

CCM2 Unit 4 NC Final Exam Review

Name: _____

Date: _____

1. A population of bacteria can multiply fivefold in 48 h. If there are 5000 bacteria now, how many will there be in 144 h?

- A. 12 500 B. 625 000
C. 72 000 D. 100 200

2. A population of insects can double in 30 days. After 80 days, how many times greater will the population be than after 30 days?

- A. 6.35 times B. 3.17 times
C. 2.67 times D. 1.34 times

3. A ball is dropped from a height of 4 m. After each bounce, it rises to 69% of its previous height. What height does the ball reach after 6 bounces?

- A. 0.63 m B. 0.51 m
C. 0.43 m D. 0.14 m

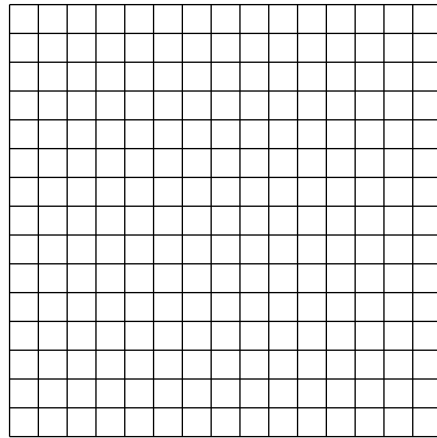
4. A laboratory had 64 oz of radioactive material. Every year $\frac{1}{2}$ of the material decayed (went away). How much was left after 7 years?

- A. 0.4 ounces B. 0.5 ounces
C. 0.6 ounces D. 6.0 ounces

5. For the new school year, St. Francis High School requires every student to own an iPad. By switching to online homework and quiz submission, the school hopes to reduce paper usage by 30% each year. Last year, St. Francis HS used 24,000 pounds of paper.

a) Complete the table and construct a graph to show how paper usage is expected to decrease over the next 5 years. Be sure to label and mark your axes.

Year	Paper (lbs)
0	24000
1	
2	
3	
4	
5	



b) Write an equation that shows paper usage (P) as a function of time in years (t).

c) In how many years does St. Francis HS expect paper usage to fall below 1000 pounds?

6. Julie is buying chocolate chip and oatmeal cookies from the bakery. Chocolate chip cookies cost 25¢ each and oatmeal cookies cost 20¢ each. She wants to buy a mixture of at least 50 cookies. Julie is planning to spend less than \$10. Let:

C = number of chocolate chip cookies she can buy.

M = number of oatmeal cookies she can buy.

Select the system of inequalities that represents this situation.

- A. $0.25C + 0.20M \geq 10.00$
 $C + M \geq 50$
- B. $0.25C + 0.20M < 10.00$
 $C + M \geq 50$
- C. $0.25C + 0.20M \geq 10.00$
 $C + M > 50$
- D. $0.25C + 0.20M < 10.00$
 $C + M > 50$

7. Solve: $\sqrt{2x} + 5 = 9$

- A. 7 B. 8 C. 16 D. \emptyset

8. Solve: $\sqrt{2x} = 6$

- A. 6 B. 18 C. 36 D. \emptyset

9. Solve: $\frac{\sqrt{y}}{2} = \frac{3}{5}$

- A. $\frac{18}{100}$ B. $\frac{9}{25}$ C. $\frac{56}{25}$ D. $\frac{36}{25}$

10. Solve: $\sqrt{x+2} = \frac{7}{\sqrt{x+2}}$

- A. 5 B. 7 C. 9 D. 14

11. Solve: $-7 = \sqrt{\frac{a}{7}} - 10$

- A. 63 B. 119 C. 2023 D. \emptyset

12. Solve: $\frac{3x-2}{2x-3} = \frac{3x+5}{2x+3}$

- A. $-\frac{9}{4}$ B. 1 C. $\frac{9}{4}$ D. $\pm\frac{9}{4}$

13. Solve: $\frac{3}{x^2+x-2} + \frac{3}{x-1} = \frac{1}{x+2}$

- A. -3 B. -5 C. 2 D. 5

14. If $f(x) = \frac{x-2}{x+5}$, then the value of x for which $f(x)$ is undefined is:

- A. -2 B. 2 C. 5 D. -5

15. Reduce: $\frac{3r^2 - 48}{6r^2 + 54r + 120}$. Determine the excluded values for r .

- A. $r \neq -4$ B. $r \neq -5$
 C. $r \neq -4, -5$ D. $r \neq 5$

16. A function is defined as follows:

$$f(x) = x^3 - 1$$

If the domain is $\{1, 2, 3\}$, what is the range of the function?

- A. $\{0, 7, 26\}$ B. $\{0, 9, 16\}$
 C. $\{2, 5, 8\}$ D. $\{2, 11, 17\}$

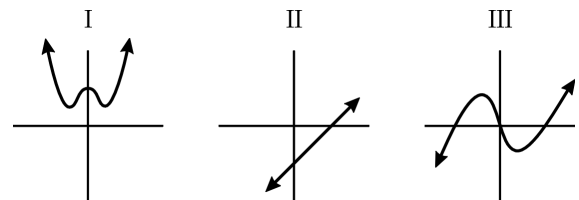
17. What are the negative parts of the domain of the function $f(x) = x^3 + 4x^2 + x - 6$?

- A. $-2 < x < 1$ or $x < -3$
 B. $-2 \leq x \leq 1$ or $x \leq -3$
 C. $-3 < x < -2$ or $x > 1$
 D. $-3 \leq x \leq -2$ or $x \geq 1$

18. The size of a fungal colony is modeled by the equation $z(t) = \frac{3}{2}t^2 + 17$, where z is the size of the colony in microns and t is the time in hours. Determine the size of the colony in $5\frac{1}{2}$ hours.

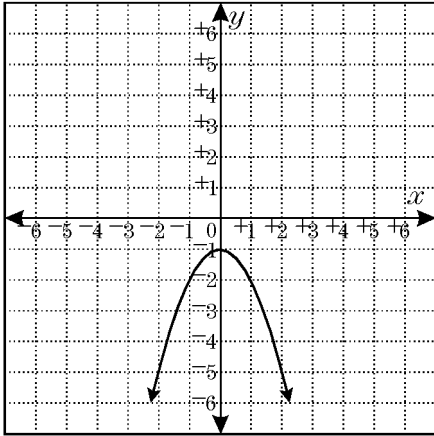
- A. $62\frac{3}{8}$ B. $25\frac{3}{4}$ C. $28\frac{3}{8}$ D. $58\frac{3}{8}$

19. Which of the following graphs represent an odd function?



- A. I only B. II only
 C. III only D. II and III

20. The graph of $y = -x^2 - 1$ is shown below.

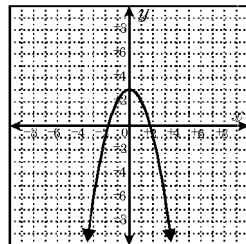


What is the *maximum* y-value graphed?

- A. 0 B. -1 C. -2 D. 5

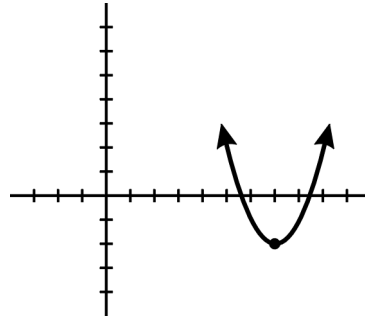
21. The graph of $y = -x^2 + 3$ is shown. What is the *maximum* y-value graphed?

- A. 1 B. 3
C. 4 D. 5

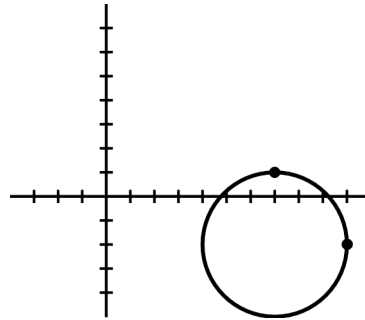


22. Which graph has lines of symmetry of $x = 7$ and $y = -2$?

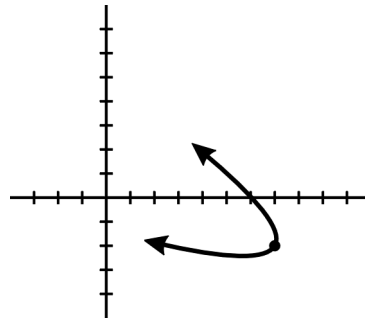
A.



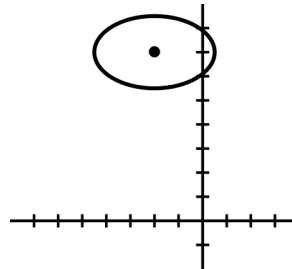
B.



C.



D.

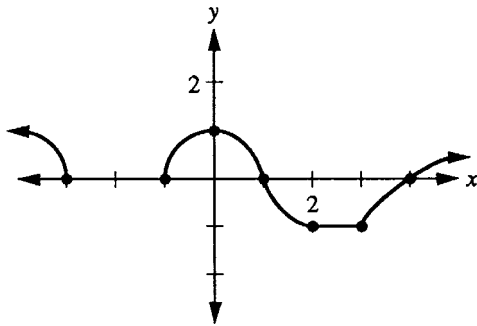


23. What type of function has the possibility of no x -intercepts?

- I. linear
- II. quadratic
- III. absolute value

- A. I only
- B. II only
- C. III only
- D. I, II, and III

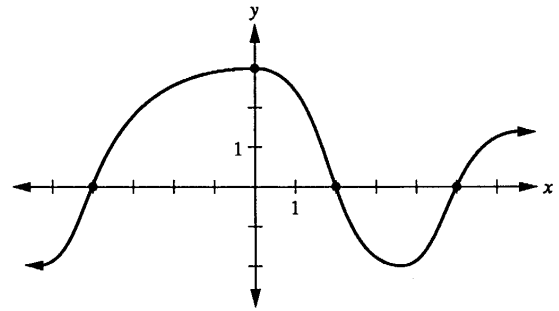
24.



Let $f(x)$ be the function with the graph shown.

- a) For what approximate value(s) of x is $f(x) = 0$?
- b) For what approximate value(s) of x is $f(x) = -1$?
- c) For what approximate value(s) of x is $f(x) > 0$?

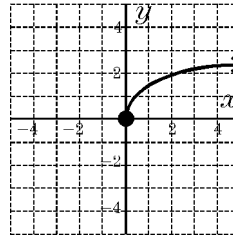
25.



Let $g(x)$ be the function with the graph shown.

- a) On which interval(s) is $g(x)$ increasing?
- b) On which interval(s) is $g(x)$ concave down?
- c) On which interval(s) is $g(x)$ both decreasing and concave down?
- d) What are the turning points?

26.

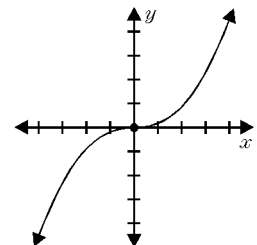


What is the domain of the function shown?

- A. $x \geq 0$
- B. $y \geq 0$
- C. $y \leq 0$
- D. all real numbers

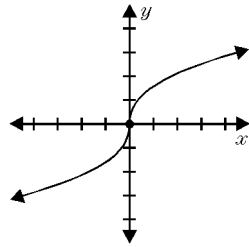
27. Given this graph of a function, describe the domain.

- A. $-3 < x < 3$
- B. $-3 < y < 3$
- C. $y \leq 5$
- D. All Real Numbers



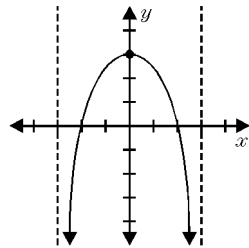
28. Given this graph of a function, describe the domain.

- A. $-3 < y < 3$
- B. $y \leq 5$
- C. $x \leq 5$
- D. All Real Numbers

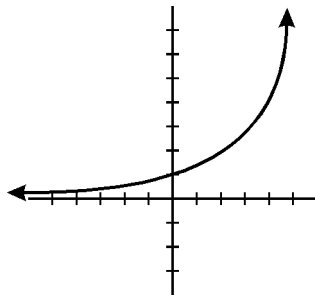


29. Given the graph, describe the range.

- A. $-3 < x < 3$
- B. $y \leq 3$
- C. $x \leq 3$
- D. All Real Numbers

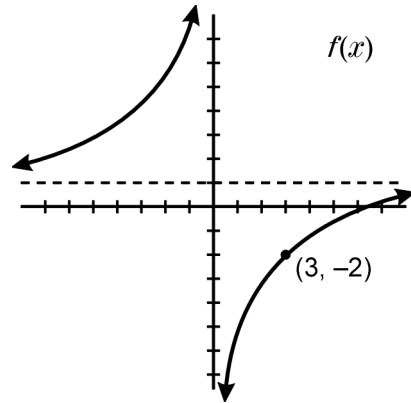


30. Given the graph of $y = a^x$, find the domain of $y = \log_a x$.



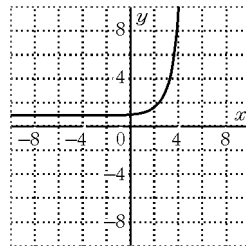
- A. $(0, \infty)$
- B. $(-\infty, \infty)$
- C. $(-\infty, 0)$
- D. not enough information to find domain

31. What value(s) are not in the range of $f(x)$?



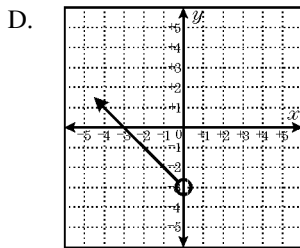
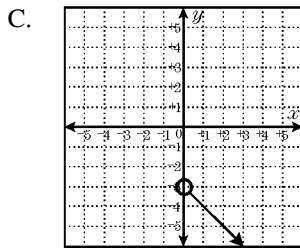
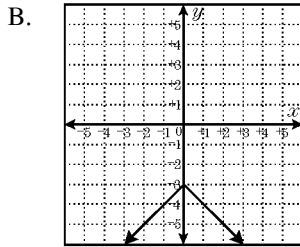
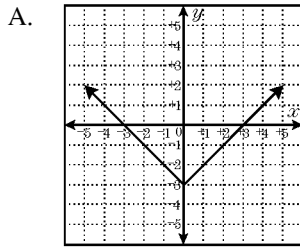
- A. 1
- B. 0
- C. 3
- D. -2

32. Consider the graph of the function $y = 3^{2(x-3)} + 1$. Identify the domain and range of the function.

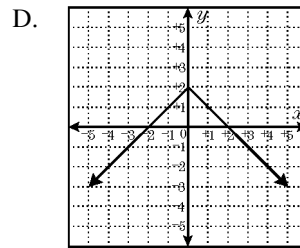
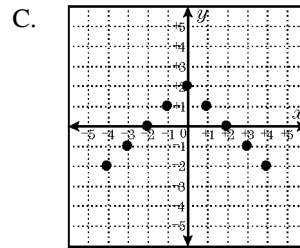
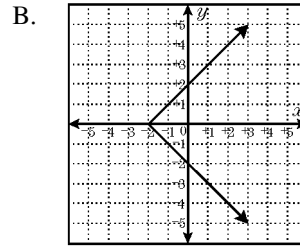
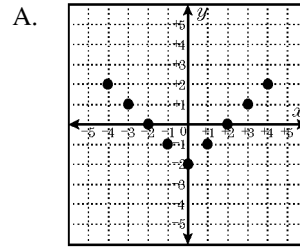


- A. domain: all real numbers; range: all real numbers
- B. domain: all real numbers; range: $y > 1$
- C. domain: $x > 1$ range: all real numbers
- D. domain: $x > 1$; range: $y > 1$

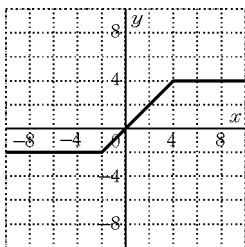
33. If x is a *positive real number*, which of the following graphs is the graph of $y = -|x| - 3$?



34. When x is a real number, which of the following is the graph of $y = -|x| + 2$?

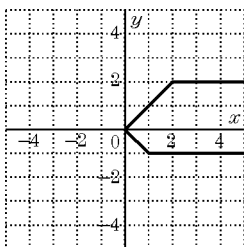


35.

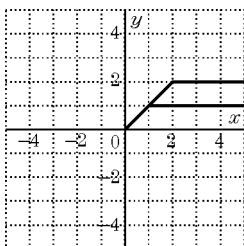


The graph of $f(x)$ is shown. Which is the graph of $|f(x)|$?

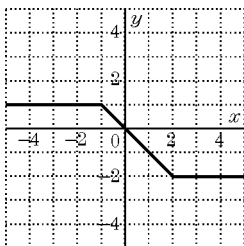
A.



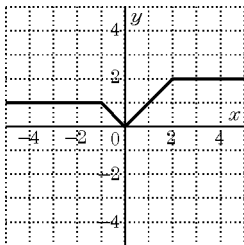
B.



C.



D.



36. Graph $f(x) = \begin{cases} -2 & \text{if } x < 0, \\ 1 & \text{if } x = 0, \\ x & \text{if } x > 0, \end{cases}$

37. Graph $f(x) = \begin{cases} -x^2 & \text{if } x < 0, \\ 2 & \text{if } x = 0, \\ 3x - 1 & \text{if } x > 0, \end{cases}$

38. If $f(x) = 3x^2$, then $f(x - 3)$ is equivalent to:

A. $3x^2 - 9x + 9$ B. $3x^2 - 18x - 27$

C. $3x^2 - 18x + 27$ D. $3x^2 - 9x + 18$

39. Find $2f(x) - 3g(x)$, given $f(x) = 2x^2 - 3x + 1$ and $g(x) = x^2 + 10x + 5$.

A. $x^2 - 36x - 13$ B. $7x^2 + 24x + 17$

C. $x^2 + 30x - 13$ D. $x^2 - 36x - 17$

40. Let $f(x) = \frac{1}{x}$ and $g(x) = \frac{1}{x} - 4$.

Describe the transformation from $f(x)$ to $g(x)$.

A. translated 4 units to the right

B. translated 4 units up

C. translated 4 units to the left

D. translated 4 units down

41. Let $f(x) = \sqrt{x}$, $g(x) = 2\sqrt{x - 4} + 6$. Describe $g(x)$ in terms of the parent function, $f(x)$.

$g(x)$ is $f(x)$:

A. vertical shrink, translated left 4 and up 6

B. vertical stretch, translated right 4 and up 6

C. horizontal stretch, translated right 6 and down 4

D. horizontal shrink, translated right 4 and up 6

42. If $f(x) = x^3$ is transformed into the graph of $h(x) = (x + 8)^3$, which of the following describes the transformation?

- A. Translation of 8 units to the right
- B. Translation of 8 units to the left
- C. Translation of 8 units up
- D. Translation of 8 units down

43. A chemist finds that the relationship between two chemicals (a and b) in a chemical reaction varies by the equation $a = b^2$. She graphs this relationship with a being the dependent variable. After adding a catalyst to the reaction, she finds that their relationship changed to $a = 2.5b^2$. Describe how the graph of this new relationship between chemicals is different from that of the original relationship.

- A. The new graph is narrower in its width.
- B. The new graph is vertically translated upward 2.5 units.
- C. The new graph is reflected about the horizontal axis (b -axis).
- D. The new graph is horizontally translated left 2.5 units.

44. Given $f(x) = \sqrt{x}$. The following is a table of values for $g(x)$, which is a translation of $f(x)$.

x	$g(x)$
2	0
3	1
6	2

Based on the values in the table, $g(x) =$

- A. $f(x + 2)$
- B. $f(x - 2)$
- C. $f(x) + 2$
- D. $f(x) - 2$

- | | |
|---|---|
| <p>1.
Answer: B
Objective: A.CED.01</p> | <p>14.
Answer: D
Objective: A.REI.02</p> |
| <p>2.
Answer: A
Objective: A.CED.01</p> | <p>15.
Answer: C
Objective: A.REI.02</p> |
| <p>3.
Answer: C
Objective: A.CED.01</p> | <p>16.
Answer: A
Objective: F.IF.02</p> |
| <p>4.
Answer: B
Objective: A.CED.01</p> | <p>17.
Answer: A
Objective: F.IF.02</p> |
| <p>5.
Answer: 16800, 11760, 8232, 5762, 4034, [graph];
$P = 24000(0.7)^t$; 9 years
Objective: A.CED.01</p> | <p>18.
Answer: A
Objective: F.IF.02</p> |
| <p>6.
Answer: B
Objective: A.CED.03</p> | <p>19.
Answer: C
Objective: F.IF.04</p> |
| <p>7.
Answer: B
Objective: A.REI.02</p> | <p>20.
Answer: B
Objective: F.IF.04</p> |
| <p>8.
Answer: B
Objective: A.REI.02</p> | <p>21.
Answer: B
Objective: F.IF.04</p> |
| <p>9.
Answer: D
Objective: A.REI.02</p> | <p>22.
Answer: B
Objective: F.IF.04</p> |
| <p>10.
Answer: A
Objective: A.REI.02</p> | <p>23.
Answer: D
Objective: F.IF.04</p> |
| <p>11.
Answer: A
Objective: A.REI.02</p> | <p>24.
Answer: (a) $x = -3, -1, 1, 4$
(b) $x = 2, 3$
(c) $x < -3, -1 < x < 1, x > 4$
Objective: F.IF.04</p> |
| <p>12.
Answer: A
Objective: A.REI.02</p> | <p>25.
Answer: (a) $x > 3.5$
(b) $-4 < x < 2, x > 5$
(c) $0 < x < 2$
(d) $(0, 3), (3.5, -2)$
Objective: F.IF.04</p> |
| <p>13.
Answer:
Objective: A.REI.02</p> | |

26.
Answer: A
Objective: F.IF.05

27.
Answer: D
Objective: F.IF.05

28.
Answer: D
Objective: F.IF.05

29.
Answer: B
Objective: F.IF.05

30.
Answer: A
Objective: F.IF.05

31.
Answer: A
Objective: F.IF.05

32.
Answer: B
Objective: F.IF.05

33.
Answer: C
Objective: F.IF.07B

34.
Answer: D
Objective: F.IF.07B

35.
Answer: D
Objective: F.IF.07B

36.
Answer: [graph]
Objective: F.IF.07B

37.
Answer: [graph]
Objective: F.IF.07B

38.
Answer: C
Objective: F.BF.01B

39.
Answer: A
Objective: F.BF.01B

40.
Answer: D
Objective: F.BF.03

41.
Answer: B
Objective: F.BF.03

42.
Answer: B
Objective: F.BF.03

43.
Answer: A
Objective: F.BF.03

44.
Answer: B
Objective: F.BF.03