

Name:

9-A Sequences and Series

1. Write a formula for the n^{th} term of the following sequences.

a) 35, 38, 41, 44, ...

b) 81, -54, 36, -24, ...

2. Evaluate.

a) $\sum_{x=2}^5 10x^2$

b) $\sum_{n=1}^{100} n$

3. Write the following series in summation notation.

a) $837 + 835 + 833 + \dots + 45$

b) $1372 - 980 + 700 - 500 + \dots$

4. Calculate the following sums.

a) the first 30 terms of $1372 - 980 + 700 - 500 + \dots$

b) $\sum_{i=10}^{60} (-3i + 1)$

9-B Limits

5. Using limits, explain how the formula $S_{\infty} = A_1 \left(\frac{1-r^n}{1-r} \right)$ can be calculated for an infinite number of terms.

6. Estimate the limit (if it exists) by plugging in values very close to 9.

a) $\lim_{x \rightarrow 9} \frac{x^2 + 11}{x - 9}$

b) $\lim_{x \rightarrow 9} \frac{3x^2 - 25x - 18}{4x - 36}$

7. Calculate the limit (if it exists).

a) $\lim_{x \rightarrow 3} \frac{x^2 + 2x - 15}{x^2 - 9x + 19}$

b) $\lim_{x \rightarrow -3} \frac{x^4 + 10x^3 + 13x^2 + 11x + 2}{x + 2}$

9-C Slopes of Curves

8. Use $h = .001$ in the formula $f'(x) \approx \frac{f(x+h) - f(x)}{h}$ to estimate the slope of the given function at $x = 3$.

a) $f(x) = x^2 + 5x + 10$

b) $g(x) = 13x - 9$

9. Use the formula $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ to find the slope functions for the following functions.

a) $d(x) = x^2$

b) $b(x) = x^4$

10. Use your answers from #9 to calculate the slope of the following functions at $x = 10$.

a) $d(x) = x^2$

b) $b(x) = x^4$

c) $c(x) = 2x^4$

d) $d(x) = 7x^4 - 3x^2$

9-D Derivatives

11. State the meaning of $f'(x)$, given $f(x)$.

a) $f(x)$ = the amount of water, in liters, in a pool after x seconds

b) $f(x)$ = the velocity of a car, in meters per second, after x seconds

12. Find the derivative function for each of the following functions.

a) $d(x) = 2x^8$

b) $b(x) = x^7$

c) $c(x) = -9x$

d) $d(x) = 4$

e) $e(x) = 2x^8 + x^7 - 9x + 4$

f) $f(x) = \sin x$

g) $g(x) = \cos x$

h) $h(x) = -8 \cos x$

13. Find the slope of the following functions at $x = 2$.

a) $d(x) = x^8$

b) $b(x) = 4x^2 - 10x + 5$

c) $c(x) = 21x - 10$

d) $d(x) = e^x$

14. Find the equation of the line tangent to $f(x) = x^3 + 10x$ at the following values of x .

a) $x = 2$

b) $x = -4$