Accelerated Alg. II Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Test Review: Exp. & Log Functions Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_

**1.** Graph each equation, then identify its asymptote, domain, and range.

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| **a.** | Graph *y* = 3 • 2*x*. | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |
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| **b.** | Graph *y* = 4 • 0**.**75*x* – 2 – 3. | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |
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**2.** Evaluate each log

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| --- | --- | --- | --- | --- |
|  | **a.** | log7 49 = | **b.** | log 1000 = |
|  |  |  |  |  |
|  | **c.** | log9 = | **d.** | log9 = |

**3.** Expand each expression as much as possible. Simplify each logarithm as much as possible (e.g., if you have log5 25, do something with it!)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **a.** | log3 81*x*5*y* | **b.** | log4 |
|  |  |  |  |  |
|  | **c.** |  | **d.** |  |
|  |  |  |  |  |

**4.** Condense each expression as one logarithm.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **a.** | 5log3 *x* – 4log3 2*y* | **b.** |  |
|  |  |  |  |  |

**5.** Without graphing, identify the asymptote, domain, and range of the following functions.

**a.** *f*(*x*) = 400(1**.**35)*x* – 4 + 150

asymptote: \_\_\_\_\_\_\_\_\_\_\_ domain: \_\_\_\_\_\_\_\_\_\_\_ range: \_\_\_\_\_\_\_\_\_\_\_

**b.** *g*(*x*) = ln (*x* – 3) + 2

asymptote: \_\_\_\_\_\_\_\_\_\_\_ domain: \_\_\_\_\_\_\_\_\_\_\_ range: \_\_\_\_\_\_\_\_\_\_\_

**6.** Graph each equation, then identify its asymptote, domain, and range.

|  |  |  |
| --- | --- | --- |
|  |  |  |
| **a.** | Graph *y* = 3 log (*x* – 5) + 4  asymptote: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |

**7.** Given *f*(*x*), write the formula for *f*-1(*x*).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **a.** | *f* (*x*) = 3 · 22*x* – 4 + 7 | **b.** | *g* (*x*) = 4 log 3 (*x* – 5) – 2 |

**8.** Solve each equation. Check for extraneous solutions (where necessary). Round to the nearest thousandth.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **a.** | 5 + 32*x* – 4 = 7 | **b.** | 2 log3(*x* – 9) = 8 |
|  | **c.** | 16*x* – 4 = 64*x* + 1 | **d.** |  |
|  | **e.** | log *x* + log (*x* + 21) = 2 | **f.** | log2 (*x*2 + 9) - log2 5 = log2 2 |

**9.** The number of bacteria (*y*) in a dish is 1**.**5 *million* at time *x* = 0. Each minute, the number of bacteria increases by 3**.**4%.

**a.** Write an equation describing this situation.

**b.** How many bacteria will there be after 20 minutes?

**10.** You invest $800 in a savings account that pays 6% annual interest, compounded *monthly*.

**a.** After 7 years, how much will you have in your account, to the nearest penny?

**b.** If the interest were compounded *continuously*, how much money would you have after 7 years, to the nearest penny?

**11.** Applications.

**a.** Brad has a government bond that is currently worth $14,000. The bond has an interest rate of 5%, compounded continuously. In how many years will the bond be worth $16,000? (Round your FINAL answer to 2 decimal places; round to 3 decimal places or better for your calculations.)

**b.** James has invested some money in an account that compounds 3% interest quarterly. In 9 years, it will be worth $2400. How much did he initially invest? (Round your answer to the nearest penny.)

**c.** How many years will it take for an investment’s value to double if it is in an account that pays 4% interest, compounded monthly? (Round your answer to the nearest tenth.)

**d.** What annual interest rate (compounded quarterly) would you need if you want your $1000 investment to turn into $1250 in 5 years? (Round your percent to the nearest tenth.)

Answer Key:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **1.** | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  | | --- | --- | | *x* | *y* | | -2 | 0.75 | | -1 | 1.5 | | 0 | 3 | | 1 | 6 | | 2 | 12 | | (decimals or fractions okay) | | | A: | *y* = 0 | | D: | (-∞,∞) | | R: | (0, ∞) | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  | | --- | --- | | *x* | *y* | | 0 | 4.11 | | 1 | 2.33 | | 2 | 1 | | 3 | 0 | | 4 | -0.75 | | A: | *y* = -3 | | D: | (-∞,∞) | | R: | (-3, ∞) | |
|  |  |  |

**2.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **a.** | 2 | **b.** | 3 |
|  | **c.** | -1 | **d.** |  |

**3.**

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| --- | --- | --- | --- | --- |
|  | **a.** | 4 + 5log3 *x* + log3 *y* | **b.** | 3 – 3log4 *a* – log4*b* |
|  | **c.** | ln 4 + 2ln*x* + ln *y* | **d.** |  |

**4.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **a.** |  | **b.** | log 25*x* 2 |

**5. a.** asymptote: *y* = 150 domain: (-∞, ∞) range: (150, ∞)

**b.** asymptote: *x* = 3 domain: (3, ∞) range: (-∞,∞)

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| **6.** | **a.** | |  |  |  | | --- | --- | --- | | *x* | *y* | asymptote: *x* = 5  domain: (5, ∞)  range: (-∞,∞) | | 5.01 | -2 | | 5.1 | 1 | | 6 | 4 | | 15 | 7 | | 105 | 10 | |  |

**7. a.** *f* -1(*x*) =  **OR**  **b.** *g* -1(*x*) = 

**8. a.** *x* ≈ 2.315 **b.** *x* = 90

**c.** *x* = -11 **d.** *x* = 1

**e.** *x* = 4 (*x* = -25 is extraneous) **f.** *x* = 1, -1

**9.**  **a.** *y* = 1**.**5 (1**.**034)*x* (*y* measured in millions; *x* measured in minutes)

**b.** 2,927,535 bacteria

**10. a.** $1,216.30

**b.** $1,217.57

**11. a.** 16000 = 14000*e*.05*t* 🡪 *t* ≈ **2.67 years**

**b.** 2400 = *x*(1.0075)9⬝4 🡪 *x* ≈ **$1833.96**

**c.** 2 = 1(1.0033333…)12*x* 🡪 *x* ≈ 17.4 years

**d.  🡪 *r*** ≈ 0.45 ≈ 4.5% each year