a)

Using the chain rule,

$$\frac{d}{dx}\left(x^{x^x}\right) = u^v \frac{dv}{dx}\left(\frac{v \frac{du}{dv}}{u} + \log(u)\right) + u^v \frac{du}{dx}\left(\frac{v}{u} + \frac{dv}{du}\log(u)\right)$$

, where $u = x$, $v = x^x$ and $\frac{du^v}{du} = v\,u^{v-1}$, $\frac{du^v}{dv} = u^v \log(u)$:

$$x^{x^x+x-1}\left(\frac{d}{dx}(x)\right) + x^{x^x}\log(x)\left(\frac{d}{dx}(x^x)\right)$$

The derivative of x is 1:

$$x^{x^x}\log(x)\left(\frac{d}{dx}(x^x)\right) + 1\,x^{x^x+x-1}$$

Using the chain rule,

$$\frac{d}{dx}(x^x) = u^v \frac{dv}{dx}\left(\frac{v \frac{du}{dv}}{u} + \log(u)\right) + u^v \frac{du}{dx}\left(\frac{v}{u} + \frac{dv}{du}\log(u)\right)$$

, where $u = x$, $v = x$ and $\frac{du^v}{du} = v\,u^{v-1}$, $\frac{du^v}{dv} = u^v \log(u)$:

$$x^{x^x}\log(x)\left(x^x\left(\frac{d}{dx}(x)\right) + x^x\log(x)\left(\frac{d}{dx}(x)\right)\right) + x^{x^x+x-1}$$

The derivative of x is 1:

$$x^{x^x}\log(x)\left(x^x\log(x)\left(\frac{d}{dx}(x)\right) + 1\,x^x\right) + x^{x^x+x-1}$$

The derivative of x is 1:

$$x^{x^x+x-1} + x^{x^x}\log(x)\left(x^x + x^x\log(x)\right)$$

b)

Using the chain rule,

$$\frac{d}{dx}((x^x)^x) = u^v \frac{dv}{dx}\left(\frac{v \frac{du}{dv}}{u} + \log(u)\right) + u^v \frac{du}{dx}\left(\frac{v}{u} + \frac{dv}{du}\log(u)\right)$$

, where $u = x^x$, $v = x$ and $\frac{du^v}{du} = v\,u^{v-1}$, $\frac{du^v}{dv} = u^v \log(u)$:

$$x\,(x^x)^{x-1}\left(\frac{d}{dx}(x^x)\right) + (x^x)^x \log(x^x)\left(\frac{d}{dx}(x)\right)$$

Using the chain rule,

$$\frac{d}{dx}(x^x) = u^v \frac{dv}{dx}\left(\frac{v \frac{du}{dv}}{u} + \log(u)\right) + u^v \frac{du}{dx}\left(\frac{v}{u} + \frac{dv}{du}\log(u)\right)$$

, where $u = x$, $v = x$ and $\frac{du^v}{du} = v\,u^{v-1}$, $\frac{du^v}{dv} = u^v \log(u)$:

$$x\,(x^x)^{x-1}\left(x^x\left(\frac{d}{dx}(x)\right) + x^x \log(x)\left(\frac{d}{dx}(x)\right)\right) + (x^x)^x \log(x^x)\left(\frac{d}{dx}(x)\right)$$

The derivative of x is 1:

$$x\,(x^x)^{x-1}\left(x^x \log(x)\left(\frac{d}{dx}(x)\right) + 1\,x^x\right) + (x^x)^x \log(x^x)\left(\frac{d}{dx}(x)\right)$$

The derivative of x is 1:

$$(x^x)^x \log(x^x)\left(\frac{d}{dx}(x)\right) + x\,(x^x)^{x-1}\,(x^x + x^x \log(x))$$

The derivative of x is 1:

$$x\,(x^x)^{x-1}\,(x^x + x^x \log(x)) + (x^x)^x \log(x^x)$$

c) like b. (1+t^2)^(-1+tan^(-1)(t)) (2 t tan^(-1)(t)+log(1+t^2)) you can get it in the same way

d)

Using the chain rule, $\frac{d}{dy}(\log(y\log(y))) = \frac{\frac{du}{dy}}{u}$, where $u = y\log(y)$ and $\frac{d\log(u)}{du} = \frac{1}{u}$:

$$\frac{\frac{d}{dy}(y\log(y))}{y\log(y)}$$

Use the product rule, $\frac{d}{dy}(u\,v) = v\frac{du}{dy} + u\frac{dv}{dy}$, where $u = y$ and $v = \log(y)$:

$$\frac{\log(y)\left(\frac{d}{dy}(y)\right) + y\left(\frac{d}{dy}(\log(y))\right)}{y\log(y)}$$

The derivative of $\log(y)$ is $\frac{1}{y}$:

$$\frac{\log(y)\left(\frac{d}{dy}(y)\right) + y\,\frac{1}{y}}{y\log(y)}$$

The derivative of y is 1:

$$\frac{1\log(y) + 1}{y\log(y)}$$