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18. zeros: $x=6$ $x=3$ $x=3i$ $\boxed{x=-3i}$

Factors: $(x-6)(x-3)(x-3i)(x+3i)$

$(x-6)(x-3)(x^2-3xi+3xi-9i^2)$ $\uparrow(-1)$

$f(x)=\boxed{(x-6)(x-3)(x^2+9)}$

19. ~~X~~ extra

zeros: $x=4$, $x=6-i$ $x=6+i$

factors: $(x-4)(x-(6-i))(x-(6+i))$

$(x-4)((x-6)+i)((x-6)-i)$

~~$f(x)=[(x-4)(x^2-x(6-i)-x(6-i)+(36+1)]$~~

~~$f(x)=[(x-4)(x^2-2x(6-i)+37]$~~

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

$\boxed{f(x)=(x-4)((x-6)^2+1)}$

20. $f(x)=\dfrac{3x^2}{x^2-2x-3} \Rightarrow \dfrac{3x^2}{(x-3)(x+1)}$

D: $\mathbb{R}, x\neq 3,-1$

holes: NONE

V.A.: $x=3, x=-1$

H.A: $y=\frac{3}{1}=3$

21. $f(x)=\dfrac{x+2}{(x+2)(x+2)} \Rightarrow$

D: $\mathbb{R}, x\neq -2$

holes: $x=-2$

V.A: ~~NONE~~

H.A.: $y=0$

22. $\dfrac{3x^2-2x-1}{x+3} \rightarrow 3x^2-3x+1x-1$

$3x(x-1)+1(x-1)$

$\Rightarrow \dfrac{(3x+1)(x-1)}{(x+3)}$

D: $\mathbb{R}, x\neq -3$

holes: NONE

V.A. $x=-3$

H.A. NONE

Slant:

$$\begin{array}{r|l} & 3x-11 \\ x+3 & 3x^2-2x-1 \\ & -3x^2-9x \downarrow \\ \hline & -11x-1 \end{array}$$

SLANT: $y=3x-11$

23. $y=\dfrac{2x^2+x}{x+1}$

D: $\mathbb{R}, x\neq -1$

holes: NONE

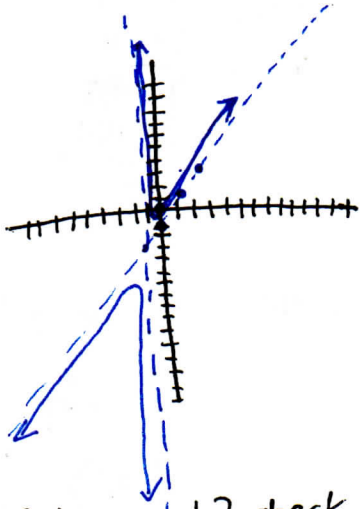
V.A. $x=-1$

H.A: NONE

$\Rightarrow y=\dfrac{x(2x+1)}{x+1}$

SLANT: $y=2x-1$

$$\begin{array}{r|l} & 2x-1 \\ x+1 & 2x^2+x+0 \\ & -2x^2-2x \downarrow \\ \hline & -x+0 \end{array}$$



Where is the graph? check w/ calculator or intercepts.

x-int: $0=2x^2+x$

$0=x(2x+1)$

$x=0$ $x=-\frac{1}{2}$

y-int: $y=\dfrac{2(0)^2+(0)}{(0)+1}=\dfrac{0}{1}=0$

$y=0$