

MATH D UNIT 5 REVIEW

INSTRUCTIONS:

Show all of your work on separate paper, do not write answers on this review sheet. Number each problem in order on your paper and box your answers. Follow directions for each problem.

I. Use the compound interest formulas, $A = P\left(1 + \frac{r}{n}\right)^{nt}$ and $A = Pe^{rt}$ to solve:
Show all your work and round answers to the nearest cent. (Section 9.1)

- 1) Find the accumulated value of an investment of \$5000 for 10 years at an interest rate of 6.5%, if the money is:
 - a) compounded semiannually
 - b) compounded monthly
 - c) compounded continuously
- 2) Suppose that you have \$6000 to invest. Which investment yields the greater return over 4 years: 8.25% compounded quarterly or 8.22% compounded continuously?

Show your calculations.

II. For the functions $f(x) = 2x^2 + 3$, $g(x) = x - 1$, and $h(x) = \sqrt{x + 7}$, find: (See section 9.2)

- 3) $(f \circ g)(x)$
- 4) $(g \circ f)(x)$
- 5) $(f \circ h)(x)$
- 6) $(f \circ g)(-5)$
- 7) $(h \circ f)(-4)$
- 8) $(g \circ h)(2)$

III. Find the inverse of the following functions. (See section 9.2)

- 9) $f(x) = \frac{1}{2}x + 3$
- 10) $f(x) = \sqrt{3x - 4}$
- 11) $h(x) = \frac{3}{4}x + 3$
- 12) $g(x) = \sqrt[3]{x + 1}$
- 13) $f(x) = x^3 - 5$

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IV. On separate paper, copy then fill in the table by writing each equation in its alternate form. Do not solve. (See sections 9.3, 9.5)

	Exponential Form	Logarithmic Form
14)	$2^4 = x$	
15)	$10^a = b$	
16)	$e^2 = y$	
17)	$3^x = 8$	
18)		$5 = \log k$
19)		$x = \log 60$
20)		$12 = \log_2 x$
21)		$\ln z = 3$

V. Use the properties of logarithms to expand each logarithmic expression as much as possible. Where possible, evaluate logarithmic expressions without a calculator. (See section 9.4)

22) $\log\left(\frac{100}{y}\right)$

23) $\log_3\left(\frac{a}{3b}\right)$

24) $\log_5 25\sqrt[3]{x}$

25) $\log 1000x\sqrt{y}$

VI. Use the properties of logarithms to condense each logarithmic expression. Where possible, evaluate logarithmic expressions without a calculator. (See section 9.4)

26) $5 \log a + 2 \log b$

27) $\log_b x + \frac{1}{2} \log_b y$

28) $\log_4 32 + \log_4 2$

29) $2 \log 5 + 2 \log 2$

30) $\log_5 150 - \log_5 6$

31) $\log_3 45 - \frac{1}{2} \log_3 25$

32) $\log_2 5 - \log_2 40$

VII. Make a table of coordinates and graph the following functions. Include a scale. (See section 9.1, 9.3)

33) $y = 2^x - 4$

34) $y = 4^x - 10$

35) $y = \left(\frac{1}{2}\right)^x + 2$

36) $y = e^x$

37) $y = \ln x$

38) $y = \log_3 x$

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VIII. Evaluate the following *without* a calculator. (See section 9.3)

39) $\log_8 8$

40) $\log_4 64$

41) $\log 1000$

42) $\log_5 625$

43) $\log_5 \frac{1}{5}$

44) $\log_4 \frac{1}{16}$

45) $\log_5 \sqrt{5}$

46) $\log_4 \sqrt[5]{16}$

47) $\log_{\frac{1}{4}} 16$

48) $\log_{\frac{1}{3}} 81$

49) $\log_{137} 1$

50) $\log_8 1$

IX. Solve the following equations. (See section 9.5)

51) $\log_5 x + \log_5 (x + 20) = 3$

52) $\log_2 x + \log_2 (x + 4) = 5$

53) $\log_8 x + \log_8 (x - 12) = 2$

54) $\log_2 (5x + 12) - \log_2 (x - 6) = 3$

55) $\log_5 (x + 9) - \log_5 (x - 3) = 2$

56) $\log_2 (9x + 39) - \log_2 (x - 11) = 5$

X. Solve the following equations. For problems 61 to 65, round answer to two decimal places. (See section 9.5)

57) $6^{x+4} = 216$

58) $4^{3-7x} = 256$

59) $\log(2x - 8) = 3$

60) $\log_4(3x - 4) = 3$

61) $3^x = 26$

62) $6^t = 23$

63) $4e^{2x} = 60$

64) $3e^{5x} = 30$

65) $\ln x = \frac{4}{5}$

XI. Using the compound interest formula, solve the following. Round to the nearest tenth of a year. (See section 9.5)

66) How many years will it take \$500 to grow to \$8,000 at 6% interest compounded monthly?

67) How many years will it take \$200 to grow to \$5,000 at 8.5% compounded annually?

68) How many years will it take \$500 to grow to \$40,000 at 15% compounded quarterly?

Do not write answers or work out problems on this page, use separate paper.

MATH D UNIT 5 REVIEW *Answers*

1) a) semiannually: \$9,479.19 b) monthly: \$9,560.92 c) continuously: \$9,577.70

2) Quarterly = \$8317.84. Continuously = \$8335.80
Therefore investing the money at 8.22% compounded continuously yields the greater return.

3) $2x^2 - 4x + 5$ 4) $2x^2 + 2$ 5) $2x + 17$ 6) 75

7) $\sqrt{42}$ 8) 2

9) $f^{-1}(x) = 2x - 6$ 10) $f^{-1}(x) = \frac{x^2 + 4}{3}, x \geq 4/3$ 11) $h^{-1}(x) = \frac{4(x-3)}{3}$

12) $g^{-1}(x) = x^3 - 1$ 13) $f^{-1}(x) = \sqrt[3]{x+5}$

(Solutions are shaded grey.)

	Exponential Form	Logarithmic Form
14)	$2^4 = x$	$4 = \log_2 x$ or $\log_2 x = 4$
15)	$10^a = b$	$a = \log b$ or $\log b = a$
16)	$e^2 = y$	$2 = \ln y$ or $\ln y = 2$
17)	$3^X = 8$	$X = \log_3 8$ or $\log_3 8 = X$
18)	$10^5 = k$ or $k = 10^5$	$5 = \log k$
19)	$10^x = 60$ or $60 = 10^x$	$x = \log 60$
20)	$2^{12} = x$ or $x = 2^{12}$	$12 = \log_2 x$
21)	$e^3 = z$ or $z = e^3$	$\ln z = 3$

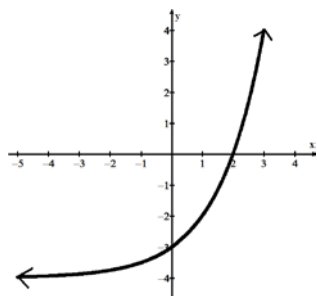
22) $2 - \log y$ 23) $\log_3 a - 1 - \log_3 b$ 24) $2 + \frac{1}{3} \log_5 x$ 25) $3 + \log x + \frac{1}{2} \log y$

26) $\log a^5 b^2$ 27) $\log_b x \sqrt{y}$ 28) 3 29) 2

30) 2 31) 2 32) -3

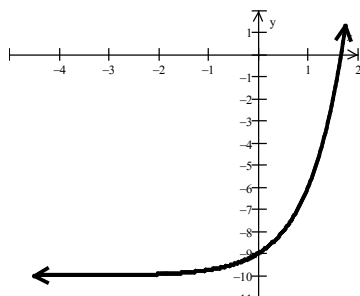
33) $y = 2^x - 4$

x	y
-2	-3.75
-1	-3.5
0	-3
1	-2
2	0
3	4



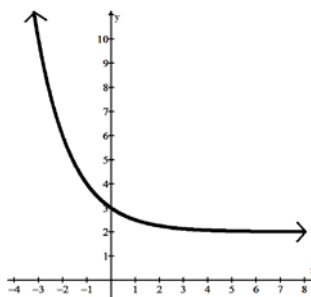
34) $y = 4^x - 10$

x	y
-2	-9.94
-1	-9.75
0	-9
1	-6
2	6



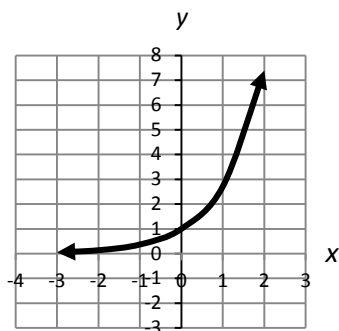
35) $y = \left(\frac{1}{2}\right)^x + 2$

x	y
-3	10
-2	6
-1	4
0	3
1	2.5
2	2.25
3	2.13



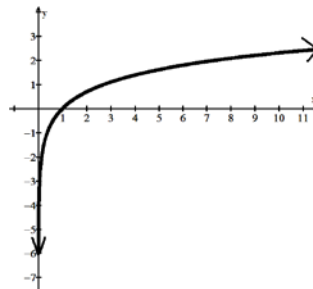
36) $y = e^x$

x	y
-3	0.050
-2	0.135
-1	0.368
0	1
1	2.718
2	7.389



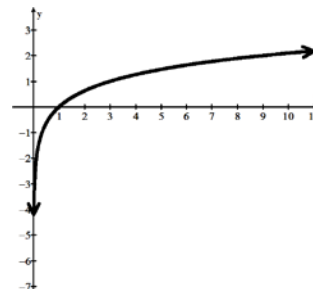
37) $y = \ln x$

x	y
0.135	-2
0.36	-1
1	0
2.7	1
7.4	2



38) $y = \log_3 x$

x	y
$\frac{1}{9}$	-2
$\frac{1}{3}$	-1
1	0
3	1
9	2



- 39) 1 40) 3 41) 3 42) 4
43) -1 44) -2 45) $\frac{1}{2}$ 46) $\frac{2}{5}$
47) -2 48) -4 49) 0 50) 0

- 51) $x = 5$ 52) $x = 4$ 53) $x = 16$
54) $x = 20$ 55) $x = \frac{7}{2}$ 56) $x = 17$

- 57) $x = -1$ 58) $x = -\frac{1}{7}$

- 59) $x = 504$ 60) $x = \frac{68}{3}$

- 61) $x \approx 2.97$ 62) $t \approx 1.75$

- 63) $x \approx 1.35$ 64) $x \approx 0.46$ 65) $x \approx 2.23$

- 66) $t \approx 46.3$ years 67) $t \approx 39.5$ years 68) $t \approx 29.8$ years