

MAT119 Math for Technical Disciplines ACAD 08-006 Verification Exam:

Relevant Objectives from ACAD 08-006 for MAT119:

1.1.1 Mathematics

Desired Outcome: Explain and use mathematical concepts, scientific notation, dimensional analysis, algebra, geometry, trigonometry, graphs, and control charts, with an understanding of basic statistics (that is, application of statistical concepts but not formula development).

Enabling Statements:

1. Perform basic arithmetic functions, including addition, subtraction, multiplication, and division; fractions and decimals; percentages; square roots; and ratios.
- *2. Perform basic statistical analysis, including mean, median, mode, standard deviation, and percent error.
3. Perform basic calculations that involve significant figures, including measurements.
5. Apply scientific and engineering notation in calculations, including conversion of numbers.
6. Demonstrate the ability to apply the concept of dimensional analysis and to perform unit conversions, unit modifiers, and metric measurements such as conversion between metric and the U.S. customary system.
7. Perform basic algebraic operations, including calculations of area and volume.
NOTE: Geometry concepts of area and volume are now included in the algebra statement.
8. Perform basic trigonometric operations, such as simple right triangle calculations of sine, cosine, and tangent.
- *9. Create and interpret graphs, including graphing data, obtaining information from graphs and control charts, using rectangular coordinate systems.

*Note: Some sections of this enabling statement have been moved to the MAT120 Course. Items shown are covered by this test. Missing items from 2&9 are covered on MAT120 certification exam. Item 4 is covered on the MAT120 exam. Other overlapping items between MAT119&MAT120 quoted in cover sheet for MAT120 exam.

Exam Rules:

- 1) Access to the internet is prohibited.
- 2) Cell phones are not allowed to be used in the exam room.
- 3) 3 hours maximum.
- 4) All scrap paper must be included with the exam.
- 5) No notes may be taken into or removed from the exam room.

Student Acknowledgement:

I understand that my score on this exam will be used as a measure of my skills in the objectives above and that these skills will be re-measured to assure that a mastery level of 80% is verified.

Student Signature & Date: _____

Graphing Calculator Allowed

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Perform the indicated operations on a calculator. Express the result with the proper accuracy and precision. Assume that all numbers are approximate.

- 1) $\frac{0.0122}{7.752} + 0.0705$ 1) _____
 A) 0.0721 B) 0.072 C) -0.0689 D) -0.069

Use scientific notation to solve the problem.

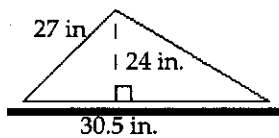
- 2) A light-year is the distance that light travels in one year. Find the number of miles in a light-year if light travels 1.86×10^5 miles per second. 2) _____
 A) 6.0×10^5 miles B) 6.0×10^7 miles C) 6.0×10^{14} miles D) 6.0×10^{12} miles

Solve the problem.

- 3) On a map of the Thunderbird Country Club golf course, 2.5 inches equals 45 yards. How long is the 14th hole if the map shows 13 inches? 3) _____
 A) 585 yd B) 234 yd C) 1462.5 yd D) 8.7 yd
- 4) A paint mixture contains 12 gallons of base for every gallon of color. In 572 gallons of paint, how many gallons of color are there? 4) _____
 A) 528 gallons B) 44 gallons C) 286 gallons D) 190 gallons

Find the area.

- 5) 5) _____



- A) 290 in.^2 B) 320 in.^2 C) 730 in.^2 D) 370 in.^2

Solve the problem.

- 6) A cylindrical flower vase is 3 inches across the top and about 7 inches high. How many cubic inches of water could it hold? 6) _____
 A) 100 in.^3 B) 200 in.^3 C) 50 in.^3 D) 100 in.^3
- 7) The owner of Nuts2U Snack Shack mixes cashews worth \$6.25 a pound with peanuts worth \$2.00 a pound to get a half-pound mixed nut bag worth \$1.70. How much of each kind of nut is included in the mixed bag? 7) _____
 A) 0.10 lb of cashews and 0.90 lb of peanuts B) 0.07 lb of cashews and 0.93 lb of peanuts
 C) 0.16 lb of cashews and 0.34 lb of peanuts D) 0.34 lb of cashews and 0.16 lb of peanuts

Solve the system of equations by use of determinants.

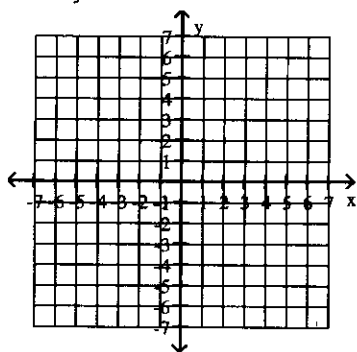
- 8) $-3x - 4y - z = -33$ 8) _____
 $x + 2y + 6z = 27$
 $5x + y + z = 14$
 A) $x = 7, y = 2, z = 7$ B) $x = 1, y = -7, z = -2$
 C) $x = 2, y = 5, z = 2$ D) $x = 1, y = 7, z = 2$

Solve the system by graphing.

9) $3x + 2y = 17$

$3x + 4y = 19$

9) _____



A) (1, 5)

B) (3, 10)

C) (5, 1)

D) Inconsistent

Solve.

10) $x^2 + x + 6 = 0$

A) $\frac{1 \pm \sqrt{-23}}{2}$

B) $\frac{-1 \pm \sqrt{23}}{2}$

C) $\frac{-1 \pm \sqrt{-23}}{2}$

D) $\frac{1 \pm \sqrt{23}}{2}$

10) _____

Use a graphing calculator to solve the equation to the nearest tenth.

11) $x^3 + 2x^2 - 11x - 22 = 0$

A) 2, 3.3, -3.3

B) 2, 3.2, -3.2

C) -2, 3.4, -3.4

D) -2, 3.3, -3.3

11) _____

Evaluate the function.

12) Find $f(3)$ for

$$f(x) = \begin{cases} 9x + 1 & \text{if } x < 1 \\ 3x & \text{if } 3 \leq x \leq 8 \\ 3 - 4x & \text{if } x > 8 \end{cases}$$

A) 33

B) 10

C) -9

D) 9

12) _____

Find the requested function value of θ .

13) If $\sin \theta = \frac{5}{8}$, find $\sec \theta$.

A) $\frac{8\sqrt{39}}{39}$

B) $\frac{5\sqrt{39}}{39}$

C) $\frac{\sqrt{39}}{5}$

D) $\frac{\sqrt{39}}{8}$

13) _____

Solve the right triangle. Round results to an appropriate number of significant digits.

14) $a = 3.7$ cm, $b = 2.7$ cm

A) $A = 36^\circ$, $B = 54^\circ$, $c = 4.6$ cm

B) $A = 47^\circ$, $B = 43^\circ$, $c = 6.4$ cm

C) $A = 50^\circ$, $B = 40^\circ$, $c = 4.6$ cm

D) $A = 54^\circ$, $B = 36^\circ$, $c = 4.6$ cm

14) _____

Solve the problem. Round results to an appropriate number of significant digits.

15) When sitting atop a tree and looking down at his pal Joey, the angle of depression of Mack's line of sight is 34.1° . If Joey is known to be standing 17 ft from the base of the tree, how tall is the tree?

A) 18 ft

B) 12 ft

C) 14 ft

D) 16 ft

15) _____

- 16) A plane is found by radar to be flying 5.9 km above the ground. The angle of elevation from the radar to the plane is 75.6° . Ten seconds later, the plane is directly over the station. Find the speed of the plane, assuming that it is flying level. 16) _____
- A) 560 km/hr B) 570 km/hr C) 540 km/hr D) 550 km/hr

Solve the problem.

- 17) Find the x and y values so that the voltages $V_1 = -9 + (y - 4)j$ and $V_2 = (x - 2) + 9j$ are equal. 17) _____
- A) $x = 13$ and $y = -7$ B) $x = -7$ and $y = -13$
 C) $x = 7$ and $y = -13$ D) $x = -7$ and $y = 13$

- 18) Find the voltage V when the impedance is $Z = -7 + 2j$ and current is $I = 4j$. ($Z = \frac{V}{I}$) 18) _____
- A) $8 - 28j$ B) $\frac{1}{2} + \frac{7}{4}j$ C) $-8 - 28j$ D) $\frac{8}{53} - \frac{28}{53}j$

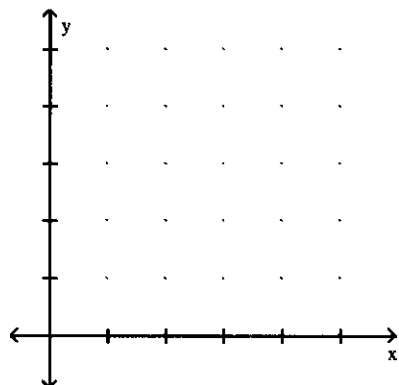
Find the equation of the circle from the given information.

- 19) The points $(-1, 8)$ and $(3, 2)$ are the ends of a diameter. 19) _____
- A) $(x - 5)^2 + (y - 1)^2 = 13$ B) $(x - 1)^2 + (y - 5)^2 = 13$
 C) $(x - 1)^2 + y^2 = 9$ D) $x^2 + (y - 5)^2 = 4$

Plot the graph and find the value from the graph.

- 20) The town of Appleville recorded the following dates and populations. 20) _____

YEAR	POPULATION (in thousands)
1980	24.5
1985	26
1990	29
1995	35



Draw a graph of the population as a function of time. What is the approximate population of Appleville in 1987?

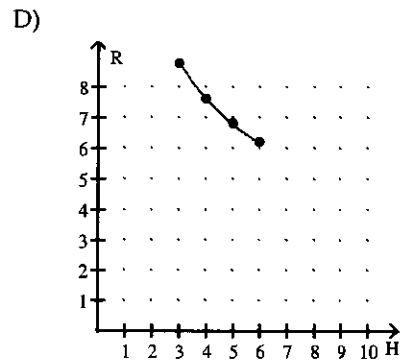
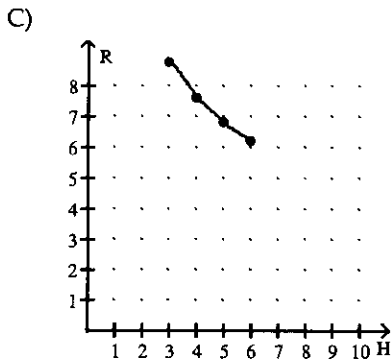
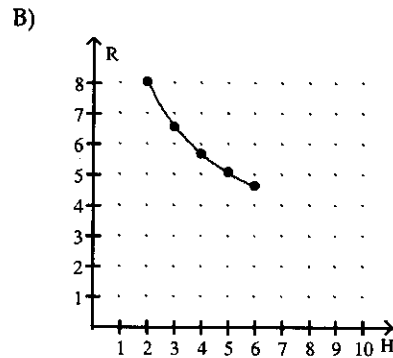
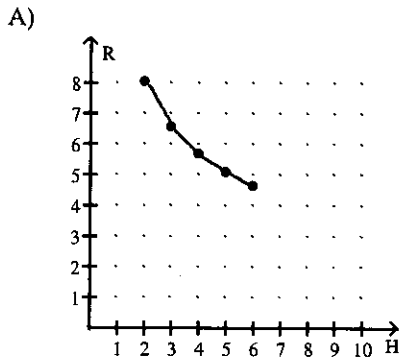
- A) 26,000 B) 27,000 C) 28,000 D) 29,000

Represent the data graphically.

21) The radius of a cone of fixed volume is related to the height according to the following table:

21) _____

Height (dm)	2	3	4	5	6
Radius (dm)	8.05	6.57	5.69	5.09	4.65



Find the mean.

22) Six college buddies bought each other Christmas gifts. They spent:

22) _____

\$206.81 \$172.26 \$173.41

\$137.22 \$293.38 \$193.72

What was the mean amount spent? Round your answer to the nearest cent.

A) \$235.36

B) \$196.13

C) \$294.20

D) \$223.36

Find the mode(s) for the given sample data.

23) The weights (in ounces) of 14 different apples are shown below.

23) _____

4.0 5.1 5.0 5.4 6.4 4.0 5.1

4.1 4.9 5.4 4.0 4.1 5.4 6.7

A) 4.70

B) None

C) 4.0, 5.4

D) 4.0

Find the standard deviation s for the given data. Round your answer to one more decimal place than the original data.

24) The manager of an electrical supply store measured the diameters of the rolls of wire in the

24) _____

inventory. The diameters of the rolls (in m) are listed below. Compute the standard deviation(s).

0.567 0.578 0.33 0.226 0.666 0.66 0.512

A) 1.7892

B) 1.9568

C) 0.226

D) 0.1671

Find the median.

25) A store manager kept track of the number of newspapers sold each week over a seven-week period. The results are shown below.
58, 24, 212, 154, 254, 237, 230

25) _____

Find the median number of newspapers sold.

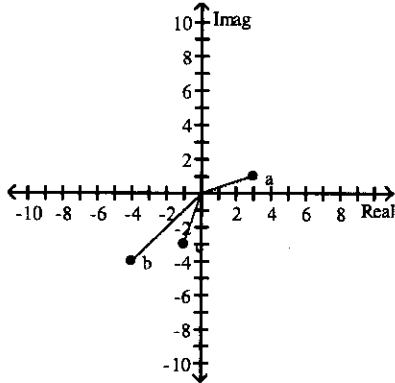
- A) 167 newspapers
B) 154 newspapers
C) 230 newspapers
D) 212 newspapers

Perform the indicated operations graphically.

26) $(3 - j) + (-4 - 4j)$

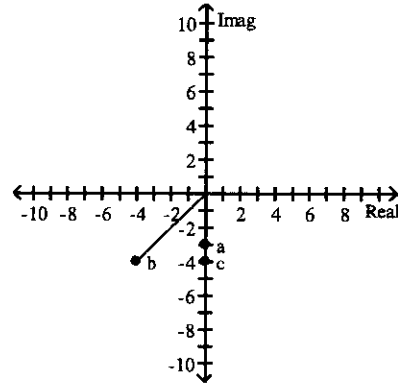
26) _____

A)



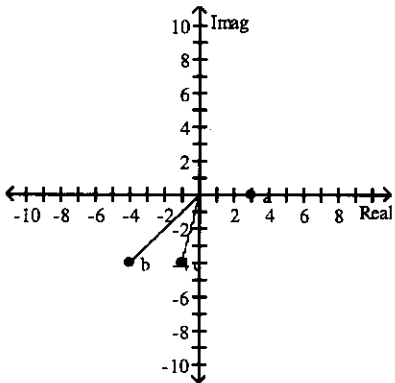
$$\begin{aligned} a &= 3 - j \\ b &= -4 - 4j \\ c &= (3 - j) + (-4 - 4j) \end{aligned}$$

B)



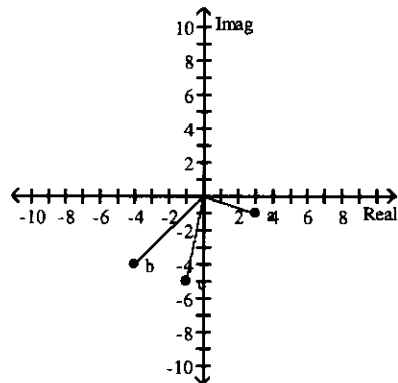
$$\begin{aligned} a &= 3 - j \\ b &= -4 - 4j \\ c &= (3 - j) + (-4 - 4j) \end{aligned}$$

C)



$$\begin{aligned} a &= 3 - j \\ b &= -4 - 4j \\ c &= (3 - j) + (-4 - 4j) \end{aligned}$$

D)



$$\begin{aligned} a &= 3 - j \\ b &= -4 - 4j \\ c &= (3 - j) + (-4 - 4j) \end{aligned}$$

Answer Key

Testname: MAT 119 EXIT REVIEW V2

- 1) A
- 2) D
- 3) B
- 4) B
- 5) D
- 6) C
- 7) C
- 8) D
- 9) C
- 10) C
- 11) D
- 12) D
- 13) A
- 14) D
- 15) B
- 16) D
- 17) D
- 18) C
- 19) B
- 20) B
- 21) B
- 22) B
- 23) C
- 24) D
- 25) D
- 26) D