BECA / Dr. Huson / 11.1 IB Math SL
29 March 2018
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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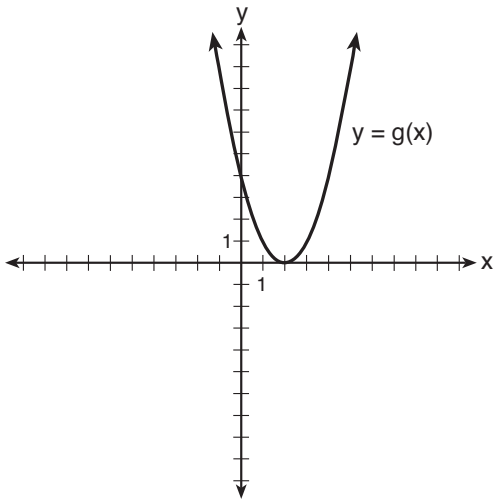
12. The function g is defined by graph of $y = g(x)$ below.

    (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. For each of the following questions select two applicable words from the following list: revenues, assets, premiums, costs, earnings, expenses, debt, reserves, overhead, investments.

    (a) What financial measure would a business manager try to *increase* in order to raise profits?

    (b) What financial measure would a manager try to reduce to improve profitability?

    (c) Since their customers could have large losses from a storm or other disaster at any time an insurance company maintains large amounts of what?

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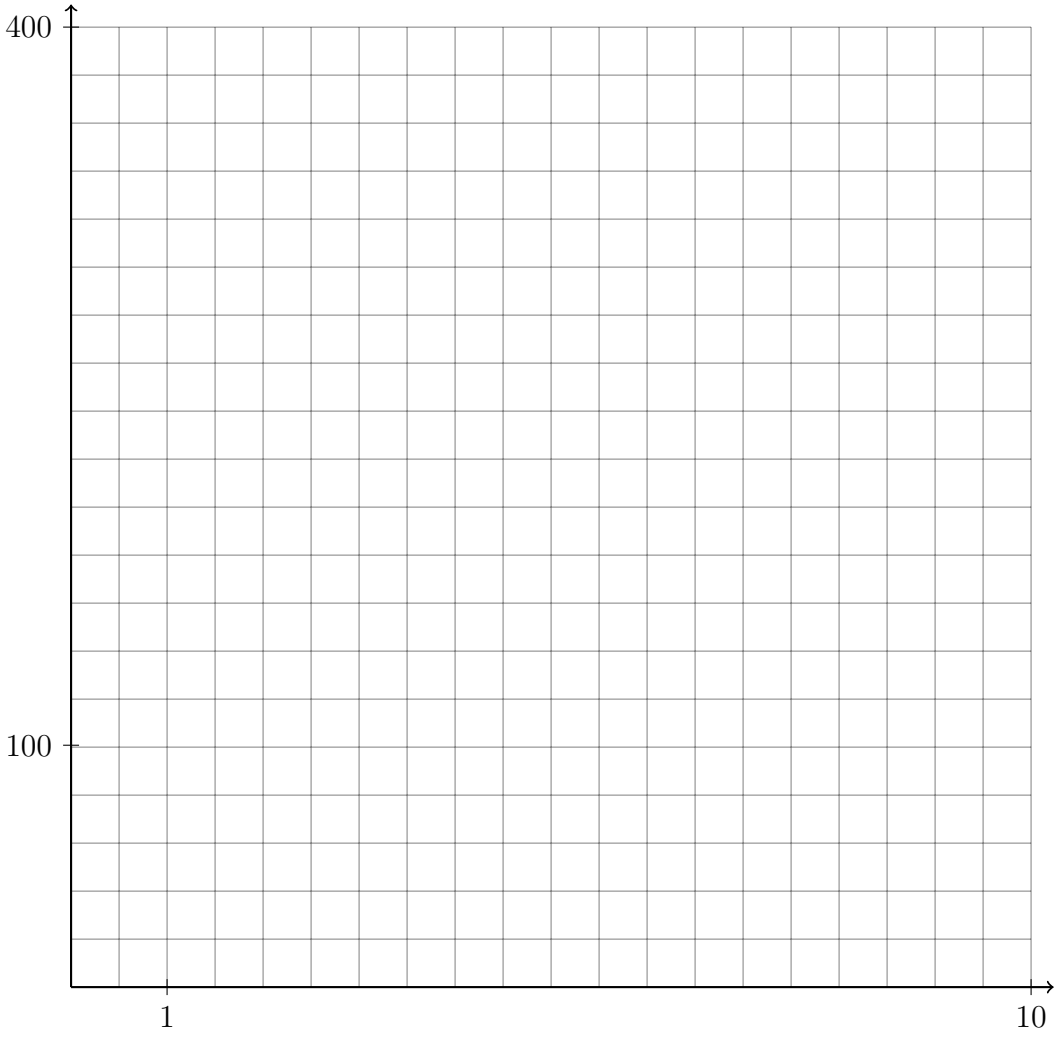
For these last two pages, answer in the space provided

15. Graph $g(x) = 30(1.5)^{\frac{x}{2}} - 5$ 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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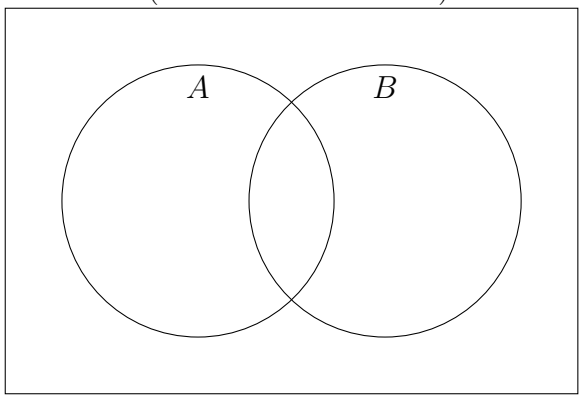
16. Let A and B be independent events, where $\mathrm{P}(A) = 0.5$ and $\mathrm{P}(B) = 0.6$.

    (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 $g(x) = f(x-3) - 1$. Plot and label the asymptote(s).