

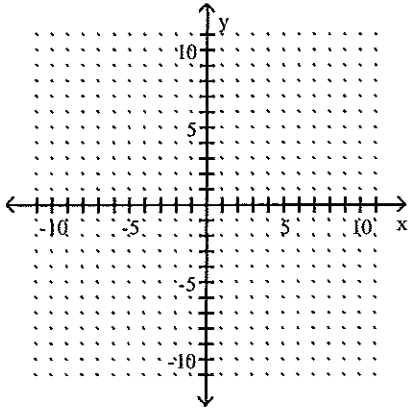
Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

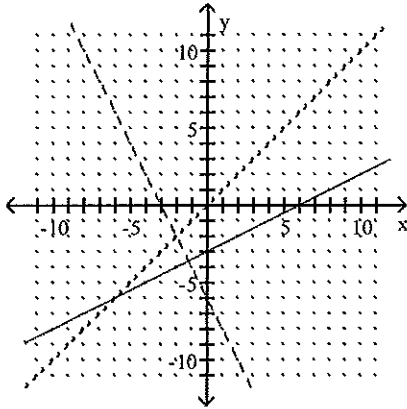
Sketch the graph of the given function, its inverse, and $y = x$ on the same set of axes. Graph the function with a solid line, and graph $y = x$ and the function's inverse using dotted lines.

1) $f(x) = \frac{1}{2}x - 3$

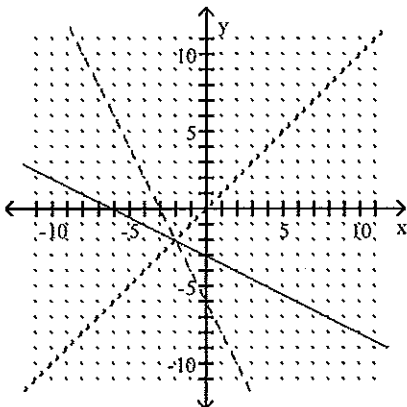
1) _____



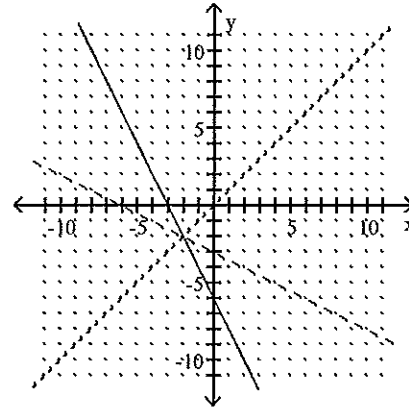
A)



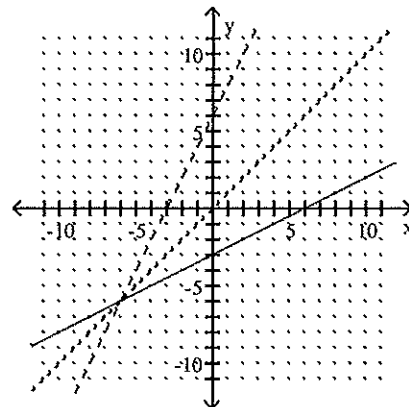
C)



B)



D)



SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

2) The number of temporary workers for various years are shown in the table below.

2) _____

Year	Average Daily Employment in Temporary Help Services (in millions)
1992	1.4
1993	1.6
1994	2.0
1995	2.2
1996	2.3
1997	2.5
1998	2.9

(Source: New York Times)

Let $n = f(t)$ represent the number of temporary workers (in millions) at t years since 1990.

An equation for f is $f(t) = 0.24t + 0.95$.

i) Find an equation for f^{-1} .

ii) Find $f(15)$. What does your result mean in terms of the situation?

iii) Find $f^{-1}(4)$. What does your result mean in terms of the situation?

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the logarithm.

3) $\log(100)$

A) 2

B) -2

C) 20

D) $\frac{1}{100}$

3) _____

4) $\log_7(\sqrt{7})$

A) $\frac{1}{2}$

B) $\frac{1}{7}$

C) 7

D) 1

4) _____

5) $\log_b(\sqrt{b})$

A) $\frac{1}{2}$

B) 2

C) $-\frac{1}{2}$

D) -2

5) _____

Find the inverse of the given function.

6) $\log_5(x)$

A) $\frac{1}{\log_5(x)}$

B) $-\log_5(x)$

C) 5^x

D) x^5

6) _____

Evaluate.

7) Let $g(x) = 3^x$. Find $g^{-1}(9)$

A) 6

B) 2

C) -2

D) -6

7) _____

8) Let $f(x) = \log_5(x)$. Find $f^{-1}(3)$

8) _____

A) $\frac{1}{3}$

B) 15

C) 125

D) 5

Write the equation in exponential form. Assume that all constants are positive and not equal to 1.

9) $\log_{25}(5) = \frac{1}{2}$

9) _____

A) $5^{25} = \frac{1}{2}$

B) $\left(\frac{1}{2}\right)^5 = 25$

C) $25^{1/2} = 5$

D) $5^{1/2} = 25$

Solve.

10) $\log_5(x - 4) = -2$

10) _____

A) $-\frac{99}{32}$

B) $\frac{101}{32}$

C) $-\frac{99}{25}$

D) $\frac{101}{25}$

11) $\log_x(36) = 2$

11) _____

A) -6

B) 6

C) $\frac{1}{6}$

D) $-\frac{1}{6}$

Solve. Round any approximate solution to the fourth decimal place.

12) $4^{3x} - 1 = 1024$

12) _____

A) 1

B) 4

C) 2

D) 3

Solve the equation. Round the solution to four decimal places, if necessary.

13) $6^{5x} \cdot 6^{3x} - 5 = 112$

13) _____

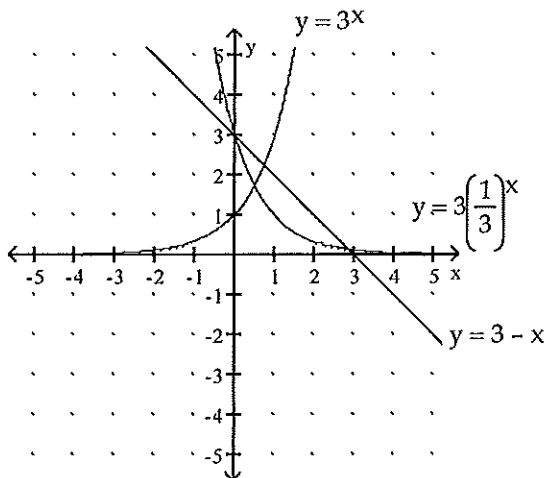
A) 0.1772

B) 0.5089

C) 0.3322

D) 0.9542

Estimate any solutions of the equation or system by referring to the graphs shown.



14) $3^x = 3 - x$

14) _____

A) 0.5

B) 0

C) 0.7

D) 2.9

Solve the problem.

- 15) The number of cases of a certain strain of influenza in the world are shown in the table for various years. 15) _____

Year	Number of Cases (thousands)
1993	283
1995	137
1998	63
2001	27
2004	19

Let $f(t)$ be the number of cases (in thousands) in the year that is t years from 1990. The equation is $f(t) = 508.64(0.78)^t$. Predict when there will be 6 thousand cases.

- A) 2010 B) 2008 C) 2011 D) 2009

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 16) A scientist wants to estimate the age of a piece of wood. The half-life of carbon-14 is 5730 years. Let $f(t)$ represent the percent of carbon-14 that remains in the wood at t years after the wood dies. 16) _____
- i) Find an equation for f .
- ii) If 20% of the carbon-14 remains, how old is the wood?

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Simplify. Write the expression as a single logarithm with a coefficient of 1.

- 17) $3 \log_x (3) + \log_x (2)$ 17) _____
- A) $\log_x (18)$ B) $\log_x (2)$ C) $3 \log_x (6)$ D) $\log_x (54)$

- 18) $5 \log_b (2x^7) - 3 \log_b (4x^4)$ 18) _____
- A) $\log_b (32x^{35} - 64x^{12})$ B) $\log_b \left(\frac{5x^3}{6} \right)$
- C) $\log_b \left(\frac{x^{23}}{2} \right)$ D) $\log_b (10x^7 - 12x^4)$

Solve. If necessary, round the answer to two decimal places.

- 19) $\log (7) + \log (x) = 0$ 19) _____
- A) 0 B) $\frac{1}{7}$ C) 7 D) $\sqrt{7}$

- 20) $\log_6 (x+6) + \log_6 (x) = 3$ 20) _____
- A) 18 B) -18 C) -12 D) 12

Find the natural logarithm.

- 21) $\ln \sqrt[4]{e}$ 21) _____
- A) $\frac{e}{4}$ B) $\frac{1}{4}$ C) 4 D) $4e$

Solve the equation.

22) $\ln(10) + \ln(x) = 0$

A) 10

B) 0

C) $\sqrt{10}$

D) $\frac{1}{10}$

22) _____

Solve the equation. Round the solution to four decimal places, if necessary.

23) $3 \ln(4x^2) - 2 \ln(8x^4) = 6$

A) 0.6514

B) 1.5351

C) 0.0498

D) 20.0855

23) _____

24) $5e^x - 16 = 3e^x + 63$

A) 2.29

B) 3.6763

C) 1.7707

D) 3.157

24) _____

Simplify. Write the expression as a single logarithm with a coefficient of 1.

25) $2 \ln(w^2) - \ln(7w^8)$

A) $\ln(w^4 - 7w^8)$

B) $\ln\left(\frac{1}{7w^4}\right)$

C) $\ln(2w^2 - 7w^8)$

D) $\ln\left(\frac{2}{w^6}\right)$

25) _____

26) $6 \ln(a) - 7 \ln(b)$

A) $\ln\left(\frac{a}{b}\right)^{13}$

B) $\frac{\ln(a^6)}{\ln(b^7)}$

C) $\ln\left(\frac{6a}{7b}\right)$

D) $\ln\left(\frac{a^6}{b^7}\right)$

26) _____

Solve the problem.

27) Since the late 1990's electronic payments made to an online company have increased exponentially.

27) _____

Year	Number of Electronic Payments (thousands)
1999	53
2001	97
2003	185
2005	354
2006	487

Let $f(t)$ be the number of electronic payments in the year that is t years since 1995. A possible equation of f is $f(t) = 14.38e^{0.32x}$. Predict in which year there will be 3000 electronic payments.

A) 2013

B) 2014

C) 2011

D) 2012

28) The value of a particular investment follows a pattern of exponential growth. In the year 2000, you invested money in a money market account. The value of your investment t years after 2000 is given by the exponential growth model $f(t) = 2200e^{0.067t}$. When will the account be worth \$3516?

A) 2009

B) 2006

C) 2007

D) 2008

28) _____

Answer Key

Testname: CHAPTER 11 TEST 2B

- 1) D
- 2) i) $f^{-1}(n) = 4.17n - 3.96$
 - ii) 4.6; The average daily employment in temporary services will be 4.6 million workers in 2005.
 - iii) 12.72; The average daily employment in temporary services will be 4 million workers in 2003.
- 3) A
- 4) A
- 5) A
- 6) C
- 7) B
- 8) C
- 9) C
- 10) D
- 11) B
- 12) C
- 13) D
- 14) C
- 15) B
- 16) i) $f(t) = 100\left(\frac{1}{2}\right)^{t/5730}$ or $f(t) = 100(0.999879)^t$
 - ii) 13,300 years
- 17) D
- 18) C
- 19) B
- 20) D
- 21) B
- 22) D
- 23) C
- 24) B
- 25) B
- 26) D
- 27) D
- 28) C