

Analysis Final Exam Review for Chapter 1 REVIEW SHEET 4
ANSWER KEY

$$1. 10 \cdot \frac{9 \cdot 8}{2} \cdot \frac{7 \cdot 6 \cdot 5}{3 \cdot 2 \cdot 1} = \frac{10 \cdot 9 \cdot 8 \cdot 7}{4 \cdot 3 \cdot 2 \cdot 1} \cdot \frac{6 \cdot 5 \cdot 4}{3 \cdot 2 \cdot 1} \cdot \frac{3 \cdot 2}{2 \cdot 1} = \frac{10 \cdot 9}{2 \cdot 1} \cdot \frac{8 \cdot 7 \cdot 6 \cdot 5}{4 \cdot 3 \cdot 2 \cdot 1} \cdot 4$$

2. a) $2^5 = 32$

b) $2^6 = 64$

c) 0

d) 0

3. a) 800 is the 98th term.

$$S = \frac{(24 + 800)98}{2} = 40,376$$

b) 7,971,610

c) 3000/19

d) 2^{30}

e) 4.8

4. a) $\sum_{n=1}^{98} (24 + 8(n-1))$

b) $\sum_{n=1}^{13} (10(3)^{n-1})$

c) $\sum_{n=1}^{\infty} (300(.9)^{n-1})$

d) $\sum_{n=0}^{30} \binom{30}{n}$

e) $\sum_{n=0}^{94} \left[(-1)^n \left(\frac{6}{2^{2n}} \right) \right]$

5. a) Establish base case (the statement is true when n=1, for example)

b) assume the statement holds true for when n=k

c) prove, using the assumption, that the statement will hold true for n = k+1

6. a) 20

b) 10.3923 (rounded)

7. r = 16, s = 20

8. 26/19

9. 1st term: $(4x)^{17}$

5th term: $\binom{17}{4} (4x)^{13} (-3y)^4$

10th term: $\binom{17}{9}(4x)^8(-3y)^9$

10. a) $\binom{n+1}{k+1}$

b) $\binom{n+2}{k+2}$

c) ** typo alert! The problem should say: $\binom{87}{0} + \binom{88}{1} + \binom{89}{2} + \binom{90}{3} + \dots + \binom{143}{56}$

answer: $\binom{144}{56}$

d) ** typo alert! The problem should say: $\binom{n+10}{n+10} + \binom{n+11}{n+10} + \binom{n+12}{n+10} + \dots + \binom{n+41}{n+10}$

answer: $\binom{n+42}{n+11}$

11. a) cone

b) hyperbolic paraboloid (saddle)

c) hyperbolic cylinder (extends parallel to the y-axis)

d) hyperbolic paraboloid (saddle)

12. continuously: \$5967.30

monthly: \$5963.33

He would have \$3.97 more by compounding continuously

13. 20.6 years

14. $\frac{3}{10}(1) + \frac{4}{10}(-3) + \frac{1}{10}(x) = 0$
 $x = 9$

15. $x = 4 \cos t + 8$
 $y = 5 \sin t + 2$

If sine and cosine were switched, the ellipse would stay the same, but be drawn in the opposite (clockwise instead of counterclockwise) direction, starting from the top of the ellipse instead of the right side (try it on your calculator to see)

16. 3/35

Wherever you sit, there are 3 other desks at your group. Your friend wants to score one of those three seats (out of a possible 35 seats in the class).