

# MAT 137 (Calculus II) Prof. Swift

Quiz 7, Power Series

Name: hey

For this quiz, you *may* work with other people. You may *not* consult your notes or the internet. You may leave the class after you turn in your quiz.

Recall that every power series centered at 0 has a radius of convergence  $R$ , such that the power series converges absolutely if  $|x| < R$  and the power series diverges if  $|x| > R$ .

Suppose a power series centered at 0 converges at  $x = 3$  and diverges at  $x = -5$ .

$R \geq 3$

$R \leq 5$

So  $R$  is between 3 and 5.

1. Does this power series converge at  $x = 1$ ?  Yes,  No,  Maybe (circle one.)

2. Does this power series converge at  $x = 4$ ?  Yes,  No,  Maybe (circle one.)

3. Does this power series converge at  $x = 6$ ?  Yes,  No,  Maybe (circle one.)

P.S.  $\left\{ \begin{array}{l} \text{converges if } |x| < 3 \\ \text{diverges if } |x| > 5 \end{array} \right.$

4. Find the first 4 terms in the power series representation of  $f(x) = \frac{2}{1+3x}$ . You do not need to simplify your answer. Write a complete sentence for full credit.

each of these are OK - full credit

$$\begin{aligned} f(x) &= 2 \frac{1}{1-(-3x)} = 2 \left( 1 + (-3x) + (-3x)^2 + (-3x)^3 + \dots \right) \\ &= 2(1 - 3x + 9x^2 - 27x^3 + \dots) = 2 - 6x + 18x^2 - 54x^3 + \dots \end{aligned}$$