

SUNY ULSTER

Stone Ridge, New York

FINAL EXAMINATION

MAT 115 - COLLEGE ALGEBRA & TRIGONOMETRY

Summer 2020

Professor: Chaitanya Mistry

NAME _____

DIRECTIONS: Work all questions in the space provided after each question. Be sure to keep your work neat and easy to read in order to ensure maximum partial credit. The point value for each question is listed.

RELAX AND GOOD LUCK!

Simplify all solutions. Use i-notation where appropriate. Use interval notation where appropriate.

Questions 1-6: **Solve for x.**

(4 points each)

1) $3x^2 + 7x - 2 = 0$

1) _____

2) $\sqrt{x+3} + 1 = 3x$

2) _____

3) $2x^3 - 50x = 0$

3) _____

4) $|2x - 1| \leq 4$

4) _____

5) $\log_4(1 - 3x) = 2$

5) _____

6) $e^{3x} = 25$ (*Round to three decimal places*)

6) _____

7) Given the points A (-6, 2), and B (3, -7)

a) Find the slope of the line through A and B.

7a) _____
(2 points)

b) Find the equation of the line containing the points A and B.
(*Express your answer in slope-intercept form.*)

7b) _____
(3 points)

8) Find the distance between A (-6, 2), and B (3, -7).

(2 points)

8) _____

- 9) Given that the equation of a circle is $(x - 4)^2 + (y + 1)^2 = 9$ (3 points)
find the center and radius.

Center _____

Radius: _____

- 10) Let $f(x) = x^2 - 4x - 5$ and $g(x) = 3x - 2$
Determine the following:

a) $(f - g)(x)$ 10a) _____ (3 points)

b) $(f \circ g)(x)$ 10b) _____ (3 points)

- 11) Given the functions $f(x) = \frac{x+1}{x^2-9}$ and $g(x) = \sqrt{2x-5}$, find the following: (2 points each)

a) The domain of $f(x)$ 11a) _____

b) The domain of $g(x)$ 11b) _____

12) Use the graph of $f(x)$ to determine the following:

(1 point each)

a) $f(x)$ Increases on _____

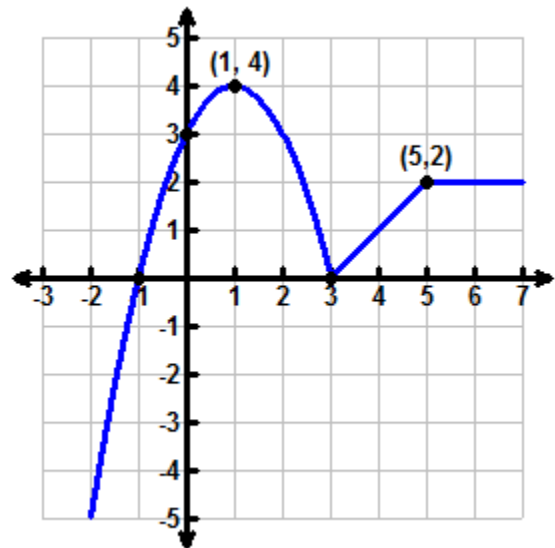
b) $f(x)$ Decreases on _____

c) Domain of $f(x)$ _____

d) Range of $f(x)$ _____

e) $f(3) =$ _____

f) $f(0) =$ _____



For questions 13 - 16, graph each of the following in the space provided on the right. Each graph is worth 3 points and other questions are worth $\frac{1}{2}$ point each. Use interval notation where appropriate.

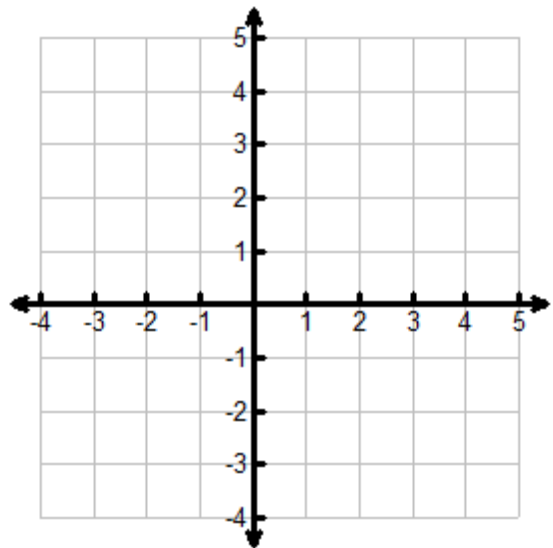
13) $f(x) = -x^2 + 2x + 3$

a) List **all** intercepts (*If they do not exist, state so.*)

i. X-Intercepts: _____

ii. Y-Intercepts: _____

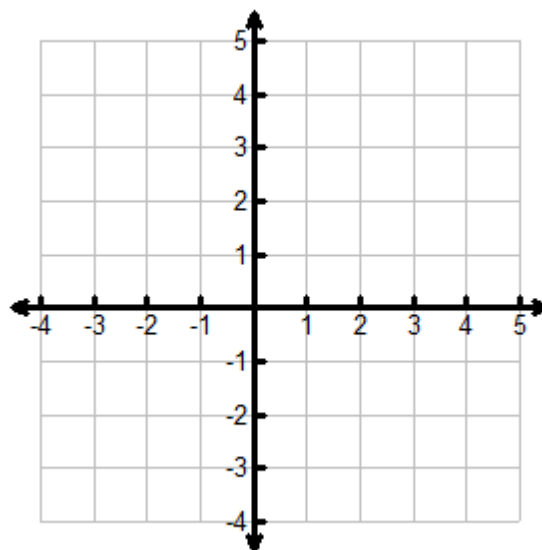
b) State the coordinates of the Vertex: _____



14) $f(x) = -|x - 1|$

Domain: _____

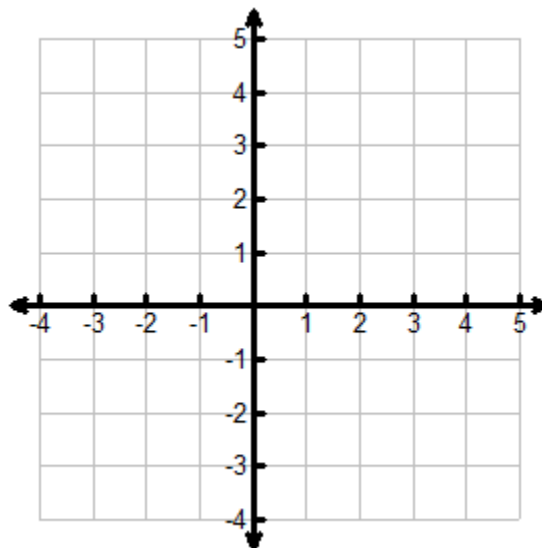
Range: _____



15) $f(x) = 2^x - 3$

Domain: _____

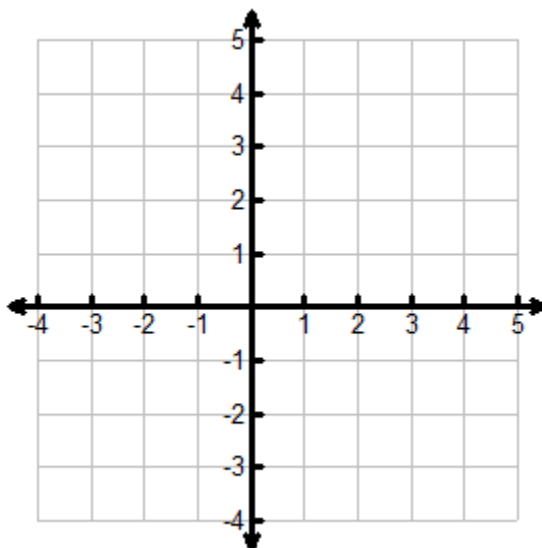
Range: _____



16) $f(x) = \sqrt{-x} + 1$

Domain: _____

Range: _____



17) Evaluate each of the following without a calculator. (2 points each)

a) $\log_3 81 =$ _____

b) $\log 1000$ _____

c) $\log_4 \frac{1}{64} =$ _____

d) $\log_{12} 1 =$ _____

18) Use the properties of logs to express the following as sums and/or differences of logs. Be sure to reduce each log as much as possible. (3 points)

$$\log_2 \frac{32(x+3)^2}{\sqrt{x-1}} =$$

18. _____

19) If $\sin \theta = -\frac{3}{7}$ and $270^\circ < \theta < 360^\circ$ find the exact value of the remaining 5 trig functions of θ .

(You must sketch the reference angle/triangle in the appropriate quadrant to receive full credit.)

(5 points)

$\cos \theta =$ _____

$\tan \theta =$ _____

$\sec \theta =$ _____

$\csc \theta =$ _____

$\cot \theta =$ _____

20) Find the **exact value** for each of the following: (3 points each)

(You must sketch the reference angle/triangle in the appropriate quadrant to receive full credit.)

a) $\cos \frac{5\pi}{4} =$ _____

b) $\sin 300^\circ =$ _____

- 21) Use your calculator to determine each of the following. (1 point each)
(Round to the nearest three places)

a) $\sec 130^\circ =$ _____

d) $\ln \pi =$ _____

b) $\tan \frac{7\pi}{8} =$ _____

- e) Find x when:

$\ln x = \frac{8}{5}$ _____

c) $\log_7 32 =$ _____

- 22) Use the formula for compound interest, $A = Pe^{rt}$, for the following: (4 points)
How much time, t, will it take an investment, P, to double, if it is invested at a rate of interest, r, of 5.25% compounded continuously?

22) _____

- 23) An object is thrown up in the air off of a building that is 312 feet high. The height of the object (in feet) is given by the height function:

$h(t) = 312 + 64t - 16t^2$ (Where, t, is time in seconds.) (4 points)

- a) When will the object reach its maximum height?

23 a) _____

- b) What is that maximum height obtained by the object?

23 b) _____