

Review for FINAL Spring 2009 FINAL EXAM is 5/13, 2-4PM in Anderson Hall AL17

Topics include problems & ideas on Exams 1 and 2 as well as material since Exam 2. Following is a list of some topics that should be reviewed. You have review problems from Exams 1 & 2 that can be used for practice for the final exam.

Percent of change	Sketch functions with certain properties	Power functions
Mean/Median/Range	Solve word problems	Composition of functions
Equations of lines from data	Polynomial properties & behavior	1-1 Functions
Perpendicular/Parallel Lines	Systems of 2 equations in 2 unknowns	Inverse functions
Rate of change	Parabolas/vertex form/x-intercepts	Exponential & Logarithmic functions
Domain & Range of functions		Compound interest
Compute line of best fit		Solve equations of various types

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- Find the equation of the line through points (2, 6) and (3,-5).
- Given $y = -3x + 7$. (a) Find the equation of a line through (1,5) parallel to the given line.
(b) Find the equation of a line through (-2,3) perpendicular to the given line.

- For the data given in the table do the following:
(a) Conjecture whether the correlation coefficient r will be positive, negative, or zero.

x	-4	-2	0	2	4
y	1.2	2.8	5.3	6.7	9.1

- (b) Find the equation of the line of best fit to the data.

- Two types of sand, fine and coarse, are mixed to form 50 pound bags which are sold for \$8.95. If the fine sand cost \$0.26 per pound and the coarse cost \$0.15 per pound, find the number of pounds of each type to use in the bags. (Round your answers to the nearest pound if necessary.)
- Determine the solution set of each of the following systems of equations.

$$2x - y = 3 \quad 2x - 6y = 22 \quad 4x + 3y = 1$$

$$-4x + 2y = -6 \quad 4x + y = 5 \quad 8x + 6y = 0$$

- Find the vertex and x-intercepts of the parabola given by $y = 2x^2 - x - 3$.
- A rectangular window has a length that is 18 inches more than its width. If its perimeter is 180 inches, find its dimensions.
- A total of \$5000 is invested in two accounts. One pays 5% annual interest, and the the other pays 7% annual interest. If the interest at the end of the first year is \$325, how much was invested in each account? What was the percent of change in the account during the first year?
- Find $(f \circ g)(x)$ and $(g \circ f)(x)$ for each of the following pairs of functions.

$$(a) f(x) = 3x - 2, g(x) = 2x^2 + 1 \quad (b) f(x) = \sqrt{x+1}, g(x) = x^2 - 5$$

- Given the functions in the tables. Determine, if possible each of the following.
(a) $(f \circ g)(3)$ (b) $(g \circ f)(4)$ (c) $(g \circ f)(3)$

x	1	3	4	5
f(x)	3	0	2	-1

x	-1	2	3	6
g(x)	1	0	5	4

- Explain how to determine if a function is 1-1.
- Determine which of the following are 1-1 functions. (a) $y = 2^x$ (b) $y = x^4$ (c) $y = 9x - 6$ (d) $y = 7$
- Find the inverse of the function $y = f(x) = x^2 + 1$ where we restrict $x \geq 0$.

14. On the figure accurately sketch $f^{-1}(x)$.
 15. For each table find either a linear or exponential function that models the data.

(a)

x	0	1	2	3	4
y	16	12	8	4	0

(b)

x	0	1	2	3	4
y	16	4	1	1/4	1/16

16. Graph $y = 3^x$ and $y = x^3$ on the grid.

17. Solve for x in $4(10^{3x}) = 244$

Give your answer to the nearest thousandth.

18. Solve for x in $5 \log(2x) = 16$

Give your answer to the nearest tenth.

19. Determine C and a in the equation $y = C a^x$ given that points (1, 3) and (2, 7) are on the graph of the curve.

20. \$5000 is deposited in a savings account giving 3.5% annual interest which is compounded quarterly. Determine the account balance in 5 years (assuming no withdrawals).

21. At an intersection cars arrive randomly with an average rate of 30 cars per hour. Highway engineers estimate the likelihood or probability that at least one car will enter the intersection within a period of x minutes with $f(x) = 1 - e^{-0.5x}$. Compute $f(2)$ to the nearest hundredth and explain what the numerical value means.

22. Hurricanes are some of the largest storms on earth. They are very low pressure areas with diameters of over 500 miles. The barometric pressure in inches of mercury at a distance x miles from the eye of a severe hurricane is modeled by the formula $f(x) = 0.48 \ln(x + 1) + 27$.

(a) Compute $f(0)$ and $f(100)$ and interpret the results.

(b) At what distance from the eye of the hurricane is the air pressure 28 inches of mercury?

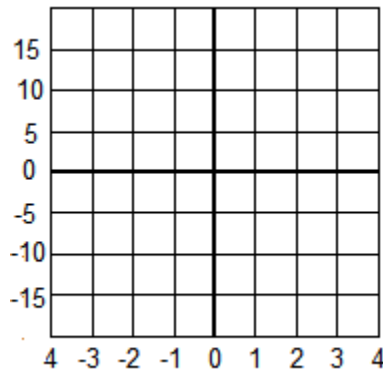
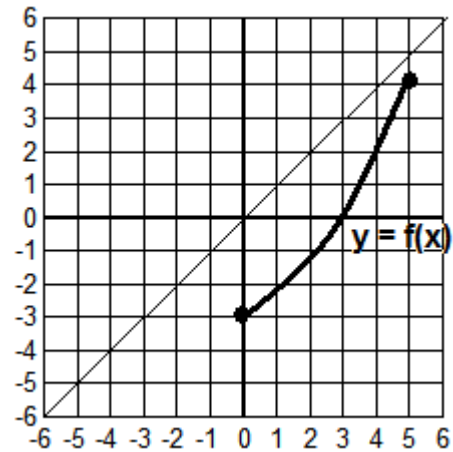
23. Expand each expression. Write your answers without exponents.

(a) $\log(2x^4)$ (b) $\ln\left(\frac{7x^3}{k}\right)$ (c) $\log\left(\frac{\sqrt{x+1}}{(x-2)^3}\right)$

24. Write each expression as the logarithm of a single expression.

(a) $\ln(2e) + \ln\left(\frac{1}{e}\right)$ (b) $\log(27) + \log(x^3)$ (c) $\log(x^3) - \log(x^2)$

25. Solve each of the equations. (a) $10^{x+2} = 10^{3x}$ (b) $7(1.5)^{2x} - 3 = 12$ (c) $\left(\frac{1}{6}\right)^{x+2} = 3$



PRACTICE ROUTINES using Flash: forming linear functions, determining the vertex of a quadratic function, solving linear systems, mixture problems, constructing exponential equations

Go to:

<http://astro.temple.edu/~dhill001/flashformathpatterns.html>