Baruch College – Student Academic Consulting Center
MTH 1023 SAMPLE FINAL

Place the letter of your answer in the space provided. The use of any calculator is NOT permitted.

1) Determine the x-intercept and slope of the equation: $3x - 6y = 12$

a. $(2, 0)$ $m = -3$
b. $(-2, 0)$ $m = 3$
c. $(4, 0)$ $m = 1/2$
d. $(-4, 0)$ $m = -2$
e. $(4, 0)$ $m = -1/2$ 1)_____

2) Determine the equation of the line that is PERPENDICULAR to: $5x - 15y = 0$ that passes through the point: $(3, -2)$

a. $y = -3x + 7$ b. $y = \frac{1}{3}x - 3$ c. $y = 3x - 11$ d. $y = \frac{1}{3}x - 5$ e. $y = -3x + 2$ 2)_____

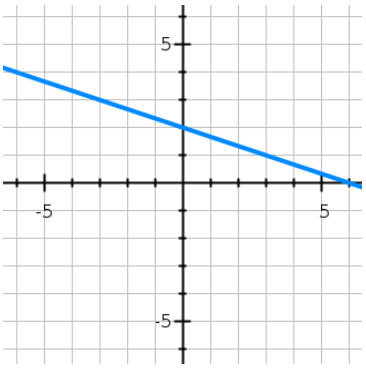
3) If $f(x) = -x^2 + 5x - 9$, what is $f(-5)$?

a. -11
b. -21
c. -44
d. -9
e. -59 3)_____

4) Solve the following system of linear equations. What is the value of y? $\begin{cases} 3x - 2y = 13 \\ x + 3y = -3 \end{cases}$

a. -3
b. 3
c. -2
d. Infinitely Many
e. No solution 4)_____

5) Which of the following equations is the correct formulation of the graph shown below?



a. $x - 3y = -6$ b. $x + 3y = 6$ c. $3x - y = -2$ d. $3x + y = 6$ e. $x - 3y = 6$ 5)_____

6) Simplify completely: $\left(\frac{25x^{-8}y^{6}}{x^{4}y^{-2}}\right)^{\frac{1}{2}}$

a. $\frac{25y^4}{x^6}$ b. $\frac{5y^4}{x^6}$ c. $\frac{5y^4}{x}$ d. $\frac{25y^4}{x}$ e. $\frac{5x^6}{y^4}$ 6)_____

7) Expand: $(3x-5)(x^2+x-1)$. One of the terms is:

a. x^3
b. $2x^2$
c. $8x$
d. $-8x$
e. $2x$ 7)_____

8) Factor both polynomials completely: x^2-4x and x^2-x-6. Which of the following is **NOT** a factor amongst either polynomial?

a. x
b. $x-4$
c. $x+2$
d. $x-3$
e. $x-2$ 8)_____

9) Factor completely: $6x^3+33x^2-18x$. One of the factors is:

a. $2x-1$
b. $x-6$
c. $2x+1$
d. $6x$
e. $2x-3$ 9)_____

10) Solve for k: $(k-3)(k+9)=-35$. One of the values is:

a. -4
b. 3
c. -9
d. 2
e. 0 10)_____

11) For which value of x will $f(x)=\frac{3x}{4x^2-9}$ be undefined?

a. $9/4$
b. $3/4$
c. 0
d. $2/3$
e. $-3/2$ 11)_____

12) Divide and simplify completely: $\frac{x^3}{x^2-5x+6} \div \frac{x^6+x^5-6x^4}{x^2-9}$

a. $\frac{x}{(x-2)^2}$ b. $x(x-2)^2$ c. x d. $\frac{1}{x}$ e. $\frac{1}{x(x-2)^2}$ 12)_____

13) Determine the LCD of the rational expressions: $\frac{4}{x^2-x}$ and $\frac{3x}{x^2+x-2}$

a. $x(x+2)$
b. $(x-1)(x+1)(x+2)$
c. $x-1$
d. $x(x+2)(x-1)$
e. $(x+2)(x-1)$ 13)_____

14) Solve for m: $\frac{3}{m-3}+\frac{2}{m-2}=4$ One of the values is:

a. 4
b. 0
c. 2
d. 3
e. 1 14)_____

15) Simplify completely: $\frac{\frac{4}{x}-1}{3+\frac{2}{x^2}}$

a. $\frac{4x-x^2}{3x^2+2}$ b. $\frac{4x^2-x}{2x^2+3}$ c. $\frac{3x^2+2}{4x-x^2}$ d. $\frac{2x^2+3}{4x^2-x}$ e. $\frac{4x+x^2}{3x^2-2}$ 15)_____

16) It is given that y varies inversely with the SQUARE ROOT of x. When $x=4$, $y=7$. What is the value of y when $x=9$?

a. 12
b. $14/3$
c. $14/9$
d. 49
e. 14 16)_____

17) Simplify completely: $\sqrt[3]{64x^6y^{24}}$

a. $4x^8y^2$
b. $8x^2y^8$
c. $4x^2y^8$
d. $8x^8y^2$
e. $4x^3y^{21}$ 17)_____

18) Simplify completely: $\sqrt{48x^5y^9z^3}$

a. $x^2y^4z\sqrt{3xyz}$
b. $16x^2y^4z\sqrt{3xyz}$
c. $x^2y^4z\sqrt{xyz}$
d. $4x^2y^4z\sqrt{3xyz}$
e. $4x^2y^4z\sqrt{xyz}$ 18)_____

19) Determine the simplified sum of: $\sqrt[3]{3x^7} + x^2\sqrt[3]{24x} - 2x\sqrt[3]{81x^4}$

a. $-3x^2\sqrt[3]{3x}$
b. $6x^2\sqrt[3]{3x}$
c. $2x^2\sqrt[3]{3x}$
d. $-4x^2\sqrt[3]{3x}$
e. $-3\sqrt[3]{3x}$ 19)_____

20) Rationalize the denominator and simplify completely: $\frac{3x^2y^5}{\sqrt[3]{9x^6y^{10}}}$

a. $y\sqrt[3]{3y^2}$
b. $\sqrt[3]{3y^2}$
c. $\sqrt[3]{3xy^2}$
d. $x\sqrt[3]{3y^2}$
e. $y\sqrt[3]{3xy^2}$ 20)_____

21) Rationalize the numerator and simplify completely: $\frac{3-\sqrt{h+4}}{h-5}$. Then evaluate when $h = 5$

a. -6
b. $1/6$
c. $-1/6$
d. 6
e. 0 21)_____

22) Solve for all value(s) of z: $\sqrt{2z-1} - z = -2$

a. $1, 5$
b. 1
c. 5
d. $-5, -1$
e. No real solution 22)_____

23) Express in $a + bi$ form: $(i^{23})^3$

a. 0
b. -1
c. $-i$
d. i
e. 1 23)_____

24) Express in $a + bi$ form: $\sqrt{-36} - 2\sqrt{-49} - \sqrt{100}$

a. $-10 - 8i$
b. $10 + 8i$
c. $10 - 8i$
d. $10 - i$
e. $-10 + 20i$ 24)_____

25) Rationalize the denominator and express in $a + bi$ form: $\frac{4}{5-2i}$

a. $\frac{20}{21} + \frac{8}{21}i$ b. $\frac{20}{29} - \frac{8}{29}i$ c. $\frac{20}{29} + \frac{8}{29}i$ d. $\frac{20}{29} - \frac{8}{29}i$ e. $\frac{20}{29} + 8i$ 25)_____

26) Solve for x: $3x^2 - 12x = -21$

a. $-2 + \sqrt{3},\ -2 - \sqrt{3}$
b. $2 + i\sqrt{3},\quad 2 - i\sqrt{3}$
c. $2 + 2i\sqrt{3},\ 2 - 2i\sqrt{3}$
d. $2 + 2\sqrt{3},\ 2 - 2\sqrt{3}$
e. $4 + i\sqrt{3},\quad 4 - i\sqrt{3}$ 26)_____

27) What type of x-intercept(s) exist in the function: $f(x) = -2x^2 + 5x - 7$?

a. Two complex (Non-Real)
b. Two real irrational
c. Two real rational
d. One real rational
e. One real irrational 27)_____

28) Solve for k: $k^{\frac{2}{5}} + 3 = 4k^{\frac{1}{5}}$

a. $1, 3$
b. $-3, -1$
c. $5, 15$
d. $-243, -1$
e. $1, 243$ 28)_____

29) Solve the inequality: $4x^2 + 1 > 4x$

a. $(-\infty, \infty)$ b. $\left(-\infty, -\frac{1}{2}\right) \cup \left(\frac{1}{2}, \infty\right)$ c. $\left(-\frac{1}{2}, \frac{1}{2}\right)$ d. $\left(-\infty, -\frac{1}{4}\right) \cup \left(\frac{1}{4}, \infty\right)$

e. $\left(-\infty, \frac{1}{2}\right) \cup \left(\frac{1}{2}, \infty\right)$ 29)_____

30) Solve the inequality: $\frac{x^2-8x+12}{x} \leq 0$

a. $(-\infty, -6] \cup [2, \infty)$
b. $(0, 2] \cup [6, \infty)$
c. $(-\infty, 0) \cup [2, 6]$
d. $(-\infty, 2] \cup [6, \infty)$
e. $[2, 6]$ 30)_____

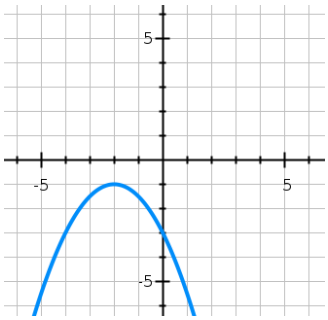
31) Determine the vertex and x-intercept of the function: $f(x) = 2(x+2)^2 - 32$

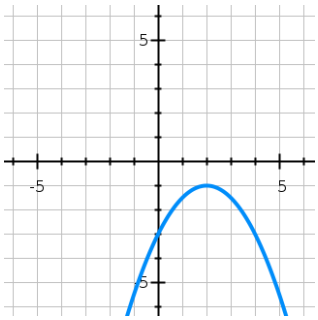
a. Vertex: $(-2, -32)$ No x-intercept
b. Vertex: $(-2, -32)$ x-intercept: $(-6, 0), (2, 0)$
c. Vertex: $(2, -32)$ x-intercept: $(-6, 0), (2, 0)$
d. Vertex: $(-2, -32)$ x-intercept: $(-2, 0), (6, 0)$
e. Vertex: $(-2, 32)$ x-intercept: $(-6, 0), (2, 0)$ 31)_____

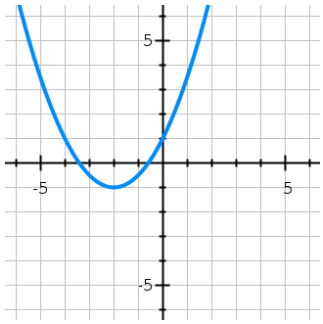
32) Determine the vertex of the function: $g(x) = -3x^2 - 12x + 15$

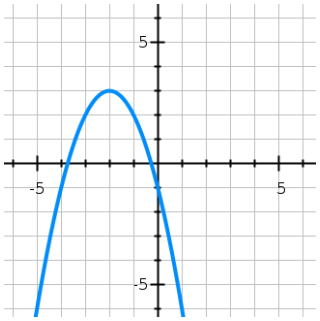
a. $(-4, 15)$
b. $(-2, 27)$
c. $(2, -21)$
d. $(-2, 15)$
e. $(2, 21)$ 32)_____

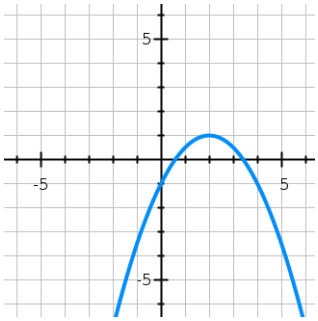
33) Which of the following is the correct illustration of the function: $f(x) = -\frac{1}{2}(x+2)^2 - 1$?

a. 

b. 

c. 

d. 

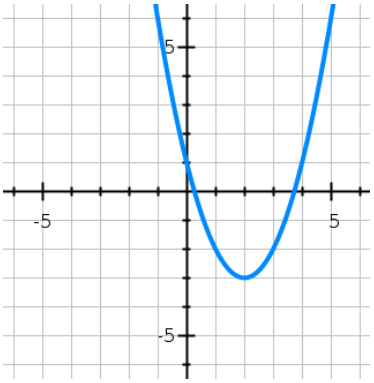
e. 

33)_____

34) The profit of selling x computer chips is given by the function: $P(x) = -4x^2 + 160x - 50$, where $P(x)$ is in dollars. What is the maximum profit?

a. 20
b. 50
c. 1650
d. 1550
e. 4750 34)_____

35) Which of the following equations is illustrated in the graph shown below?



a. $y = x^2 - 4x + 1$ b. $y = \frac{1}{2}x^2 - 2x + 1$ c. $y = x^2 + 4x + 1$

d. $y = \frac{1}{2}x^2 + 2x + 1$ e. $y = -\frac{1}{2}x^2 + 2x + 1$ 35)_____

ANSWER KEY

1) c
2) a
3) e
4) c
5) b
6) b
7) d
8) e
9) a
10) a
11) e
12) e
13) d
14) a
15) a
16) b
17) c
18) d
19) a
20) a
21) c
22) c
23) d
24) a
25) c
26) b
27) a
28) e
29) e
30) c
31) b
32) b
33) a
34) d
35) a