9.2/ 13. $(ab^2)^x + \left(\frac{a}{b}\right)^{-x}$, first write as exponents:

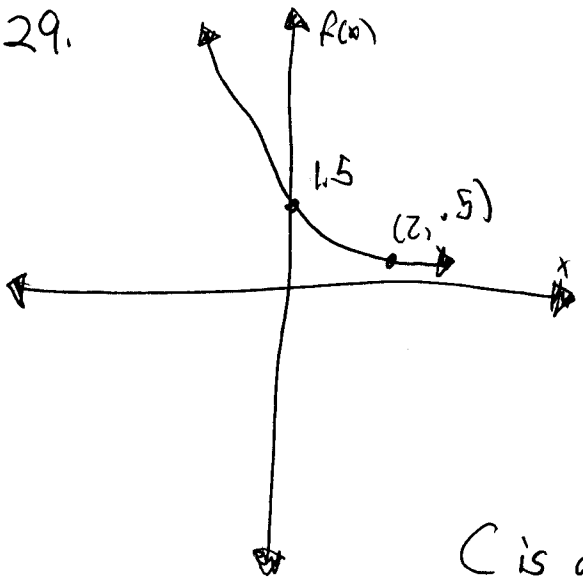
$= (ab^2)^x + (ab^{-1})^{-x}$, distribute exponents over mult.

$= a^x b^{2x} + a^{-x} b^x$, rewrite with positive exponents

$= \boxed{a^x b^{2x} + \frac{b^x}{a^x}}$

18. $\sqrt{\frac{a^{2x}}{b^{-2x}}} = \sqrt{a^{2x} b^{2x}} = a^x b^x = (ab)^x$, so it's **True**

29.



First we note this has been flipped across y axis $\Rightarrow$ x has been replaced with $-x$

We also have points $(0, 1.5)$ and $(2, .5)$

So plugging them into $f(x) = Ca^{-x} + D$

Gives: $1.5 = C + D$

and $.5 = C \cdot \frac{1}{a^2} + D$

C is greater than 0 because otherwise the graph would be upside down. Since the function goes to 0 as $x \to \infty$, we know it hasn't been shifted up or down, so $D = 0$.

So now $1.5 = C + D \Rightarrow C = 1.5$, and the next equation says $.5 = 1.5\left(\frac{1}{a^2}\right) \Rightarrow a^2 = \frac{1.5}{.5} = 3 \Rightarrow a = \sqrt{3}$

So $\boxed{f(x) = 1.5\,(\sqrt{3})^{-x}}$ or $\boxed{f(x) = 1.5\left(\frac{1}{\sqrt{3}}\right)^x}$

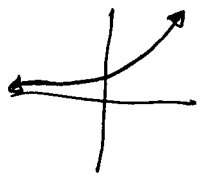
30. a) $(a^2+b^2)^{1/2} \stackrel{?}{=} a+b$. **NO** $a=1, b=1 \Rightarrow (1+1)^{1/2} \stackrel{?}{=} 1+1$, $\sqrt{2} \neq 2$

b) $(a+b)^{-1} = \frac{1}{a+b}$ $a, b \neq 0$ **True** Incidentally, a should not equal $-b$ either.

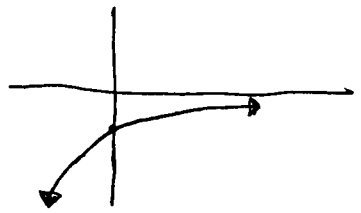
c) $(a+b)^{-1} \stackrel{?}{=} \frac{1}{a} + \frac{1}{b}$ **NO** $a=1, b=1 \Rightarrow (1+1)^{-1} \stackrel{?}{=} \frac{1}{1} + \frac{1}{1}$, $\frac{1}{2} \neq 2$

d) $R^{-\frac{1}{2}} \stackrel{?}{=} \frac{-1}{\sqrt{R}}$ $R > 0$ **NO** $R = 1 \Rightarrow 1^{-1/2} \stackrel{?}{=} \frac{-1}{1}$, $1 \neq -1$

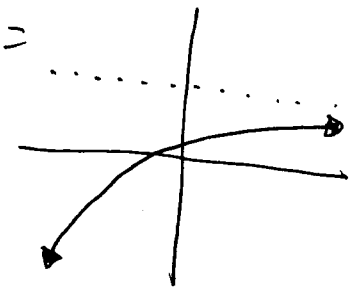
31. a) $f(x) = 3\left(\frac{3}{2}\right)^x$, matches w/ [i] =



b) $f(x) = -2(.4)^x$, matches w/ [ii] =

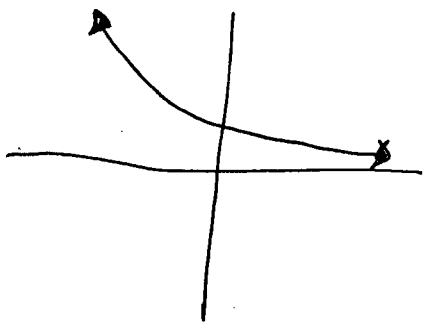


c) $f(x) = 2 - 3^{-x}$, matches w/ [vi] =

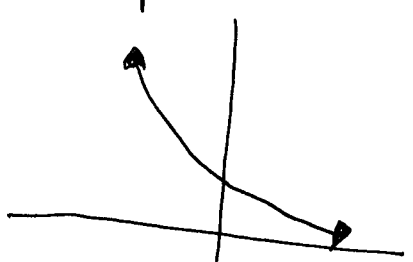


d) $f(x) = 4\left(\frac{2}{3}\right)^x$, matches w/ [iii]

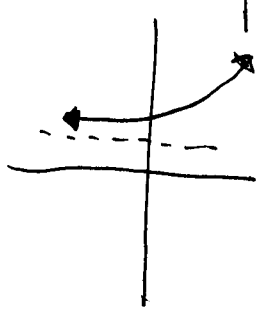
=



e) $f(x) = 4^{-x}$, matches w/ [iii]



f) $f(x) = 1 + 2^x$, matches w/ [v]



32. a) $\dfrac{x^{2y}+x^{y+2}}{x^y} = \dfrac{x^{2y}}{x^y} + \dfrac{x^{y+2}}{x^y} = \boxed{x^y + x^2}$

b) $\dfrac{\dfrac{\sqrt{x}}{x^{-1/2}y} - 1}{y - \dfrac{x^2}{y}} = \dfrac{x^{1/2}\cdot x^{1/2}\cdot y^{-1} - 1}{y - x^2y^{-1}} = \dfrac{xy^{-1}-1}{y-x^2y^{-1}} \cdot \dfrac{y}{y} = \boxed{\dfrac{x-y}{y^2-x^2}}$

c) $\dfrac{A^{B+4} - A^{3B}}{A^B(A^2 - A^B)} = \dfrac{A^B(A^4 - A^{2B})}{A^B(A^2 - A^B)} = \dfrac{A^4 - A^{2B}}{A^2 - A^B} = \dfrac{(A^2 + A^B)(A^2 - A^B)}{A^2 - A^B} = \boxed{A^2 + A^B}$