EAST LOS ANGELES COLLEGE **NAME:**

MATH 260 SAMPLE TEST CHAPTER 4 -- STEWART'S PRECALCULUS
INSTRUCTOR: ANNE SISWANTO; TOTAL POINTS: 100; TIME: 70 MINUTES.

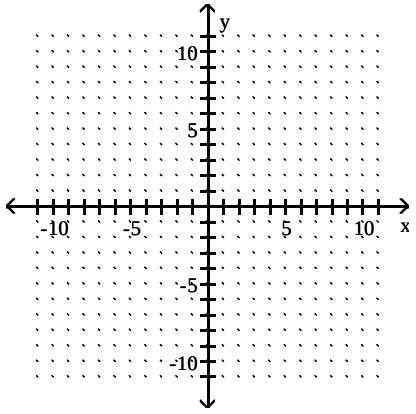
Direction: No graphing calculator is allowed during test. Please write your answer in the answer blanks and show all work to get full credits. The sample test is longer than the actual test.

Determine i) the domain of the function, ii) the range of the function, iii) the domain of the inverse, and iv) the range of the inverse.

1) $f(x) = \sqrt{2 - 5x}$

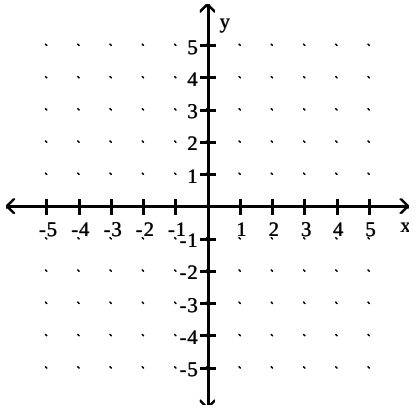
Use transformations to graph the function. Determine the domain, range, and horizontal asymptote of the function.

2) $f(x) = -2^{x+3} + 4$



Graph the function.

3) $f(x) = 2^{-x} - 4$



Solve the equation.

4) $3^{1+2x} = 27$

5) $3^{6-3x} = \frac{1}{27}$

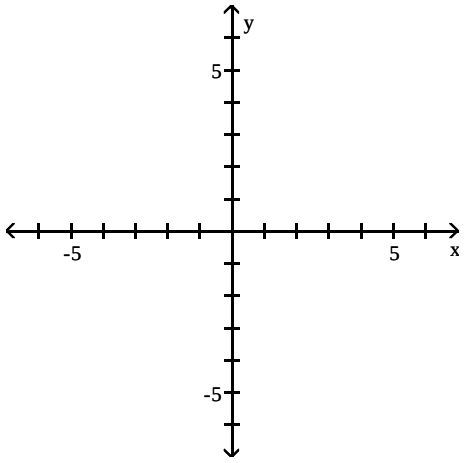
6) $\left(\frac{9}{4}\right)^{x} = \frac{256}{6561}$

Solve the problem.

7) Letitia borrows \$6250 at a rate of 11% compounded quarterly. Find how much Letitia owes at the end of 4 years.

Use transformations to graph the function. Determine the domain, range, and vertical asymptote of the function.

8) $h(x) = -2 + \log(x + 4)$



Solve the equation.

9) $\log_5 (x^2 - 4x) = 1$

10) $3 + 9 \ln x = 7$

11) $e^{x+8} = 2$

The loudness of a sound of intensity x, measured in watts per square meter, is defined as $L(x) = \log\left(\frac{x}{x_0}\right)$, where $x_0 = 10^{-3}$.

12) A particular Boeing 747 jetliner produces noise at a loudness level of 113 decibels. Find the intensity level (round to the nearest hundredth) in watt per square meter for this noise.

Solve the problem.

13) $pH = -\log_{10}[H^+]$ Find the $[H^+]$ if the pH = 4.4.

14) $pH = -\log_{10}[H^+]$ Find the pH if the $[H^+] = 4.8 \times 10^{-2}$.

Use the properties of logarithms to find the exact value of the expression. Do not use a calculator.

15) $\ln e^{\sqrt{6}}$

16) $\log_{60} 3 + \log_{60} 20$

17) $\log_2 34 - \log_2 17$

Find the value of the expression.

18) Let $\log_b A = 2$ and $\log_b B = -10$. Find $\log_b \frac{A}{B}$.

19) Let $\log_b A = 5$ and $\log_b B = -4$. Find $\log_b B^2$.

20) Let $\log_b A = 5$ and $\log_b B = -2$. Find $\log_b \sqrt{AB}$.

Write as the sum and/or difference of logarithms. Express powers as factors.

21) $\log_3 \frac{17\sqrt{r}}{s}$

22) $\log_3 \left(\frac{\sqrt{x}}{27}\right)$

23) $\log_9 \frac{\sqrt[2]{17}}{q^2 p}$

Express as a single logarithm.

24) $(\log_a m - \log_a n) + 2\log_a k$

25) $2\log_a x - \frac{5}{3}\log_a y + \frac{1}{2}\log_a w - 5\log_a z$

Use the Change–of–Base Formula and a calculator to evaluate the logarithm. Round your answer to three decimal places.

26) $\log_4 66.46$

Use the Change–of–Base Formula and a calculator to evaluate the logarithm. Round your answer to two decimal places.

27) $\log_{5.0} 265$

28) $\log_{\sqrt{7}} 70.9$

Solve the equation.

29) $\log(2 + x) - \log(x - 5) = \log 2$

30) $\log_3 x + \log_3(x - 24) = 4$

31) $\log_2(3x - 2) - \log_2(x - 5) = 4$

32) $2 + \log_3(2x + 5) - \log_3 x = 4$

33) $3 \cdot 5^{2t-1} = 75$

34) $3^{2x} + 3^x - 6 = 0$

Solve the exponential equation. Express the solution set in terms of natural logarithms.

35) $e^{x+5} = 3$

36) $2^{7x} = 4.9$

37) $4^{x+4} = 5^{2x+5}$

Solve the problem.

38) Find out how long it takes a $3200 investment to double if it is invested at 8% compounded semiannually. Round to the nearest tenth of a year. Use the formula $A = P\left(1 + \frac{r}{n}\right)^{nt}$.

Find the amount that results from the investment.

39) $14,000 invested at 14% compounded semiannually after a period of 5 years

Solve the problem.

40) Find the amount owed at the end of 8 years if $5000 is loaned at a rate of 5% compounded monthly.

41) Which of the two rates would yield the larger amount in 1 year: 4.7% compounded semiannually or 4.6% compounded quarterly?

Find the present value. Round to the nearest cent.

42) To get $6500 after 10 years at 4% compounded quarterly

Solve the problem.

43) What principal invested at 8% compounded continuously for 4 years will yield $1190? Round the answer to two decimal places.

44) How long does it take $1125 to triple if it is invested at 7% interest, compounded quarterly? Round your answer to the nearest tenth.

45) If Emery has $2000 to invest at 12% per year compounded monthly, how long will it be before he has $3500? If the compounding is continuous, how long will it be? (Round your answers to three decimal places.)

46) Cindy will require $13,000 in 5 years to return to college to get an MBA degree. How much money should she ask her parents for now so that, if she invests it at 11% compounded continuously, she will have enough for school? (Round your answer to the nearest dollar.)

47) Conservationists tagged 90 black–nosed rabbits in a national forest in 1990. In 1991, they tagged 180 black–nosed rabbits in the same range. If the rabbit population follows the exponential law, how many rabbits will be in the range 6 years from 1990?

48) During 1991, 200,000 people visited Rave Amusement Park. During 1997, the number had grown to 834,000. If the number of visitors to the park obeys the law of uninhibited growth, find the exponential growth function that models this data.

49) A culture of bacteria obeys the law of uninhibited growth. If 140,000 bacteria are present initially and there are 609,000 after 6 hours, how long will it take for the population to reach one million?

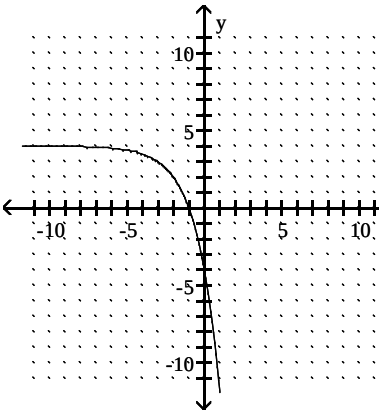
50) The half–life of silicon–32 is 710 years. If 90 grams is present now, how much will be present in 100 years? (Round your answer to three decimal places.)

51) A fossilized leaf contains 36% of its normal amount of carbon 14. How old is the fossil (to the nearest year)? Use 5600 years as the half–life of carbon 14.

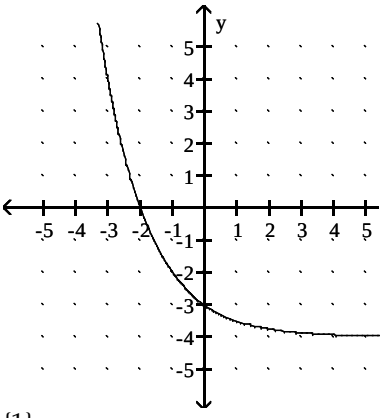
52) Strontium 90 decays at a constant rate of 2.44% per year. Therefore, the equation for the amount P of strontium 90 after t years is $P = P_0 e^{-0.0244t}$. How long will it take for 15 grams of strontium to decay to 5 grams? Round answer to 2 decimal places.

1) f(x): D = $\left\{x \mid x \le \frac{2}{5}\right\}$, R = $\{y \mid y \ge 0\}$;
$f^{-1}(x)$: D = $\{x \mid x \ge 0\}$, R = $\left\{y \mid y \le \frac{2}{5}\right\}$

2) domain of f: $(-\infty, \infty)$; range of f: $(-\infty, 4)$;
horizontal asymptote: y = 4

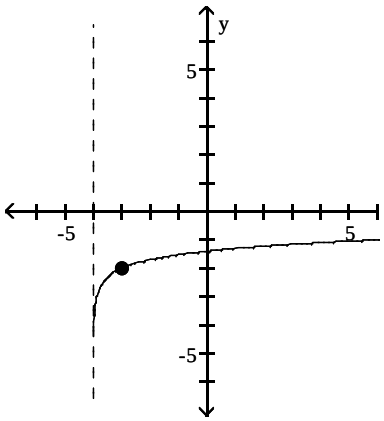


3)



4) {1}
5) {3}
6) {–4}
7) $9646.93

8) x = –4



domain $(-4, \infty)$
range $(-\infty, \infty)$
vertical asymptote x = –4

9) {5, –1}
10) $\{e^{4/9}\}$
11) {ln 2 – 8}
12) 0.20 watt per square meter
13) 3.98×10^{-5}
14) 1.32
15) $\sqrt{6}$
16) 1
17) 1
18) 12
19) –8
20) 0.600
21) $\log_3 17 + \frac{1}{2}\log_3 r - \log_3 s$
22) $\frac{1}{2}\log_3 x - 3$
23) $\frac{1}{2}\log_9 17 - 2\log_9 q - \log_9 p$
24) $\log_a \frac{mk^2}{n}$
25) $\log_a \frac{x^2 w^{1/2}}{y^{5/3} z^5}$
26) 3.027
27) 3.47
28) 4.38
29) {12}
30) {27}
31) {6}

32) $\left\{\frac{5}{7}\right\}$
33) $\left\{\frac{3}{2}\right\}$
34) $\left\{\frac{\ln 2}{\ln 3}\right\}$
35) {ln 3 – 5}
36) $\left\{\frac{\ln 4.9}{7 \ln 2}\right\}$
37) $\left\{\frac{5 \ln 5 - 4 \ln 4}{\ln 4 - 2 \ln 5}\right\}$
38) 8.8 years
39) $27,540.12
40) $7452.93
41) 4.7% compounded semiannually
42) $4365.75
43) $864.12
44) 15.8 years
45) 4.687 yrs, 4.663 yrs
46) $7500
47) 5760
48) $f(t) = 200{,}000e^{0.238t}$
49) 8.024 hours
50) 81.629
51) 8239
52) 45.03 years.