HW #22 (3.7) 22, 26, 28, 30, 66, 68 (4.1) 8, 14, 20, 22, 28, 36, 38

22) $r(x) = \dfrac{2x-3}{x^2-1}$

vertical asymptotes: $x^2-1=0$

$\boxed{x = 1 \text{ or } -1}$

horizontal asymptotes: $\boxed{y=0}$

b/c degree of denominator is greater than that of the numerator

26) $s(x) = \dfrac{8x^2+1}{4x^2+2x-6}$

vertical asymptotes: $4x^2+2x-6=0$

$2(2x+3)(x-1)=0$

$\boxed{x = -\frac{3}{2} \text{ or } x = 1}$

horizontal asymptote: $\frac{8}{4} = \boxed{y = 2}$

28) $s(x) = \dfrac{(2x-1)(x+3)}{(3x-1)(x-4)}$

vertical asymptotes: $\boxed{x = \frac{1}{3} \text{ or } 4}$

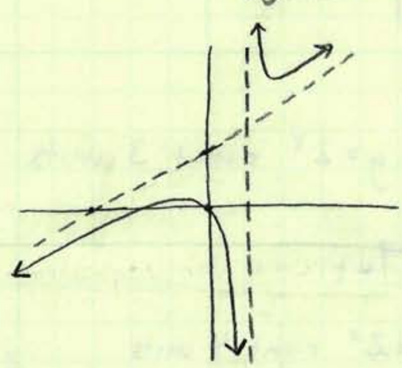
horizontal asymptotes: $\boxed{y = \frac{2}{3}}$

30) $r(x) = \dfrac{5x^3}{x^3+2x^2+5x} = \dfrac{5x^3}{x(x^2+2x+5)}$

vertical asymptote: $\boxed{x=0}$

horizontal asymptote: $\boxed{y=5}$

66) $r(x) = \dfrac{x^2+2x}{x-1} = \dfrac{x(x+2)}{x-1}$



when $x=0$, $y=0$ so graph goes through the origin

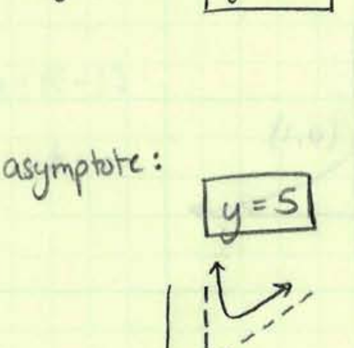
and when $y=0$, $x=0$ or $x=-2$

vertical asymptote: $\boxed{x=1}$

horizontal asymptotes: $\boxed{\text{none}}$

slant asymptote: $\boxed{y=x+3}$ $\Rightarrow$ since long division yields $y = x+3+\frac{2}{x-1}$

68) $r(x) = \dfrac{3x-x^3}{2x-2} = \dfrac{x(3-x^2)}{2(x-1)}$



when $x=0$, $y=0$ so graph goes through the origin

and when $y=0$, $x=0, 3$

vertical asymptote: $\boxed{x=1}$

horizontal asymptote: $\boxed{\text{none}}$

slant asymptote: $\boxed{-\frac{1}{2}x+1=y}$ $\Rightarrow$ since long division yields $y = -\frac{1}{2}x+1+\frac{1}{x-1}$

4.1 8, 14, 20, 22, 28, 36, 38

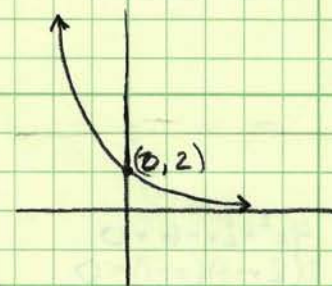
4.1

8) $g(x) = \left(\frac{3}{4}\right)^{2x}$ $g(0.7), g\left(\frac{\sqrt{7}}{2}\right), g\left(\frac{1}{\pi}\right), g\left(\frac{2}{3}\right)$

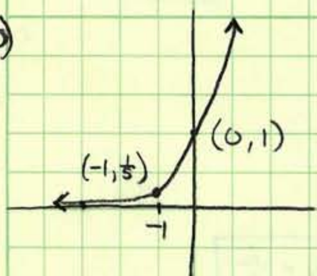
$g(0.7)$	≈ 0.668
$g(\sqrt{7}/2)$	≈ 0.467
$g(1/\pi)$	≈ 0.833
$g(2/3)$	≈ 0.681

14) $h(x) = 2\left(\frac{1}{4}\right)^x$

x	-2	-1	0	1	2	3	4
y	32	8	2	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{32}$	$\frac{1}{128}$



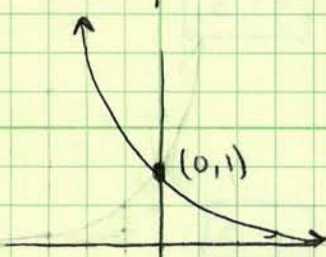
20)



$f(-1) = a^{-1} = \frac{1}{5}$

so, $a = 5$ $\therefore$ $\boxed{f(x) = 5^x}$

22)

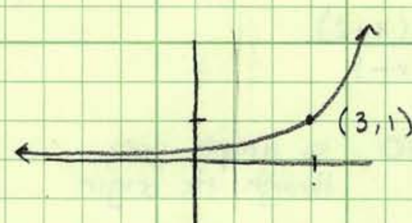


$f(-3) = a^{-3} = 8$

$a = \frac{1}{2}$ so, $\boxed{f(x) = \left(\frac{1}{2}\right)^x}$

28) $g(x) = 2^{x-3}$

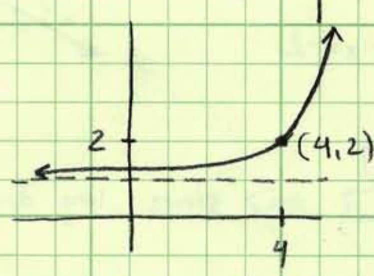
shift $y = 2^x$ right 3 units



Domain: $(-\infty, \infty)$
Range: $(0, \infty)$
asymptote: $y = 0$

36) $h(x) = 2^{x-4} + 1$

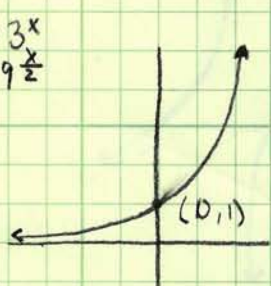
shift $y = 2^x$ right 4 units and upward 1 unit



Domain: $(-\infty, \infty)$
Range: $(1, \infty)$
asymptote: $y = 1$

38) $g(x) = 3^x$

a) $f(x) = 9^{\frac{x}{2}}$



b) $f(x) = 9^{\frac{x}{2}} = (3^2)^{\frac{x}{2}} = 3^x = g(x)$

so, graphs are the same

$\boxed{f(x) = g(x)}$