Chapter 1 – Functions, Test Form B

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

____ 1. If $f(x,y) = \frac{x\text{^}3 + y\text{^}3}{x\text{^}2 + y\text{^}2}$, calculate the value of $f(1.86, 3.85)$.

a. 3.47
b. 37.75
c. 5.71
d. None of the above

____ 2. If $g(x,y) = \frac{e^{x} + e^{-y}}{xy^{-e}}$, calculate the value of $g(9.3, 3.85)$.

a. 10938.02
b. 45909.64
c. 45712.3
d. –45712.3

____ 3. If $k(x,y) = \frac{\pi^{x+y}}{x+y}$, calculate the value of $k(4.56, 3.33)$.

a. 185.35
b. 1837.96
c. 188.99
d. 1060.32

____ 4. If $g(h,k) = \frac{h}{k} + \frac{k}{h}$, calculate the value of $g(5.03, 1.41)$.

a. 0.56
b. 7.13
c. 2
d. 3.85

____ 5. If $f(x,y,z) = \frac{xy+z}{x+yz}$, calculate the value of $f(16.92, 1.56, -3.76)$.

a. 2.05
b. 20.31
c. –4.53
d. 26.06

____ 6. The distance, in miles, from me to a moving train is given by

$D(t) = \sqrt{(30t)^2 + (5 - 30t)^2}$.

Here t represents hours since I heard the train whistle. Calculate the distance to the train 7 hours after I heard the whistle.

a. 5 miles
b. 293.47 miles
c. 86125 miles
d. 208.55 miles

____ 7. The following table shows the U.S. population, in millions, in the given year.

d = year	1960	1970	1980	1990	2000
N = population in millions	179.32	203.3	226.54	248.71	281.42

Use the average rate of change to estimate the U.S. population in 1994.

a. 261.79 million
b. 251.98 million
c. 265.07 million
d. None of the above

____ 8. The following table shows the number of bird species found on an island of area A square miles that is part of a particular Pacific island chain.

A = area	10	20	30	40	50
W = number of species	25	31	36	39	42

Calculate the average rate of change in the number of species as the area changes from 20 to 30 square miles.

a. 0.76 species per square mile
b. 36 species per square mile
c. 0.5 species per square mile
d. None of the above

____ 9. The following table shows average rice yield, in tons per hectare, in Asia t years since 1980.

t=years since 1980	5	10	15	20	25
Y =yield	3.32	3.61	3.73	3.95	4.11

Use the average rate of change to estimate the yield in 1989.

a. 3.32 tons per hectare
b. 3.55 tons per hectare
c. 3.46 tons per hectare
d. None of the above

____ 10. The following table shows average rice yield, in tons per hectare, in Asia t years since 1980.

t=years since 1980	5	10	15	20	25
Y=yield	3.32	3.61	3.73	3.95	4.11

Use the average rate of change to estimate the yield in 1997.

a. 3.73 tons per hectare
b. 3.82 tons per hectare
c. 3.87 tons per hectare
d. None of the above

____ 11. The temperature in degrees Fahrenheit can be estimated from the number of cricket chirps per minute. If a cricket chirps 40 times per minute, the temperature is approximately 50 degrees Fahrenheit. The average rate of change in temperature is 0.25 degree per chirp per minute. Use these facts to estimate the temperature when a cricket chirps 51 times per minute.

a. 52.75 degrees
b. 78 degrees
c. 40.25 degrees
d. none of the above

____ 12. A balloon that originally holds 13.6 cubic inches of air springs a leak. Let $V(t)$ represent the volume, in cubic inches, of air in the balloon t minutes after the balloon starts to leak air. The average rate of change of V is -1.02 cubic inches per minute. Use these facts to estimate $V(8)$.

a. 13.6 cubic inches
b. 21.76 cubic inches
c. 12.25 cubic inches
d. none of the above

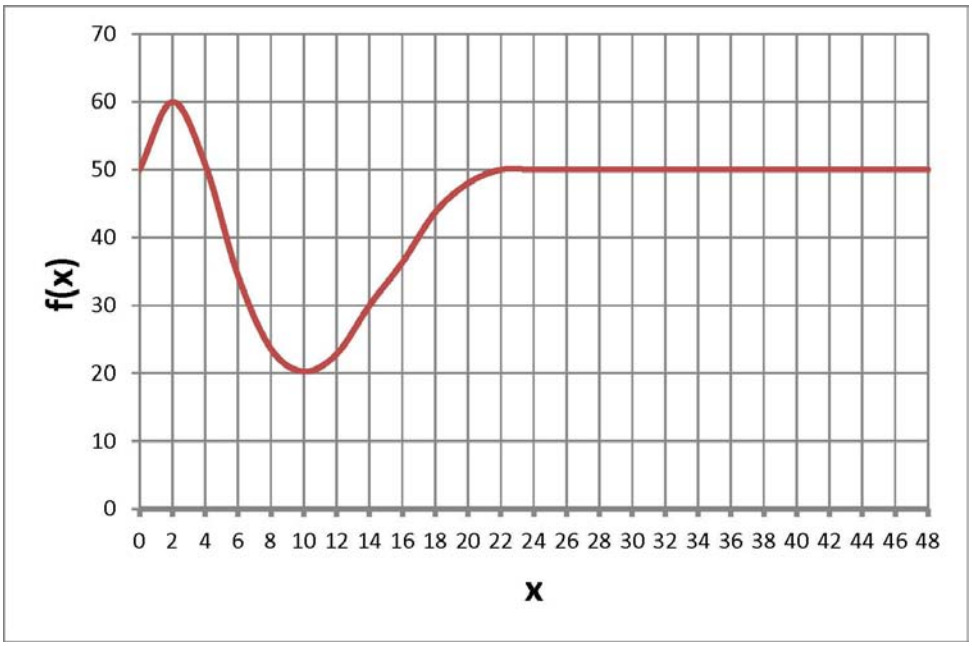
____ 13. Choose the answer that best completes the following sentence. A graph that is decreasing and concave up represents a function that is ...

a. increasing at an increasing rate
b. increasing at a decreasing rate
c. decreasing at a decreasing rate
d. decreasing at an increasing rate

____ 14. Choose the answer that best completes the following sentence. A point of inflection occurs where...

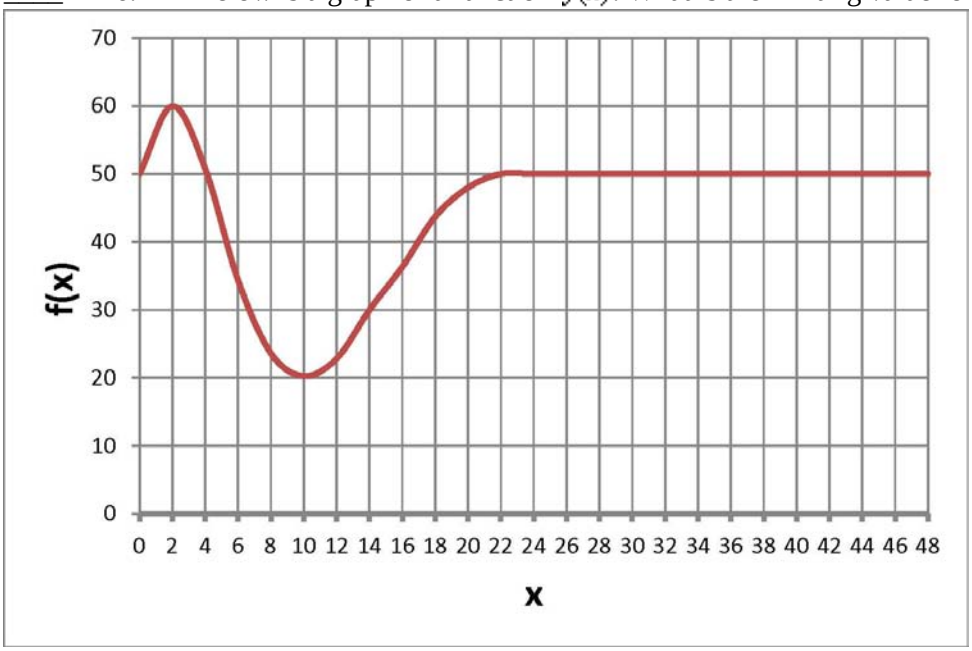
a. concavity changes
b. concavity is at a maximum
c. the graph is increasing
d. the graph is bent

____ 15. Below is a graph of a function $f(x)$. Find the average rate of change in f from 10 to 12 .



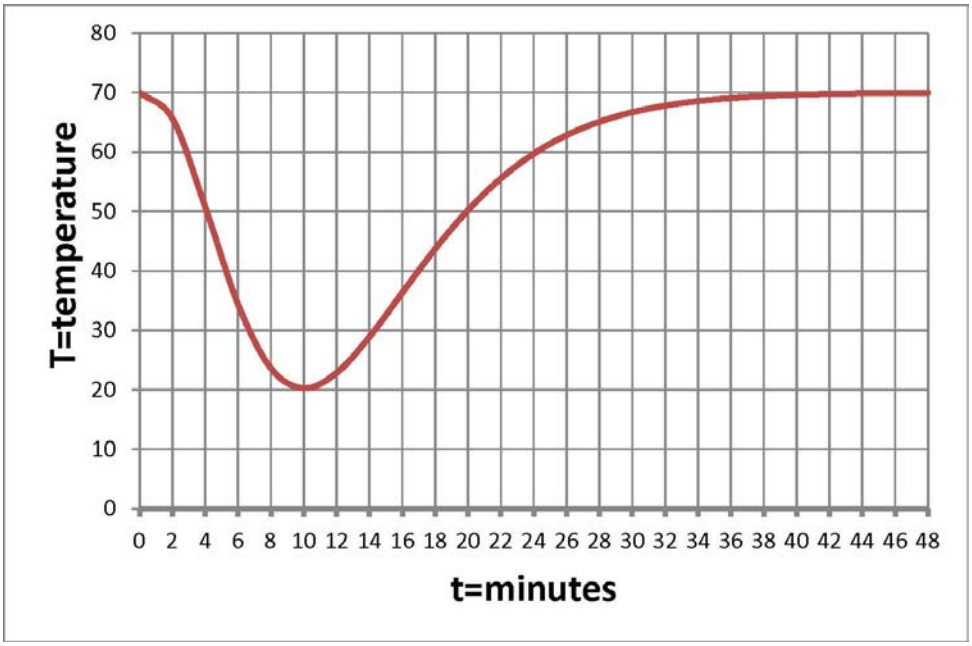
a. 30
b. 2.5
c. 10
d. None of the above

____ 16. Below is a graph of a function $f(x)$. What is the limiting value for f?



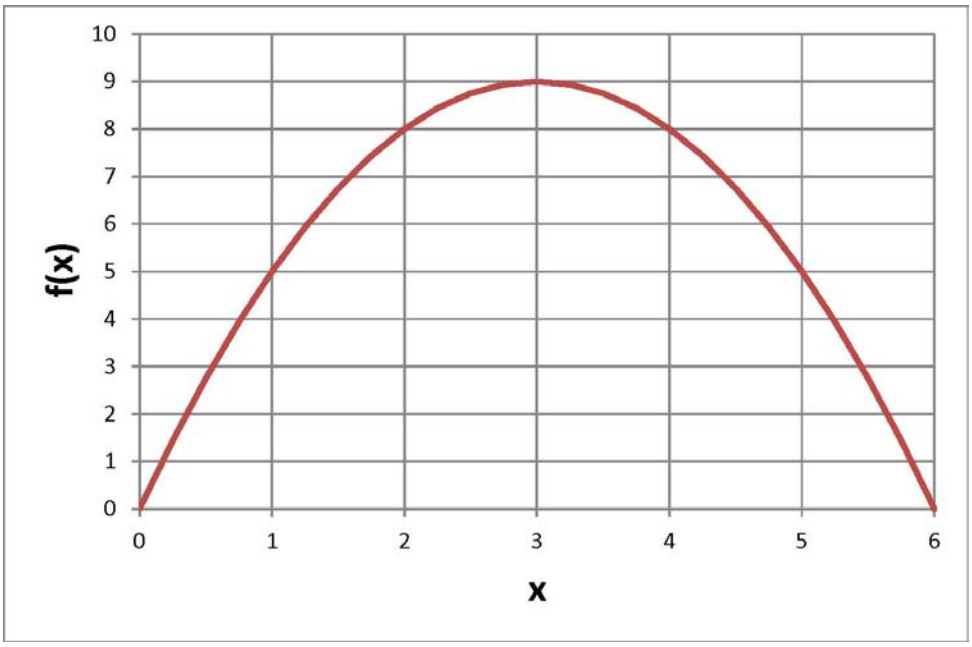
a. 60
b. 20
c. 50
d. None of the above

____ 17. You put a drink in the freezer to cool. You take it out of the freezer when it is cold. But you forget about the drink and leave it sitting on the kitchen counter. The graph below shows the temperature, in degrees, of the drink t minutes after the drink is placed in the freezer. What is the temperature in the kitchen?



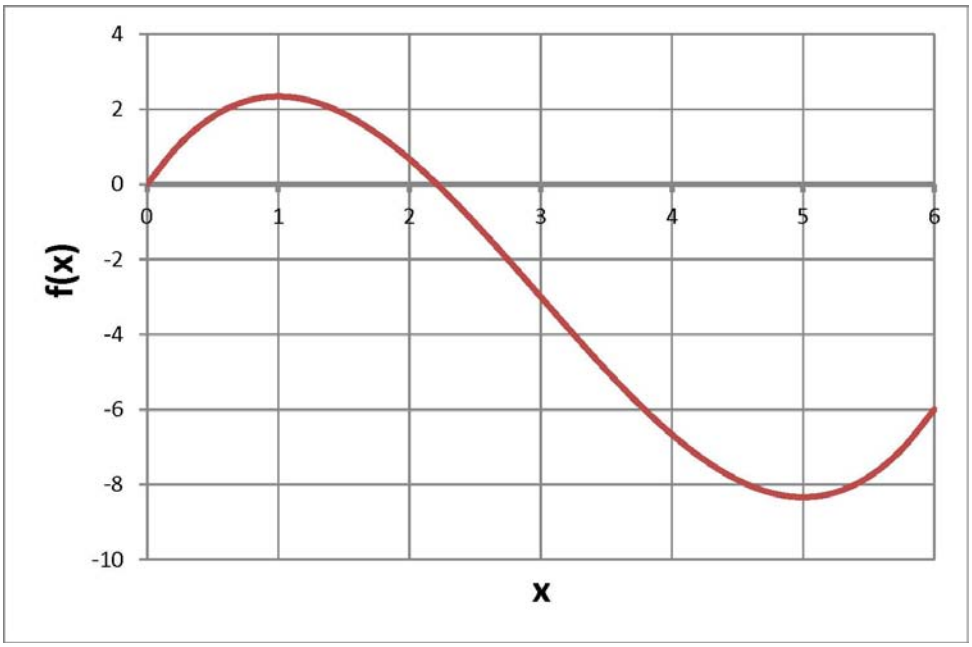
a. 20 degrees
b. 60 degrees
c. 70 degrees
d. None of the above

____ 18. Below is a graph of a function $f(x)$. What is the value of $f(0)$?



a. 0
b. –1
c. 9
d. None of the above

____ 19. Below is a graph of a function $f(x)$. Over what region(s) is the graph concave up?



a. at $x = 3$
b. from 0 to 3
c. from 3 to 6
d. None of the above

____ 20. If you work 46 hours per week, then your weekly pay P, in dollars, is proportional to your hourly wage W, in dollars per hour. Express this proportionality relationship as a formula.

a. $P \propto W$
b. $P = 46W$
c. $W = 46P$
d. None of the above.

____ 21. Sugar costs \$1.27 per pound, and lemons cost \$0.47 each. You sell lemonade for \$1.35 per glass. Write S for the pounds of sugar used, L for the number of lemons used, G for the number of glasses of lemonade you sell, and P for the profit, in dollars, you make. Express using a formula your profit in terms of pounds of sugar used, number of lemons used, and number of glasses of lemonade sold.

a. $P = 1.35G - 1.27S - 0.47L$
b. $P = 1.35G + 1.27S + 0.47L$
c. $P = 1.27S + 0.47L - 1.35G$
d. $P + 1.27G + 1.35S - 0.47L$

____ 22. The following table shows some function values.

x	1.3	2.1	4.2	7.2
$f(x)$	0.97	0.89	0.74	0.59

Which formula below fits these data?

a. $f(x) = 9x + 8$

b. $f(x) = 8x + 9$

c. $f(x) = \dfrac{x+9}{8}$

d. $f(x) = \dfrac{9}{x+8}$

____ 23. The following table shows your monthly payment P, in dollars, if you pay off a loan in t months.

t = number of months	12	24	36	48
P = monthly payment	$452.86	$239.93	$169.29	$134.22

Which formula below fits these data?

a. $P = \dfrac{5097}{t}$

b. $P = \dfrac{50.97 \times 1.01^t}{1.01^t - 1}$

c. $P = \dfrac{5097 \times (1.01)^t}{t - 1.01}$

d. None of the above

____ 24. The maximum length of a certain type of fish is 64 centimeters. The difference between the maximum length and the length at age t years is given by $D = 60.8 \times 0.81^t$ centimeters. Write a formula that gives the length L, in centimeters, of the fish at age t years.

a. $L = 64 + 60.8 \times 0.81^t$

b. $L = 64 - 60.8 \times 0.81^t$

c. $L = 64 \times 60.8 \times 0.81^t$

d. $L = 60.8 \times 0.81^t - 64$

____ 25. The temperature of an oven remains constant at 361 degrees Fahrenheit. A potato is placed in the oven to bake. The difference between the temperature of the oven and that of the potato after t minutes in the oven is given by $D = 286 \times 0.91^t$ degrees Fahrenheit. Write a formula that gives the temperature T, in degrees Fahrenheit, of the potato after t minutes in the oven.

a. $T = 361 - 286 \times 0.91^t$

b. $T = 361 + 286 \times 0.91^t$

c. $T = 361 \times 286 \times 0.91^t$

d. $T = 286 \times 0.91^t - 361$

Chapter 1 – Functions, Test Form B
Answer Section

MULTIPLE CHOICE

1.	ANS:	A	PTS:	1	DIF:	easy
2.	ANS:	B	PTS:	1	DIF:	easy
3.	ANS:	D	PTS:	1	DIF:	easy
4.	ANS:	D	PTS:	1	DIF:	easy
5.	ANS:	A	PTS:	1	DIF:	easy
6.	ANS:	B	PTS:	1	DIF:	medium
7.	ANS:	A	PTS:	1	DIF:	medium
8.	ANS:	C	PTS:	1	DIF:	medium
9.	ANS:	B	PTS:	1	DIF:	medium
10.	ANS:	B	PTS:	1	DIF:	medium
11.	ANS:	A	PTS:	1	DIF:	medium
12.	ANS:	D	PTS:	1	DIF:	medium
13.	ANS:	C	PTS:	1	DIF:	easy
14.	ANS:	A	PTS:	1	DIF:	easy
15.	ANS:	B	PTS:	1	DIF:	medium
16.	ANS:	C	PTS:	1	DIF:	medium
17.	ANS:	C	PTS:	1	DIF:	medium
18.	ANS:	A	PTS:	1	DIF:	easy
19.	ANS:	C	PTS:	1	DIF:	easy
20.	ANS:	B	PTS:	1	DIF:	easy
21.	ANS:	A	PTS:	1	DIF:	medium
22.	ANS:	D	PTS:	1	DIF:	easy
23.	ANS:	B	PTS:	1	DIF:	medium
24.	ANS:	B	PTS:	1	DIF:	medium
25.	ANS:	A	PTS:	1	DIF:	medium