

Binomial, Multinomial, and Review

Except for #4b, do all problems on your own paper. COBRA everything, especially #s 1-2

1. Find the coefficient of x^2y^3 in $(x + 2y - 3)^7$. 2. Find the coefficient of x^3y^2 in $(x + y^2 - \sqrt{2})^6$.

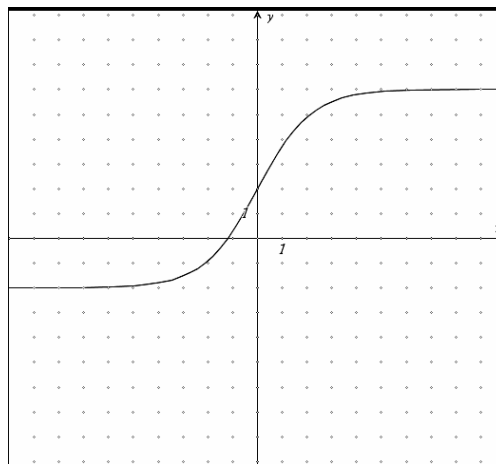
3. Let $\{a_n\} = 4 - (1/2)^{n-3}$.

a. Graph a_n . b. Suppose that, for all n , $b_n = a_{n+2}$. Graph b_n .

c. Explain the relationship between your graphs in (a) and (b).

4. If f is the function graphed at right,

a. Find $f^{-1}(5)$ b. Graph $f^{-1}(x)$ on the same axes.



5. Let $S_n = 1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{n}$.

a. Use your calculator to approximate S_{10} , S_{100} , S_{1000} , and S_{10000} . What patterns do you notice?

b. Based on your observation in part (a), do you think

$\sum_{i=1}^{\infty} \frac{1}{i}$ converges or diverges? Explain.

c. Does your calculator agree? Compute the infinite sum (use $\boxed{\text{ctrl}} - \textcircled{i}$ for ∞).

6. An isosceles trapezoid has one base of length 16 and legs of length 6. Find the length for the other base that yields the maximum area.

7. A ball is hit and flies according to the parametric equations $x = 40t$, $y = 4 + 60t - 4.9t^2$. Find the distance the ball travels before hitting the ground (i.e. $y = 0$).

8. Your friend believes that only 60% of Payton students support Obama, but you believe the percentage is much higher, so you survey 20 students and find that 16 support Obama.

a. In summation notation, write an expression for the probability that 16 or more students would support Obama in a sample of 20, if the probability of any student supporting Obama really is 60%.

b. Now compute the probability from a. Does it support your friend's theory?

9. Find the domain of $\sqrt{\frac{x^2 + 9x + 7}{x - 2}}$. Give exact values for endpoints.

10. If $f(x) = x^2 + 5x - 3$, compute (a) $f(x + 1)$ (b) $f(x + h)$ (c) $Df(x)$.