Find the interval of convergence of the following power series:

$$1. \sum_{n=0}^{\infty} \left(\frac{x}{10}\right)^n$$

$$2. \sum_{n=0}^{\infty} \frac{nx^n}{n!}$$

3.
$$\sum_{n=1}^{\infty} \frac{(x-2)^n}{2^n}$$

4.
$$\sum_{n=1}^{\infty} \frac{n! x^n}{(2n)!}$$

5.
$$\sum_{n=1}^{\infty} \frac{(-1)^n x^{2n+1}}{2n+1}$$

$$6. \sum_{n=1}^{\infty} n! x^n$$

Find the power series around the specified center for the following functions

1.
$$\frac{1}{1-2x}$$
, center $c = 0$

2.
$$\frac{1}{1+x^2}$$
, center $c = 0$

3.
$$\frac{1}{(1-x)^2}$$
, center $c = 0$

4.
$$\frac{2x}{(1-x^2)^2}$$
, center $c = 0$

5.
$$\arctan(x)$$
, center $c = 0$

6.
$$\frac{1}{x}$$
, center $c=1$

Find the Taylor series for the following functions, complete with radius of convergence, centered at the origin.

1.
$$e^x$$

2.
$$e^{x^2}$$

3.
$$x\sin(x)$$

$$4. \ x^2 \cos(x^3)$$

5.
$$e^x sin(x)$$
 (first three terms only)

6.
$$tan(x)$$
 (first three terms only)

7.
$$\int cos(t^2)dt$$

8.
$$\int e^{x^2} dx$$

9.
$$\int xe^{x^2}dx$$