Problem: Calculate $\dfrac{d}{dx}\left(x^{\arcsin x}\right)$.

The simplest way is to use logarithmic differentiation. Let

$$y = x^{\arcsin x}, \tag{1}$$

so that

$$\ln y = \ln x^{\arcsin x} = (\arcsin x)(\ln x). \tag{2}$$

We wish to find $\frac{dx}{dy}$. Differentiating both sides of (2) with respect to x yields

$$\frac{d}{dx}\big[\ln y\big] = \frac{d}{dx}\big[(\arcsin x)(\ln x)\big]. \tag{3}$$

Applying the Chain Rule to the left side of (3) and the Product Rule to the right side, we obtain

$$\frac{1}{y}\frac{dy}{dx} = (\arcsin x)\cdot\frac{1}{x} + \frac{1}{\sqrt{1-x^2}}\cdot\ln x,$$

that is,

$$\frac{dy}{dx} = y\left(\frac{\arcsin x}{x} + \frac{\ln x}{\sqrt{1-x^2}}\right). \tag{4}$$

Finally, we can substitute (1) into (4) to obtain the final answer:

$$\boxed{\frac{dy}{dx} = x^{\arcsin x}\left(\frac{\arcsin x}{x} + \frac{\ln x}{\sqrt{1-x^2}}\right).}$$