BECA / Dr. Huson / 11.1 IB Math SL
18 April 2019
Test: Sequences & series Name:

Answer on lined paper. Show work.

1. In an arithmetic sequence, the first term is 7 and the second term is 11.
   (a) Find the common difference.
   (b) Find the eighth term.
   (c) Find the sum of the first eight terms of the sequence.
2. Given that for a geometric sequence $u_1 = 18$ and $u_3 = 8$
   (a) Find the value of r.
   (b) Given that u_k is the first term of the sequence with a value less than one, find k.
   (c) Find the sum of the infinite series S_∞
3. The first three terms of an arithmetic sequence are $u_1 = 5.1$, $u_2 = 5.5$, and $u_3 = 5.9$.
   (a) Find the common difference.
   (b) Given that the kth term of the sequence, $u_k = 11.5$. Find k.
4. Let $f(x) = 2x - 3$ and $g(x) = (x-1)^2$
   (a) Find $(f \circ g)(4)$
   (b) Find $f^{-1}(x)$
5. Simplify the expression $\sqrt{a} \cdot \sqrt{a^5}$
6. $(2x^2 - 2x - 5)(x + 3) - 2x(x^2 - x - 4)$
7. What is the inverse of the function $y = \frac{2}{x+3}$?
8. Let $x = ln2$ and $y = ln5$. Write down the following expressions in terms of x and y.
   (a) $\ln \frac{2}{5}$
   (b) $\ln 50$
   (c) $\ln 0.1$
9. Using the quadratic formula or otherwise, find the solution set to $2x^2 - 3x - 5 = 0$.
10. Simplify the expression $2xi(4 + 3i)$.
11. Simplify the expression $\left(\frac{x^{-2}}{x^2}\right)^{\frac{1}{2}}$ to one with positive integer exponents and radicals.

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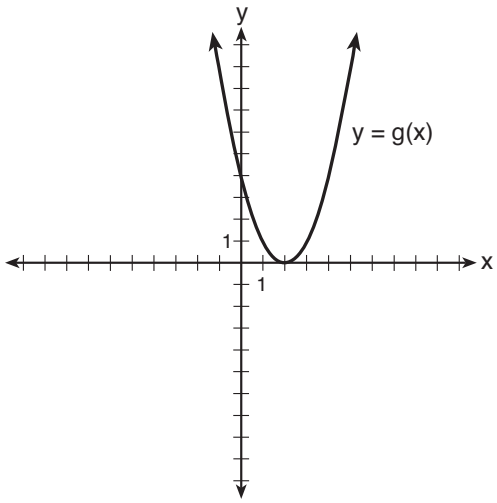
12. The function g is defined by graph of $y = g(x)$ below.

    (a) Write down the equation for $g(x)$ in factored form.

    (b) The function $h(x)$ is made by reflecting g across the y-axis. What is the equation for $h(x)$?



13. Let $f(x) = x^2 - 6x + 4$

    (a) Rewrite quadratic in vertex form and state the vertex as an ordered pair.

    (b) The parabola is translated vertically by k units to make the function $g(x)$. The equation $g(x) = 0$ has one solution. Find k.

14. Use your knowledge of the binomial expansion and combinatorics to answer the following questions.

    (a) Write down the first 5 rows of Pascal's triangle.

    (b) Find ${}_7C_3$.

    (c) Expand the binomial $(x + 1)^6$.

    (d) What is the coefficient of the x^3 term of the expansion of $(x + 1)^7$?

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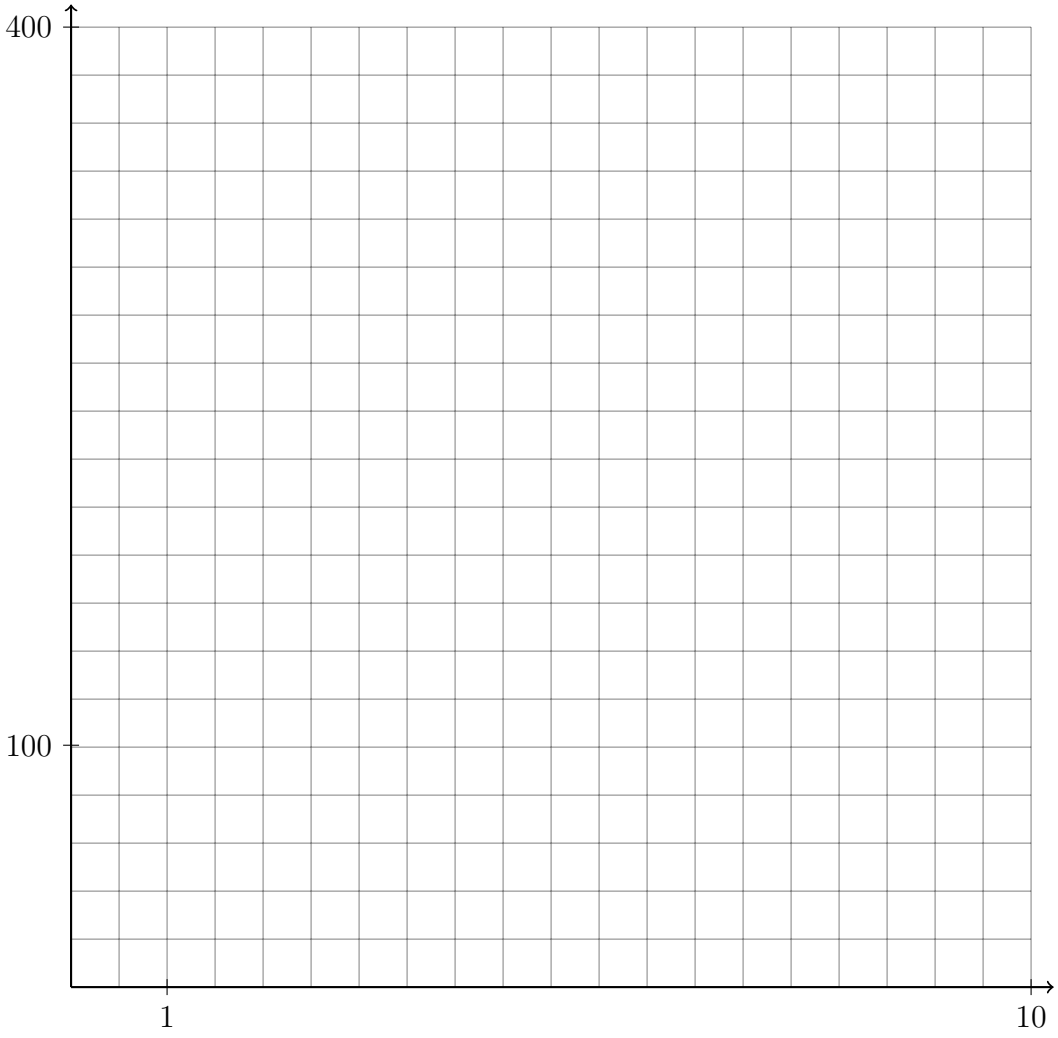
For these last two pages, answer in the space provided

15. Graph $f(x) = 280 \cdot 0.75^{\frac{x}{2}} + 20$ on the set of axes below.



Is the function an example of exponential growth or exponential decay? Justify your answer algebraically.

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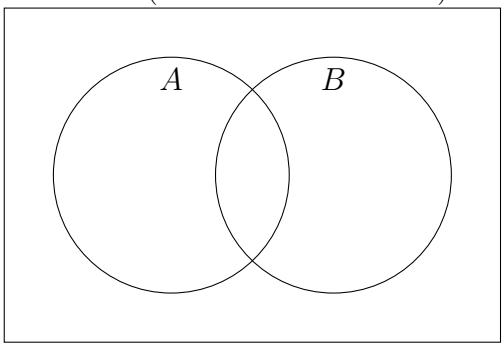
16. Let A and B be independent events, where $\mathrm{P}(A) = 0.4$ and $\mathrm{P}(B) = 0.5$.

    (a) Find $\mathrm{P}(A \cap B)$

    (b) Fill in the probability value for each area in the Venn diagram representing the situation. (there are four values)



    (c) Find $\mathrm{P}(A \cup B)$

    (d) Find $\mathrm{P}(A \cap B')$

17. The function $f(x) = e^x$ is shown on the graph. Sketch $g(x) = f(x-2)+1$. Plot and label the asymptote(s).