

**PCH Chapter 3 Fall 2013 (No Calculators are permitted)**

**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

1. If  $\log_b(3^b) = \frac{b}{2}$  then  $b =$

- a. 1/9
- b. 9
- c. -9
- d. 1/3

$\log_b 3 = \frac{b}{2}$

- e. -3
- f. 3
- g. -1/9
- h. none of these

$\log_2 4^2 =$   
 $b \log_b 3 = \frac{b}{2}$   
 $\frac{b \log_b 3}{b} = \frac{1}{2}$

2. The approximate value of  $\log_9 10$  is

- a. -2.3456
- b. 0.8576
- c. 1.04795

$\frac{\log 10}{\log 9}$

- d. 1.9347
- e. 0.4956

$b^{\frac{1}{2} \log_b 3} = \frac{1}{2}$   
 $b^{\frac{1}{2}} = 3 = 3^2 = 9$

3. Simplify:  $(\log_4 3)(\log_3 16) =$

- a. -2
- b. 2
- c. -1/2

$\frac{\log 3}{\log 4} \cdot \frac{\log 16}{\log 3} = \frac{\log 16}{\log 4} = \log_4 16 = 2$

- d. 1/2
- e. 4
- f. none of these

**Multiple Response**

Identify one or more choices that best complete the statement or answer the question.

4. Select all that apply:  $f(x) = \ln(x)$

- a. There is a horizontal asymptote
- b. The domain is  $(-\infty, \infty)$
- c.  $f(x)$  has an inverse function
- d. The graph is decreasing

- e.  $f(0) = 1$
- f. The graph is increasing
- g.  $f(1) = 0$
- h. There is a vertical asymptote

5. Select all that apply:  $f(x) = e^x$

- a. The domain is  $(-\infty, \infty)$
- b.  $f(0) = 1$
- c. The graph is increasing
- d. The graph is decreasing

- e. There is a vertical asymptote
- f.  $f(x)$  has an inverse function
- g.  $f(1) = 0$
- h. There is a horizontal asymptote

## Matching

Match the equation:

a.  $A = P(1+r)$

b.  $\left(1 + \frac{1}{x}\right)^x$  as  $x \rightarrow \infty$

c.  $A = P\left(1 + \frac{n}{r}\right)^{nt}$

d.  $\left(1 + \frac{1}{x}\right)^x$  as  $x \rightarrow 0$

e.  $A = P\left(1 + \frac{r}{n}\right)^{nt}$

f.  $(1+x)^{\frac{1}{x}}$  as  $x \rightarrow \infty$

g.  $A = Pe^{rt}$

h. none of these

- \_\_\_ 6. The formula for the account balance of P dollars invested at r% per year compounded n times per year is
- \_\_\_ 7.  $e =$
- \_\_\_ 8. The formula for the account balance of P dollars invested at r% per year compounded continuously is
- \_\_\_ 9. The formula for the account balance of P dollars invested at r% simple interest is

More Log values

a. undefined

b. x

c. 0

d. 1

e. 2

f. -1

g. -x

h. none of these

\_\_\_ 10.  $\ln 10 =$  h

\_\_\_ 11.  $\log_b b =$  d

\_\_\_ 12.  $e^{\ln x} =$  ~~d~~

\_\_\_ 13.  $\log 10 =$  d

\_\_\_ 14.  $\ln e^x =$  b

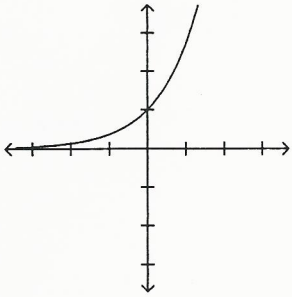
\_\_\_ 15.  $\log e^x =$

\_\_\_ 16.  $\log_b 1 =$

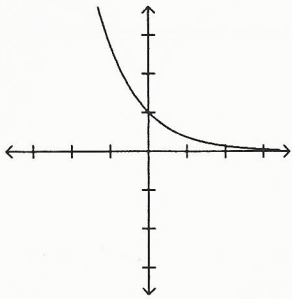
\_\_\_ 17.  $b^{\log_x x} =$

**Exponential Graphs**

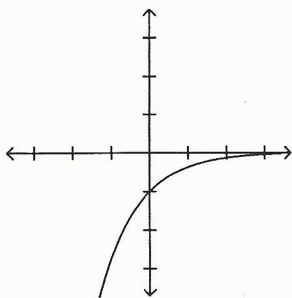
a.



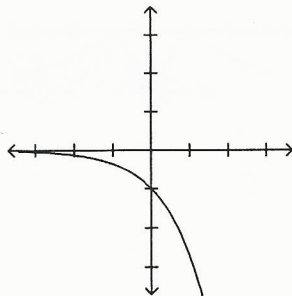
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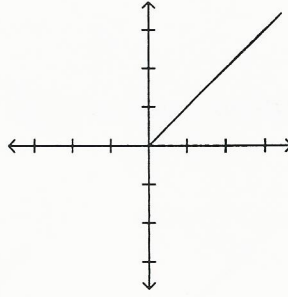
c.



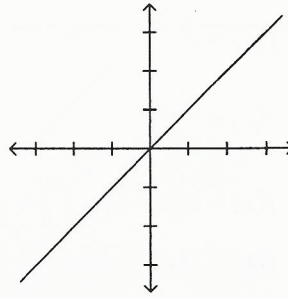
d.



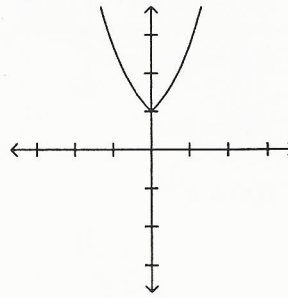
e.



f.



g.



h. none of these

\_\_\_ 18.  $f(x) = e^x$

\_\_\_ 19.  $f(x) = e^{-x}$

\_\_\_ 20.  $f(x) = e^{|x|}$

\_\_\_ 21.  $f(x) = -e^{-x}$

\_\_\_ 22.  $f(x) = e^{\ln x}$

\_\_\_ 23.  $f(x) = \frac{1}{e^x}$

**Match the domain with the function.**

a.  $(-\infty, \infty)$

b.  $(-\infty, 0) \cup (0, \infty)$

c.  $(1, \infty)$

d.  $(0, \infty)$

e.  $(-1, \infty)$

f.  $[0, \infty)$

g.  $[1, \infty)$

h. none of these

\_\_\_ 24. What is the domain of  $f(x) = e^x$ ?

\_\_\_ 25. What is the domain of  $f(x) = \frac{1}{e^x}$ ?

\_\_\_ 26. What is the domain of  $f(x) = \ln(x-1)$   $(1, \infty)$

\_\_\_ 27. What is the domain of  $f(x) = \ln x$ ?  $(0, \infty)$

\_\_\_ 28. What is the domain of  $f(x) = \ln(-x)$   $(-\infty, 0)$

\_\_\_ 29. What is the domain of  $f(x) = \ln|x|$   $b$

\_\_\_ 30. What is the domain of  $f(x) = \ln e^x$

\_\_\_ 31. What is the domain of  $f(x) = e^{\ln x}$

**Log values**

a. undefined

b. 1

c. 2

d.  $1/2$

e.  $2/3$

f. 0

g. 3

h. none of these

\_\_\_ 32.  $\frac{\ln 27}{\ln 3} = \log_3 27 = 3$

\_\_\_ 33.  $\ln 1 = 0$

\_\_\_ 34.  $\ln 1000 =$

\_\_\_ 35.  $\log -10$

\_\_\_ 36.  $\log_4 4 =$

\_\_\_ 37.  $\ln 0$

\_\_\_ 38.  $\ln e^3$

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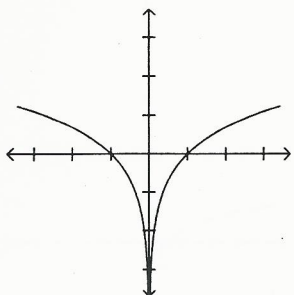
\_\_\_ 39.  $\log \sqrt{10} =$

\_\_\_ 40.  $\log 1000 =$

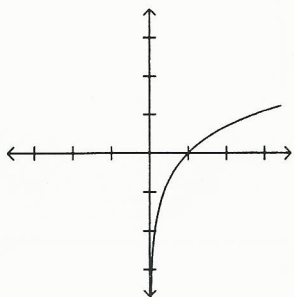
\_\_\_ 41.  $\log_8 4 =$

**Log graphs**

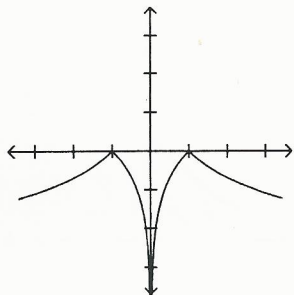
a.



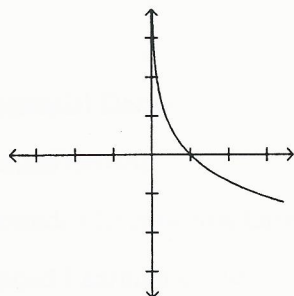
b.



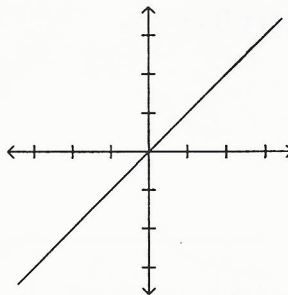
c.



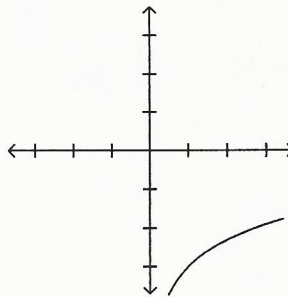
d.



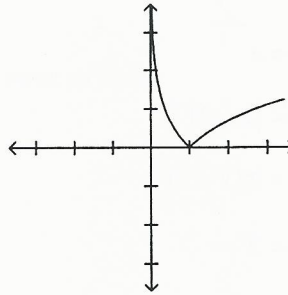
e.



f.



g.



h. none of these

\_\_\_ 42.  $f(x) = \ln|x|$

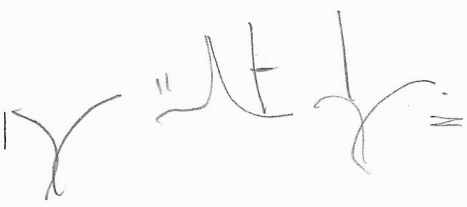
\_\_\_ 43.  $f(x) = \ln x$

\_\_\_ 44.  $f(x) = \ln(e^x)$

\_\_\_ 45.  $f(x) = -|\ln|x||$

\_\_\_ 46.  $f(x) = |\ln x|$

\_\_\_ 47.  $f(x) = -\ln x$



Match the range with the function.

- a.  $(0, \infty)$
- ~~b.  $(-\infty, -1) \cup (1, \infty)$~~
- ~~c.  $(-\infty, 0) \cup (0, \infty)$~~
- d.  $[1, \infty)$

49

- ~~e.  $(0, 1]$~~
- ~~f.  $(-\infty, \infty)$~~
- g.  $[0, \infty)$
- h. none of these

\_\_\_ 48. Find the range of  $f(x) = \left(\frac{1}{3}\right)^x$

\_\_\_ 49. Find the range of  $f(x) = |\ln(x^2 - 1)|$  \*

\_\_\_ 50. Find the range of  $f(x) = e^{\ln x}$

\_\_\_ 51. Find the range of  $f(x) = \ln e^x$

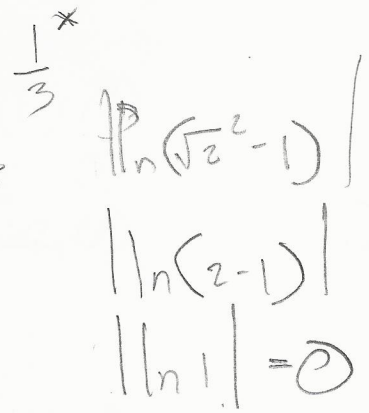
\_\_\_ 52. Find the range of  $f(x) = \ln x$

\_\_\_ 53. Find the range of  $f(x) = e^{\frac{x^2}{2}}$

\_\_\_ 54. Find the range of  $f(x) = |\ln(x)|$

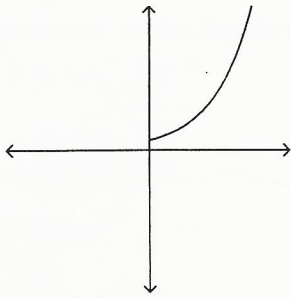
\_\_\_ 55. Find the range of  $f(x) = \ln(x - 1)$

\_\_\_ 56. Find the range of  $f(x) = 2^x$

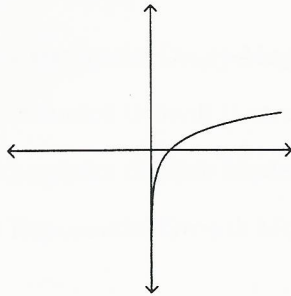


Match the graph with the model

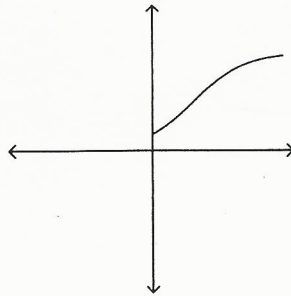
a.



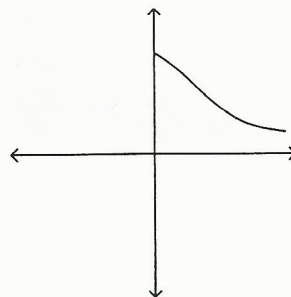
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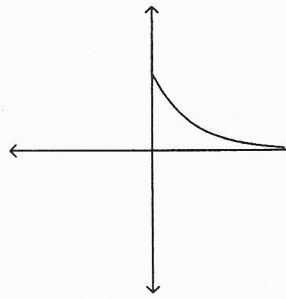
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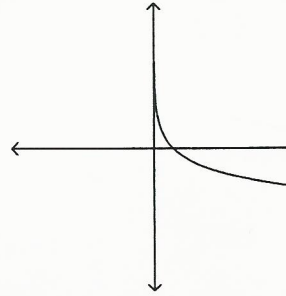
d.



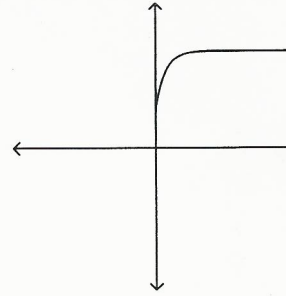
e.



f.



g.

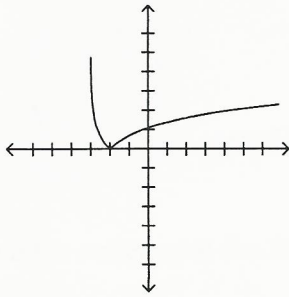


h. none of these

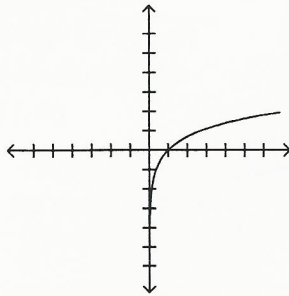
- \_\_\_ 57. Exponential Decay
- \_\_\_ 58. Logistics Growth
- \_\_\_ 59. Unbounded Exponential Growth
- \_\_\_ 60. Bounded Learning Curve

**Translations of log and exponential graphs**

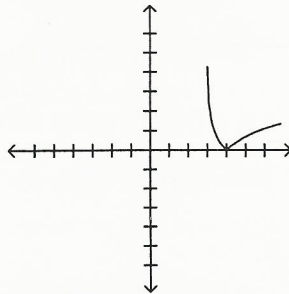
a.



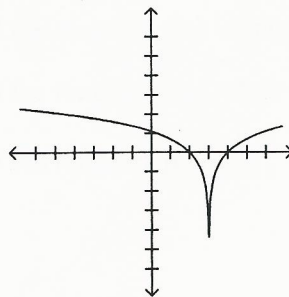
b.



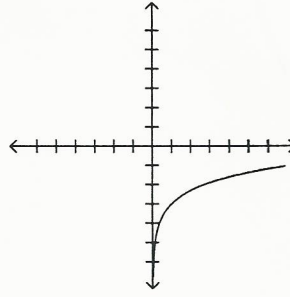
c.



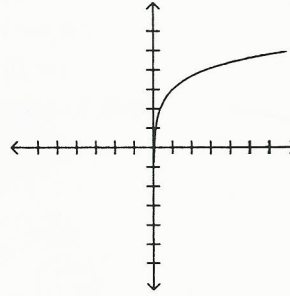
d.



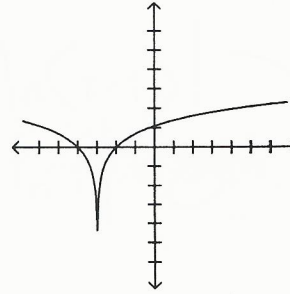
e.



f.



g.



h. none of these

- \_\_\_ 61. Identify the graph of  $f(x) = \ln x + 3$
- \_\_\_ 62. Identify the graph of  $f(x) = |\ln(x - 3)|$
- \_\_\_ 63. Identify the graph of  $f(x) = \ln(x) - 3$
- \_\_\_ 64. Identify the graph of  $f(x) = \ln(x)$
- \_\_\_ 65. Identify the graph of  $f(x) = -\ln(-x)$



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\_\_\_ 66. Identify the graph of  $f(x) = \ln|x - 3|$

**Exponential Model Equations: Match the model with the equation**

a.  $y = A_0 e^{kt}$ ,  $k > 0$

e.  $A = Pe^{rt}$

b.  $A = P\left(1 + \frac{r}{n}\right)^{nt}$

f.  $y = A - Be^{-kt}$ ,  $t \geq 0$

c.  $y = A_0 e^{-kt}$ ,  $k > 0$

g.  $y = \frac{k}{x}$

d.  $y = \frac{A}{1 + Be^{-Akt}}$ ,  $t \geq 0$

h. none of these

\_\_\_ 67. The Exponential Decay Model

\_\_\_ 68. The Bounded Growth (Learning Curve) Model

\_\_\_ 69. The Logistics Growth Model

\_\_\_ 70. The Exponential Growth Model

# Student Grade Report

Legend: Incorrect:

**Student: Vestil, Keanu**

	Grade	Total Score	Score (%)
Overall	A	67.00 / 70.00	95.71 <div style="width: 100px; height: 10px; background-color: black; display: inline-block; vertical-align: middle;"></div>

## Responses

Question	Response	Correct Answer	Question	Response	Correct Answer	Question	Response	Correct Answer
Question1	B		Question25	A		Question49	G	
Question2	C		Question26	C		Question50	A	
Question3	B		Question27	D		Question51	F	
Question4	(C,F,G,H)		Question28	H		Question52	F	
Question5	(A,B,C,F,H)		Question29	B		Question53	A	E
Question6	C	E	Question30	A		Question54	G	
Question7	B		Question31	D		Question55	F	
Question8	G		Question32	G		Question56	A	
Question9	H		Question33	F		Question57	E	
Question10	H		Question34	H		Question58	C	
Question11	D		Question35	A		Question59	A	
Question12	B		Question36	B		Question60	G	
Question13	D		Question37	A		Question61	F	
Question14	B		Question38	G		Question62	C	
Question15	H		Question39	D		Question63	E	
Question16	C		Question40	G		Question64	B	
Question17	H		Question41	E		Question65	H	
Question18	A		Question42	A		Question66	D	
Question19	B		Question43	B		Question67	C	
Question20	G		Question44	H	E	Question68	F	
Question21	C		Question45	C		Question69	D	
Question22	E		Question46	G		Question70	A	
Question23	B		Question47	D				
Question24	A		Question48	A				