

Review: Exponential & Logarithmic Functions

Date: _____

8) A bacteria culture starts with 10 000 bacteria. After 40 min the count is 30 000. What is the doubling period?

9) A sample of Radon-211 decays to 30% of its original mass in 29 h. What is the half-life of Rn^{211} ?

10) The half-life of V^{48} is 16 d.

a) Find the amount remaining from a 120 mg sample after i) t days; ii) 256 d; iii) 40 d.

b) How many days will it take to decay to 1 mg?

11) Solve the following equations.

a) $\log_2(3x+2) + \log_2(x-2) = 3$

b) $2^{x^2+x} = 5$

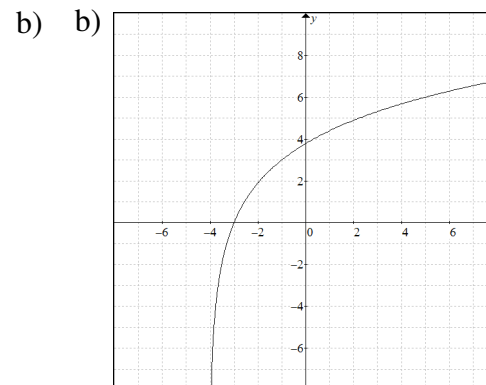
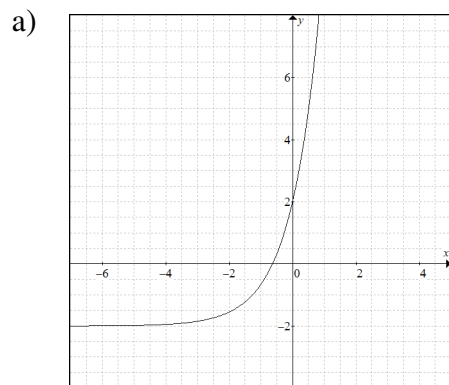
c) $10^{2^x} = 15$

d) $\log_5(\log_{10} x) = 2$

12) Find the domain of the function $f(x) = \log_{10}(3+2x)$.

13) Find the domain of the function $g(x) = \log_2(x-x^2)$.

14) Determine the equation for the following graphs,

**Answers**

1a) 2 b) 4 c) 3 d) 3 e) 0 f) -1 g) $\frac{1}{2}$ h) 7 2a) $\log_{10} 14 + \log_{10} 29$ b) $\log_2 11 + \log_2 13 + \log_2 15$ c) $10 \log_3 2$

d) $\log_{10} 61 - \log_{10} 43$ e) $\frac{1}{2} \log_5 37$ f) $-\log_{10} 6$ g) $\log_2 3 + \log_2 \pi$ h) $\log_2 5$ i) $\log_2 6$ j) $\log_5 12 + \log_5 97 - \log_5 35$

3a) -5 b) 3 c) -7 d) $\frac{1}{2}$ e) 3 f) $\frac{5}{2}$ g) 3.7 h) 97 i) 2 j) 3 4a) 8^5 b) 6 c) $\frac{1}{5}$ d) 5^4 e) 3 f) 32 g) 3 h) 3

5a) $\log_{10} \left(\frac{x}{y^2} \right)$ b) $\log_2(x^3 y^6)$ c) $\log_3(MN\sqrt{P})$ d) $\log_5 \left(\frac{A^4}{\sqrt{B}} \right)$ 6a) 2.4649 b) 0.2584 c) -1.3561 d) 1.8723

7a) 4000 b) $400002^{\frac{1}{20}}$ c) 11313 d) 1.05×10^{13} 8) 25.24 min 9) 16.69 h 10a) i) $1202^{\frac{1}{16}}$ mg ii) 0.0018311 mg iii) 21.213203mg

b) 110.5 d) 11a) $\frac{2+2\sqrt{10}}{3}$ b) $\frac{-1 \pm \sqrt{1+4\log_2 5}}{2}$ c) $\log_2(\log_{10} 15)$ d) 10^{25} 12) $x > \frac{-3}{2}$ 13) $0 < x < 1$

14a) $y = 4(3^x) - 2$ b) $y = 3 \log_3(x+4)$