 Name________________________

Power Series

Date________________ Period____

Use the fifth partial sum of the exponential series to approximate each value. Round your answer to the nearest thousandth.

1) $e^{0.4}$

2) $e^{-0.5}$

Use the fifth partial sum of the power series for sine or cosine to approximate each value. Round your answer to the nearest thousandth.

3) $\sin \frac{5\pi}{7}$

4) $\sin \frac{7\pi}{12}$

Use $\sum_{n=0}^{\infty} x^n = \frac{1}{1-x}$ to find a power series representation of $g(x)$. Indicate the interval in which the series converges.

5) $g(x) = \frac{3}{1 - x^2}$

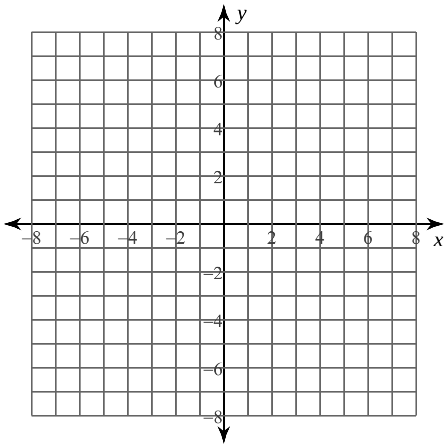
6) $g(x) = \frac{4}{3 + 2x^2}$

7) $g(x) = \frac{1}{1 - x^2}$

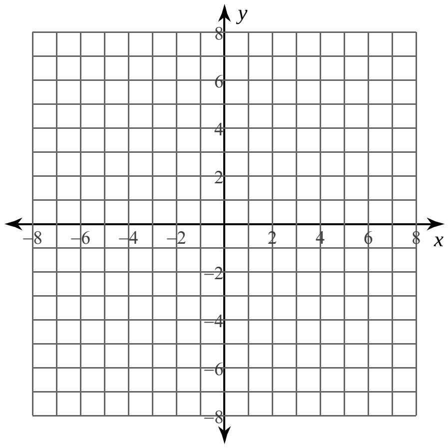
8) $g(x) = \frac{3}{3 - x^2}$

Use $\sum_{n=0}^{\infty} x^n = \frac{1}{1-x}$ to find a power series representation of $g(x)$. Indicate the interval in which the series converges. Then graph $g(x)$ and the sixth partial sum of its power series.

9) $g(x) = \frac{2}{2 + x^2}$



10) $g(x) = \frac{1}{1 - x^2}$



Write each in exponential form.

11) $-i\sqrt{17}$

12) $2\sqrt{2} - 2i\sqrt{2}$

13) $-3 - 3i\sqrt{3}$

14) $-\sqrt{3} + i$

Write each in rectangular form.

15) $6e^{\frac{11i\pi}{6}}$

16) $4e^{\frac{4i\pi}{3}}$

17) $4e^{\frac{i\pi}{3}}$

18) $6e^{\frac{5i\pi}{3}}$

Write each as a complex number in rectangular form.

19) $\ln -6.7$

20) $\ln -5$

21) $\ln -13$

22) $\ln -3$

Solve each equation over the complex numbers.

23) $e^z + 10 = 1$

24) $3 = e^z + 10$

25) $e^{2z} + 6 = -1$

26) $20e^z + 100 = -e^{2z}$

Critical thinking questions:

27) Evaluate: i^{2i}

28) Evaluate: $\ln\ i$

Power Series

Date________________ Period____

Use the fifth partial sum of the exponential series to approximate each value. Round your answer to the nearest thousandth.

1) $e^{0.4}$ 1.492

2) $e^{-0.5}$ 0.607

Use the fifth partial sum of the power series for sine or cosine to approximate each value. Round your answer to the nearest thousandth.

3) $\sin \frac{5\pi}{7}$ 0.782

4) $\sin \frac{7\pi}{12}$ 0.966

Use $\sum_{n=0}^{\infty} x^n = \frac{1}{1-x}$ to find a power series representation of $g(x)$. Indicate the interval in which the series converges.

5) $g(x) = \frac{3}{1-x^2}$ $\sum_{n=0}^{\infty} \left(\frac{2+x^2}{3}\right)^n$

Converges in: $(-1, 1)$

6) $g(x) = \frac{4}{3+2x^2}$ $\sum_{n=0}^{\infty} \left(\frac{1-2x^2}{4}\right)^n$

Converges in: $\left(-\frac{\sqrt{10}}{2}, \frac{\sqrt{10}}{2}\right)$

7) $g(x) = \frac{1}{1-x^2}$ $\sum_{n=0}^{\infty} (x^2)^n$

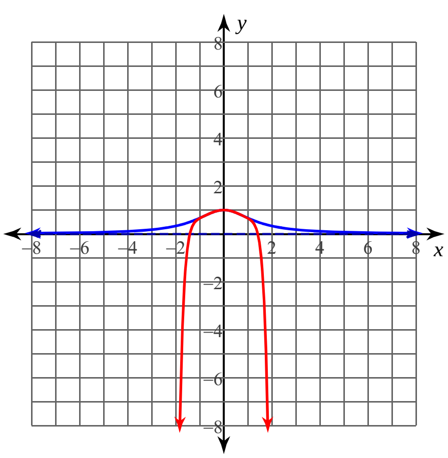
Converges in: $(-1, 1)$

8) $g(x) = \frac{3}{3-x^2}$ $\sum_{n=0}^{\infty} \left(\frac{x^2}{3}\right)^n$

Converges in: $(-\sqrt{3}, \sqrt{3})$

Use $\sum_{n=0}^{\infty} x^n = \frac{1}{1-x}$ to find a power series representation of $g(x)$. Indicate the interval in which the series converges. Then graph $g(x)$ and the sixth partial sum of its power series.

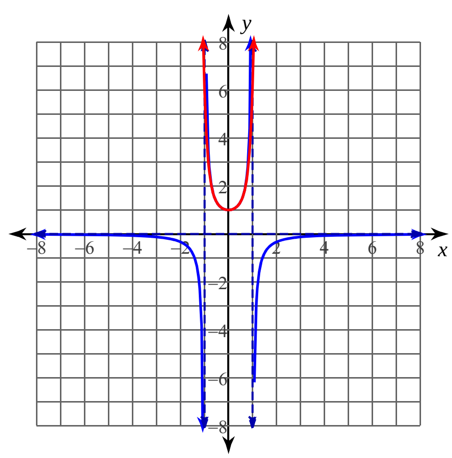
9) $g(x) = \frac{2}{2+x^2}$



$\sum_{n=0}^{\infty} \left(-\frac{x^2}{2}\right)^n$

Converges in: $(-\sqrt{2}, \sqrt{2})$

10) $g(x) = \frac{1}{1-x^2}$



$\sum_{n=0}^{\infty} (x^2)^n$

Converges in: $(-1, 1)$

Write each in exponential form.

11) $-i\sqrt{17}$

$\sqrt{17}e^{\frac{3i\pi}{2}}$

12) $2\sqrt{2} - 2i\sqrt{2}$

$4e^{\frac{7i\pi}{4}}$

13) $-3 - 3i\sqrt{3}$

$6e^{\frac{4i\pi}{3}}$

14) $-\sqrt{3} + i$

$2e^{\frac{5i\pi}{6}}$

Write each in rectangular form.

15) $6e^{\frac{11i\pi}{6}}$

$3\sqrt{3} - 3i$

16) $4e^{\frac{4i\pi}{3}}$

$-2 - 2i\sqrt{3}$

17) $4e^{\frac{i\pi}{3}}$

$2 + 2i\sqrt{3}$

18) $6e^{\frac{5i\pi}{3}}$

$3 - 3i\sqrt{3}$

Write each as a complex number in rectangular form.

19) $\ln -6.7$

$1.902 + i\pi$

20) $\ln -5$

$1.609 + i\pi$

21) $\ln -13$

$2.565 + i\pi$

22) $\ln -3$

$1.099 + i\pi$

Solve each equation over the complex numbers.

23) $e^z + 10 = 1$

$\{\ln 9 + i\pi + 2i\pi n\}$

24) $3 = e^z + 10$

$\{\ln 7 + i\pi + 2i\pi n\}$

25) $e^{2z} + 6 = -1$

$\left\{\frac{\ln 7 + i\pi + 2i\pi n}{2}\right\}$

26) $20e^z + 100 = -e^{2z}$

$\{\ln 10 + i\pi + 2i\pi n\}$

Critical thinking questions:

27) Evaluate: i^{2i}

$e^{-\pi}$

28) Evaluate: $\ln i$ $\frac{\pi}{2}i$