

BARUCH COLLEGE
MATH 1030 Practice Final Part 1, NO CALCULATORS

1. Find the domain of $f(x) = \frac{2x^2 + 2x}{x^2 - 4x}$. 1. _____

- (A) $(-\infty, 0) \cup (0, 4) \cup (4, \infty)$ (B) $(-\infty, 0) \cup (4, \infty)$ (C) $(-\infty, 4) \cup (4, \infty)$
(D) $(-\infty, -2) \cup (-2, 0) \cup (0, \infty)$ (E) All real numbers

2. Find the equation of the line that is parallel to $2x + 4y = 15$ and that has an x -intercept of 5. 2. _____

- (A) $x = 5$ (B) $y = -\frac{1}{2}x + \frac{5}{2}$ (C) $y = \frac{1}{2}x - \frac{5}{2}$
(D) $y = 2x - 10$ (E) $y = -2x + 10$

3. Rationalize the denominator of $\frac{\sqrt{3} + 3}{\sqrt{3} - 1}$. 3. _____

- (A) $\sqrt{3}$ (B) $1 + \sqrt{3}$ (C) $3 + 2\sqrt{3}$ (D) $6 + 2\sqrt{3}$ (E) $\frac{6 + \sqrt{3}}{2}$

4. Put $\frac{12 - 5i}{2 + 3i}$ into the form $a + bi$. 4. _____

- (A) $-\frac{9}{5} + \frac{46}{5}i$ (B) $6 - \frac{5}{3}i$ (C) $3 - 2i$ (D) $-3 + 2i$ (E) $\frac{9}{13} - \frac{46}{13}i$

5. Solve for x in the following equation: $x^2 = 6x - 10$ 5._____

- (A) $x = 3 \pm \sqrt{19}$ (B) $x = -3 \pm \sqrt{19}$ (C) $x = 3 \pm i$
(D) $x = -3 \pm i$ (E) $x = 6 \pm \sqrt{76}$

6. What is true of the zeroes of $f(x) = 6x^2 + 2x - 4$? 6._____

- (A) This function has no zeroes. (B) This function has no real zeroes.
(C) This function has one real zero. (D) This function has two real, **rational** zeroes.
(E) This function has two real, **irrational** zeroes.

7. Solve the following inequality for x : $\frac{x^2}{x+2} > 0$. Write your answer in interval notation. 7._____

- (A) $(0, \infty)$ (B) $(-2, 0)$ (C) $(-2, \infty)$ (D) $(-\infty, -2)$ (E) $(-2, 0) \cup (0, \infty)$

8. What are the vertex and the axis of symmetry for $y = 2x^2 + 12x + 11$? 8._____

- (A) Vertex: $(-3, -7)$; Axis of symmetry: $x = -3$ (B) Vertex: $(3, 65)$; Axis of symmetry: $x = 3$
(C) Vertex: $(-3, -7)$; Axis of symmetry: $x = -7$ (D) Vertex: $(-3, 29)$; Axis of symmetry: $y = -3$
(E) Vertex: $(-3, 29)$; Axis of symmetry: $x = -3$

9. Given that the profit from producing and selling x units of a commodity is given by $P(x) = -3x^2 + 120x - 1000$, find the number of units to sell in order to maximize profit. 9._____

- (A) 8 (B) 12 (C) 16 (D) 20 (E) 24

10. Solve for $x : 8^{x-1} = 4^{2x-3}$ 10._____

- (A) $x = 1$ (B) $x = \frac{7}{4}$ (C) $x = 2$ (D) $x = 3$ (E) $x = \frac{11}{4}$

11. Simplify $\left(\frac{8xy^5}{2x^5y^3}\right)^{-1/2}$ (assuming the x and y are positive). 11._____

- (A) $\frac{16y^4}{x^8}$ (B) $\frac{2y}{x^2}$ (C) $\frac{x\sqrt{2}}{y}$ (D) $\frac{x^2}{2y}$ (E) $\frac{x^4}{4y^2}$

12. Simplify $\sqrt[3]{-27x^5y^9}$ as much as possible. 12._____

- (A) $-3x^2y^6$ (B) $3i \cdot xy^2\sqrt[3]{x^2}$ (C) $-3xy^3\sqrt[3]{x^2}$ (D) $-3x^2y^2\sqrt[3]{y^2}$ (E) $-3i \cdot x^2y^3$

13. Solve for $x : \sqrt{2x+1} - x = -1$ 13._____

- (A) There are no real solutions. (B) $x = 4$ only (C) $x = 0$ AND $x = 4$
(D) $x = 0$ only (E) The real solutions are irrational.

14. Solve for $x : \frac{1}{x^2} - \frac{4}{x} = 5$ 14._____

- (A) $x = 0$ only (B) $x = -1$ only (C) $x = \frac{1}{5}$ AND $x = -1$
(D) $x = \frac{1}{5}$ only (E) $x = -1, x = 0$ AND $x = \frac{1}{5}$

15. Solve for $y : \log_2(y^2 - 9) = 4$ 15. _____

- (A) There are no solutions (B) $y = 4$ only (C) $y = -5$ only
 (D) $y = \sqrt{7}$ only (E) $y = 5$ AND $y = -5$

16. Which of the following is the expansion into simplest terms of $\log_2 \frac{8x^5}{\sqrt{z}}$? 16. _____

- (A) $3 + 5 \log_2 x - \frac{1}{2} \log_2 z$ (B) $15 + 5 \log_2 x - \frac{1}{2} \log_2 z$ (C) $5 \log_2 8x + \frac{1}{2} \log_2 z$
 (D) $5 \log_2 8x - \frac{1}{2} \log_2 z$ (E) $3x - \frac{1}{2} \log_2 z$

17. Find all solutions to the system of equations:

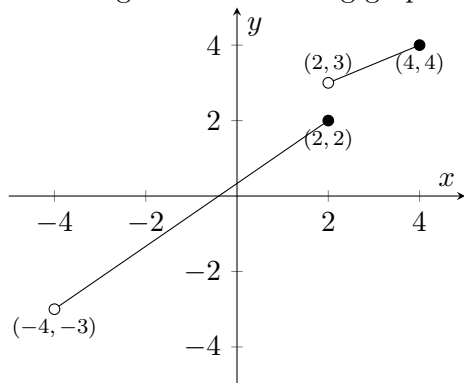
$$x^2 - y = 3$$

$$2x^2 + y = 9$$

17. _____

- (A) $(1, -2)$ AND $(-1, -2)$ (B) $(1, -2)$ only (C) $(2, 1)$ AND $(1, 3)$
 (D) $(2, 1)$ AND $(-2, 1)$ (E) $(1, -2)$ AND $(2, 1)$

18. You are given the following graph for a function $y = f(x)$:

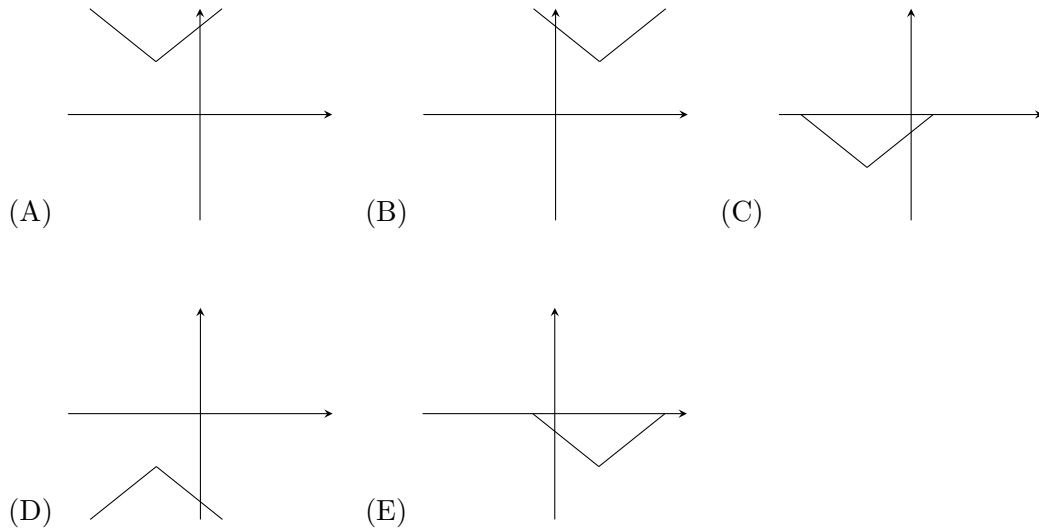


What are the domain and range of this function? Assume that the graph defines the entire function. 18. _____

- (A) $D : x \in [-4, 2) \cup (2, 4]$ (B) $D : x \in (-4, 4]$ (C) $D : x \in (-4, 4)$
 $R : y \in (-3, 2] \cup (3, 4]$ $R : y \in (-3, 2] \cup (3, 4]$ $R : y \in (-3, 4)$
 (D) $D : x \in (-4, 4]$ (E) $D : x \in [-4, 2) \cup (2, 4]$
 $R : y \in (-3, 4]$ $R : y \in (-3, 4]$

19. Which of the following could be a partial graph of the function $y = |x+2|+3$?

19. _____

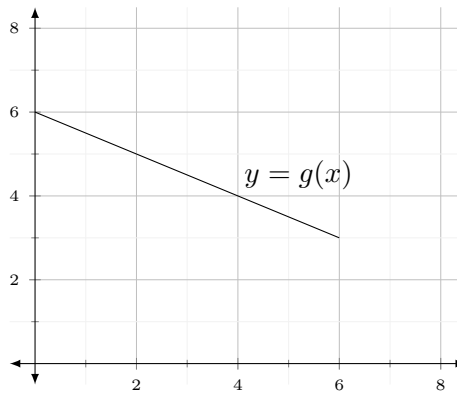
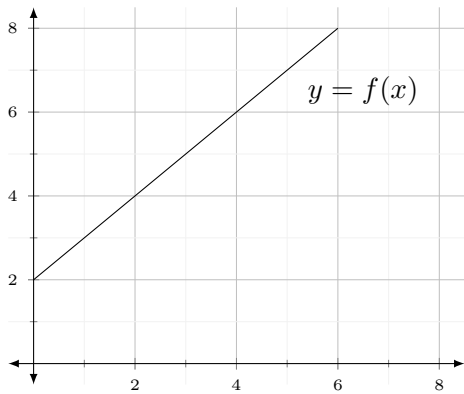


20. Simplify: $(2i^7)^3$

20. _____

- (A) -2 (B) $-8i$ (C) 8 (D) $2i$ (E) $8i$

21. You are given the graphs of $y = f(x)$ and $y = g(x)$ below:

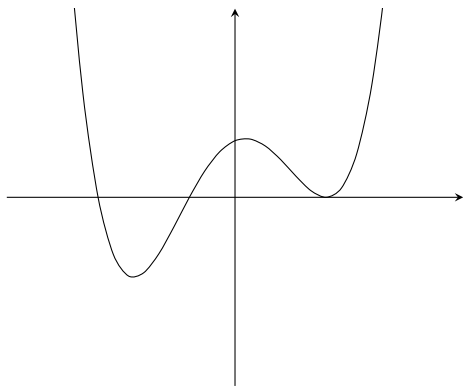


Which of the following values would be reasonable as a guess for $f(g(2))$?

21. _____

- (A) 15 (B) 12 (C) 7 (D) 5 (E) 2

22. You are given the graph of $y = f(x)$ below:



Which one of the following is true of $f(x)$?

22. _____

- (A) $f(x)$ is a polynomial of degree 3 (B) $f(x)$ has no inverse
(C) $f(x)$ is one-to-one (D) $f(x)$ is a polynomial of degree 1
(E) None of the above

23. If $g(x) = \frac{2x-2}{x+6}$, find $g^{-1}(4)$.

23. _____

- (A) -11 (B) -13 (C) $-\frac{1}{3}$ (D) 3 (E) 4

24. The graph of a quadratic function has a vertex of $(2, -1)$ and goes through the point $(1, 1)$. Find the function.

24. _____

- (A) $f(x) = 3(x+2)^2 - 1$ (B) $f(x) = -2(x+2)^2 - 1$ (C) $f(x) = 3(x-1)^2 - 2$
(D) $f(x) = -3(x-2)^2 + 1$ (E) $f(x) = 2(x-2)^2 - 1$

25. Given a circle $x^2 + y^2 = 85$, find the slope of the tangent line to this circle at the point $(2, 9)$. 25. _____

- (A) $m_{tan} = -3$ (B) $m_{tan} = -\frac{2}{9}$ (C) $m_{tan} = 0$ (D) $m_{tan} = \frac{3}{2}$ (E) $m_{tan} = \frac{9}{2}$

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26. Find the distance between the points $(12, -1)$ and $(7, 14)$; approximate to two decimal places. 26._____
- (A) 14.22 (B) 15.37 (C) 15.81 (D) 16.47 (E) 17.80
27. The size of the population of a bacterial colony is given by $p(t) = 50000e^{1.31t}$, where t is measured in hours. After how many hours will the colony's population be 130000? Round your answer to 2 decimal places. 27._____
- (A) 0.73 hours (B) 1.30 hours (C) 1.51 hours (D) 1.96 hours (E) 2.68 hours
28. If \$5000 is deposited in an account with APR of 1.55% for 10 years, how much will be in the account if the interest compounds MONTHLY? Round your answer to 2 decimal places. 28._____
- (A) \$5,775.00 (B) \$5,819.44 (C) \$5,831.31 (D) \$5,837.71 (E) \$5,838.29
29. If \$5000 is deposited in an account with APR of 1.55% for 10 years, how much will be in the account if the interest compounds CONTINUOUSLY? Round your answer to 2 decimal places. 29._____
- (A) \$5,775.00 (B) \$5,819.43 (C) \$5,831.31 (D) \$5,837.71 (E) \$5,838.29
30. Solve for x : $\log_3(x + 3) + \log_3(2x + 1) = 4$. Round your answer to 2 decimal places. 30._____
- (A) $x = -8.24$ AND $x = 4.74$ (B) $x = -7.22$ AND $x = 3.22$ (C) $x = 3.22$
(D) $x = 4.74$ (E) $x = 7.96$
31. Find $\log_{0.25} 12$; round to 2 decimal places. 31._____
- (A) -2.44 (B) -1.79 (C) -0.56 (D) 1.86 (E) 3.00

32. The height of a ball is given by the function $h(t) = -16t^2 + 90t + 100$, where t is in seconds and h is in feet. Find the maximum height that the ball achieves. Round your answer to 2 decimal places. 32. _____

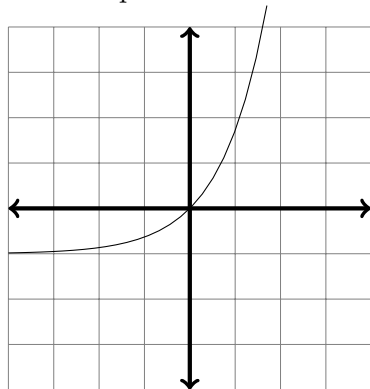
- (A) 216.44 feet (B) 223.40 feet (C) 226.06 feet (D) 226.56 feet (E) 228.19 feet

33. For this problem: please solve the equation to the nearest hundredth and then choose the answer choice that represents the digit in the TENTHS place of your solution. For example, if your solution is $x = 13.57$, then you would choose the answer 5, since 5 is the digit in the tenths place. 33. _____

Solve the equation $2^{4x} = 5$ to the nearest hundredth. The digit in the TENTHS place of the solution is:

- (A) 2 (B) 3 (C) 5 (D) 7 (E) 9

34. Which equation could have the graph shown below? 34. _____



- (A) $y = e^{(x-1)}$ (B) $y = e^x - 1$ (C) $y = \ln(x) - 1$
 (D) $y = \ln(x)$ (E) $y = \ln(x - 1)$

35. A rocket makes a parabolic flight. Let $A(t)$ be the altitude (in feet) of the rocket at time t seconds. If $A(t) = -0.0003t^2 + 9.3t + 46075$, at what time does the plane attain maximum altitude? 35. _____

- (A) 15,500 sec (B) 121,910 sec (C) 6,190.5 sec (D) 24,809.5 sec (E) 26,000 sec

1. A
2. B
3. C
4. E
5. C
6. D
7. E
8. A
9. D
10. D
11. D
12. C
13. B
14. C
15. E
16. A
17. D
18. B
19. A
20. E
21. C
22. B
23. B
24. E
25. B
26. C
27. A
28. D
29. E
30. D
31. B
32. D
33. C
34. B
35. A