{-4(x-3)(x+2)}$

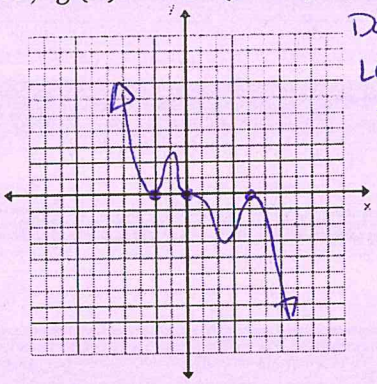
poly division gives slant asy of $y = -\frac{1}{4}x$

14) $y = x^3 - 10x^2 + 28x - 18$

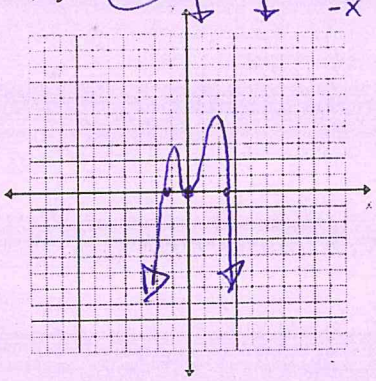


15) $g(x) = -x^3(x+2)^2(x-4)^2$

Deg: 7
LC: -



16) $y = -x^4 + x^3 + 3x^2 \quad -x^2(x^2 - x - 3)$



I can determine domain and range of functions.	4	3	2	1

Find the domain and range of each function.

17) $y = 2\sqrt{x+7} + 4$

$x + 7 \geq 0$

$x \geq -7$

D: $[-7, \infty)$

R: $[+4, \infty)$

18) $y = \frac{3x+8}{x-7}$

$x \neq 7 \quad y \neq 3$

D: $(-\infty, 7) \cup (7, \infty)$

R: $(-\infty, 3) \cup (3, \infty)$

19) $y = -\frac{2}{3}e^{x+1} + 7$

D: $(-\infty, \infty)$

R: $(-\infty, 7]$

I can solve equations.	4	3	2	1

Solve each equation.

20) $2x^2 - 2x - 28 = -x$

$2x^2 - x - 28 = 0$

$(2x+7)(x-4) = 0$

$x = -\frac{7}{2}, 4$

21) $-x + \sqrt{2x-5} = -2$

$(\sqrt{2x-5} = -2+x)^2$

$2x - 5 = 4 - 4x + x^2$

$x^2 - 6x + 9 = 0$

$(x-3)(x-3) = 0$

$x = 3$

22) $81^{-2x-2} = \left(\frac{1}{9}\right)^{3x}$

$3^{4(-2x-2)} = 3^{-2(3x)}$

$-8x - 8 = -6x$

$-8 = 2x$

$x = -4$

23) $3 \cdot 4^{5x-5} - 4 = 89$

$4^{5x-5} = \frac{85}{3}$ $x \approx 1.4824$

$5x - 5 = \frac{\ln(85/3)}{\ln 4}$

$x = \left(\frac{\ln(85/3)}{\ln 4} + 5\right) \div 5$

24) $\log_6 4 - \log_6 5x = \log_6 35$

$\log_6 \frac{4}{5x} = \log_6 35$

$4 = 175x$

$x = \frac{4}{175}$

25) $\ln(x-3) + \ln(x-16) = \ln 48$

$(x-3)(x-16) = 48$

$x^2 - 19x + 48 = 48$

$x(x-19) = 0$

$x = 0, 19$

$x = 19$

26) $\frac{3x-6}{3x} = \frac{3x}{3} + \frac{6x-18}{x} \cdot 3x$

$x - 6 = x^2 + 18x - 54$

$48 = 18x$

$x = \frac{48}{18} = \frac{8}{3}$

27) $1 = \frac{x+1}{x+3} + \frac{1}{x+8}$

$(x+3)(x+8) = (x+1)(x+8) + x+3$

$x^2 + 11x + 24 = x^2 + 9x + 8 + x + 3$

$x = -13$

28) $-9 = -x + \sqrt{11-x}$

$-9 + x = \sqrt{11-x} \rightarrow 81 - 18x + x^2 = 11 - x$

$x^2 - 17x + 70 = 0$

$(x-7)(x-10) = 0$

$x = 7, 10$

I can find and simplify a composition of functions.	4	3	2	1

29) $f(x) = \frac{3x+2}{x-1}$ and $g(x) = \frac{x+2}{x-3}$

Find $g(f(x)) = \frac{\left(\frac{3x+2}{x-1} + 2\right)(x-1)}{\left(\frac{3x+2}{x-1} - 3\right)(x-1)}$

$= \frac{3x+2+2(x-1)}{3x+2-3(x-1)} = \frac{3x+2+2x-2}{3x+2-3x+3}$

$= \frac{5x}{5} = x$

30) $f(x) = \frac{1}{x+1}$; $g(x) = \frac{\sqrt{x-1}}{x}$; and $h(x) = x^2 + 1$

Find $f(g(h(x)))$

$g(h(x)) = \frac{\sqrt{x^2+1-1}}{x^2+1} = \frac{|x|}{x^2+1}$

$f(g(h(x))) = \frac{(1)(x^2+1)}{\left(\frac{|x|}{x^2+1} + 1\right)(x^2+1)} = \frac{x^2+1}{|x|+x^2+1}$

I can use polynomial or synthetic division.	4	3	2	1

31) Is $x - 2$ a factor of $9x^4 - 17x^3 + 7x^2 - 20x + 4$?

2	9	−17	7	−20	4
		18	2	18	−4
	9	1	9	−2	0

yes.

32) Divide. $\frac{4x^3-2x^2-3}{2x^2-1}$

$2x^2 - 1 \overline{)\,4x^3 - 2x^2 + 0x - 3}$ $\quad 2x - 1$

$-4x^3 \quad +2x$

$-2x^2 + 2x - 3$

$+2x^2 \quad +1$

$2x - 4$

$\frac{4x^3-2x^2-3}{2x^2-1} = 2x - 1 + \frac{2x-4}{2x^2-1}$