CC Math III Final Exam 2 (Fall 15)

Mark multiple choice on the bubble sheet provided and show all work on the short answer questions for full credit!!

Unit 1- Statistics

Multiple Choice: Select the BEST answer for each question. (1 pt ea.)

1. CNN conducts a study of 500 voters to determine the percentage planning to vote for Donald Trump. Name the population and the sample.

   a. Population: All eligible voters in the U.S.
   Sample: The 500 voters surveyed

   b. Population: The 500 voters surveyed
   Sample: All eligible voters in the U.S.

   c. Population: Everyone who watches CNN
   Sample: The 500 voters surveyed

   d. Population: All American TV watchers
   Sample: People who watch CNN

2. Match the sample of students with the correct sampling method: the first 100 students to arrive at school

   a. random b. convenience c. self-selected d. systematic

3. Of the 2000 students at Heritage, 400 stated that they are planning to work this summer. Find an interval that will represent the most probable percentage of students who will work this summer.

   a. 2.2% ± 20% b. 20% ± 5% c. 20% ± 2.2% d. 5% ± 2.2%

4. The amount of money spent on Christmas presents per household this year was normally distributed with an average of $1,250 and a standard deviation of $100. What percentage of households spent $1,050 and $1,350?

   a. 99.7% b. c. 95% c. 68% d. 81.5%

5. Short answer question: Four hundred students in your school took the SAT test. Assuming that a normal distribution existed after the results, how many of the students scored within two standard deviations of the mean? (Give the percent & the number.)

Unit 2 – Linear programming and Functions

Multiple Choice: Select the BEST answer for each question. (1 pt ea.)

6. The feasible region of system of linear inequalities has vertices $(0,0),\ (0,46),\ (25,25),$ and $(30,0)$. What is the maximum value of the objective function $C = 2x + 6y$?

   a. 60 b. 200 c. 276 d. 326

7. Efficient Homemakers makes canvas wallets and leather wallets. The profit on a canvas wallet is $25 and $40 for the leather wallet. For the canvas wallets, they need two yards of canvas, and three yards of leather. For the leather wallets, they need two yards of leather and three yards of canvas. Their production unit has purchased 36 yards of leather and 40 yards of canvas. Let x be the number of leather wallets and y be the number of canvas wallets. Write a system of inequalities to represent the number of the leather and canvas wallets that can be produced.

$2x + 3y \le 36$	$2x + 2y \le 36$	$2x + 2y \le 40$	$3x + 2y \le 36$
$3x + 2y \le 40$	$3x + 3y \le 40$	$3x + 3y \le 36$	$2x + 3y \le 40$
a) $x \ge 0,\ y \ge 0$	b) $x \ge 0,\ y \ge 0$	c) $x \ge 0,\ y \ge 0$	d) $x \ge 0,\ y \ge 0$

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Short Answer – Unit 2

8. Dairy Depot plans to offer a special for the month of February. If you are an HHS student, the cost of your ice cream can be determined by the piecewise function below :

$$C(t) = \begin{cases} 9, & 0 \le t < 3 \\ 9+t, & 3 \le t < 8 \\ 20, & 8 \le t < 28 \end{cases}$$

where *C(t)* is the cost of the ice cream and *t* is the day of the month. On which day(s) of the month would you pay the most for your ice cream?

_____

Unit 3 Pt 1 – Quadratic Functions and Imaginary Numbers

Multiple Choice: Select the BEST answer for each question. (1 pt ea.)

9. State the axis of symmetry for $y = 2(x+6)^2 - 7$.

   a. x = –7 b. x = -6 c. y = -7 d. y = -6

10. Find the maximum *y* value for $y = -3(x-5)^2 - 3$.

    a. (5, -3) b. -3 c. (-5,-3) d. 3

11. Which is NOT one of the zeros of the function y = x(x – 5)(x + 4)?

    a. 1 b. -4 c. 5 d. 0

12. One of the factors of $7x^2 + 53x + 28$ is:

    a. $7x - 4$ b. $x - 4$ c. $7x + 4$ d. $7x + 196$

13. Multiply (10-2i)(7+4i)

    a. 78-26i b. -26i+78 c. 78+26i d. 26i+78

Short Answer – Unit 3 Pt 1

14. Find a quadratic equation in standard form with roots of -4 and 2.

_____

Unit 3 Pt 2 – Polynomial Functions

Multiple Choice: Select the BEST answer for each question. (1 pt ea.)

15. State the multiplicity of zeros for the following function. $f(x) = 8x^3 - 32x^2 + 16x$

    a. 16 has multiplicity of 1 b. 8 has multiplicity of 3 c. 1 has multiplicity of 1 d. 0 has multiplicity of 1

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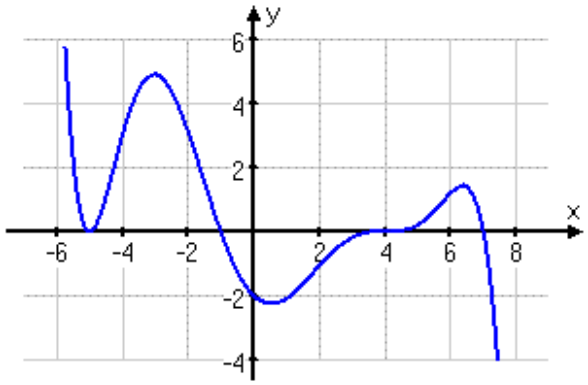
16. Which is the polynomial for the given graph?



a. $P(x)=(x+5)(x+1)(x-4)(x-7)$

b. $P(x)=(x+1)(x+5)^2(x-4)^3(x-7)$

c. $P(x)=(x+1)(x+5)^2(x-4)^3$

d. $P(x)=(x+1)^2(x-4)^3(x-7)$

17. Determine the zeros of the function: $f(x)=12x^3+2x^2-30x-5$

a. $\{\sqrt{\frac{5}{2}}, -\sqrt{\frac{5}{2}}, -\frac{1}{6}\}$ b. $\{\frac{\sqrt{5}}{2}, -\frac{\sqrt{5}}{2}, -\frac{1}{6}\}$ c. $\{\sqrt{\frac{5}{2}}, -\sqrt{\frac{5}{2}}, \frac{1}{6}\}$ d. $\{\frac{\sqrt{5}}{2}, -\frac{\sqrt{5}}{2}, \frac{1}{6}\}$

18. Which is correct factoring of $8x^3 - 64$?

a. $(2x + 4)(2x^2 - 8x + 16)$ b. $(2x - 4)(2x^2 + 8x + 16)$ c. $(2x – 4)(4x^2 + 8x + 16)$ d. $(2x + 4)(4x^2 + 8x + 16)$

19. What is the remainder of $\frac{2x^2-17x-38}{2x+3}$?

a. 5 b. 2 c. -10 d. -8

Short Answer – Unit 3 Pt 2

20. Explain how to determine the end behavior of $y=-(x+5)(x-3)^2(x+1)^3$ without using a calculator. **(2 pts)**

Unit 4 - Rational Expressions and Equations

Multiple Choice: Select the BEST answer for each question. (1 pt ea.)

21. Simplify. $\frac{7}{x+8}+\frac{7}{x^2-64}$

a. $\frac{7x-49}{(x-8)(x+8)}$ b. $\frac{14}{x^2+x-56}$ c. $\frac{14}{(x-8)(x+8)}$ d. $\frac{7x+63}{(x-8)(x+8)}$

22. Multiply. $\frac{x^2}{x+1}\cdot\frac{x^2+3x+2}{x^2+3x}$

a. $\frac{x^2+2x}{x+3}$ b. $\frac{x+2}{x+3}$ c. $\frac{x+2}{x-3}$ d. $\frac{x^2+2x}{x-3}$

23. Solve the equation. $\frac{-2}{x+4}=\frac{4}{x+3}$

a. $-\frac{3}{14}$ b. $\frac{11}{6}$ c. $-\frac{11}{3}$ d. $-\frac{31}{24}$

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24. Where are the points of discontinuity for the rational function $y = \frac{(x-5)(x-2)}{(x-2)(x+4)}$?

a. asymptote at x = -4 and hole at x = 2 b. asymptote at x = -4 and x = 2 c. asymptote at x = -5 and hole at x = -4 d. asymptote at x = 4 and hole at x = -2

25. What is the domain for the rational function $\frac{4}{x^2-7x-18}$?

a. $(-\infty,-7) \cup (-7, \infty)$ b. $(-\infty, -2) \cup (-2, 9) \cup (9, \infty)$ c. $(-\infty, 9) \cup (9, \infty)$ d. $(-\infty, -2) \cup (-2, \infty)$

Short Answer – Unit 4

26. Population experts predict that the number of schools in eastern North Carolina will grow according to the function $P(t) = \frac{45(1+0.6t)}{(3+0.02t)}$.

a) How many schools will there be after 20 years? **(2 pts)**

b) When will there be 600 schools? **(2 pts)**

Unit 5 – Logarithmic Equations & Piecewise Functions

Multiple Choice: Select the BEST answer for each question. (1 pt ea.)

27. Solve the equation $5^{2x+8} = 25$.

a. $x = 4$ b. $x = 3$ c. $x = -3$ d. $x = \frac{1}{4}$

28. Express $3 \ln 2x + 4 \ln(x - 4)$ as a single logarithm.

a. $12 \ln 2x^2 - 8x$ b. $\ln \frac{(2x)^3}{(x-4)^4}$ c. $\ln(2x)^3(x-4)^4$ d. $12 \ln \frac{2x}{(x-4)}$

29, Rounded to four decimal places, what is the solution of the equation $5 + \ln(x - 3) = 8$?

a. $x = 23.0855$ b. $x = 17.0855$ c. $x = 442{,}416.3921$ d. $x = 6.6952$

30. Find the inverse of the equation: $y = \ln(x - 4) + 5$.

a. $y = \ln(x - 5) + 4$ b. $y = \ln(x + 4) - 5$ c. $y = e^{x+5} - 4$ d. $y = e^{x-5} + 4$

31. You are investing $2,000 in an account that will earn interest compounded continuously. At what interest rate should you invest if you want to double your money in 5 years?

a) .13% b) 1.52% c) 13.9% d) 152%

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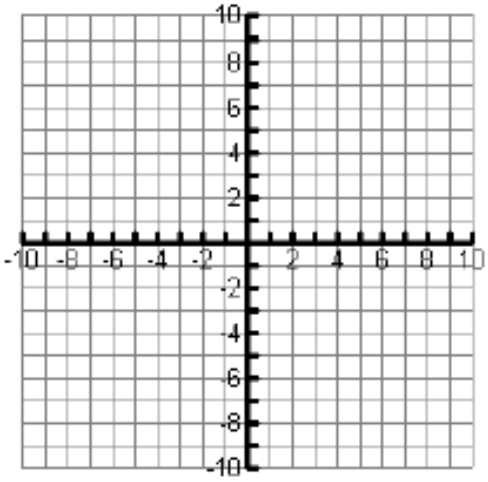
Short Answer – Unit 5

32. Graph the following piecewise function. **(5 pts)**

$$f(x) = \begin{cases} x + 4, & x < -5 \\ -\frac{1}{4}x, & -5 \le x \le 3 \\ -6, & x > 3 \end{cases}$$



$f(-5) =$

$f(7) =$

$3f(1) =$

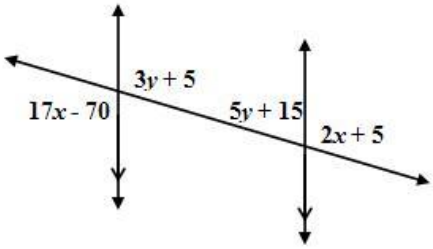
Unit 6: Lines, Angles, and Parallelogram Relationships

Multiple Choice: Select the BEST answer for each question. (1 pt ea.)

33. If two parallel lines are cut by a transversal which pair(s) of angles are supplementary?

a. Consecutive interior b. Alternate Interior c. Alternate Exterior d. Corresponding

34. Given the diagram shown at the right, find the value of x.



a. 3.95 b. 5.76 c. -5 d. 5

35. Given the diagram shown, what is the value of y? (Ignore the value for x you found in the last problem.)

a. 25 b. 20 c. -5 d. 5

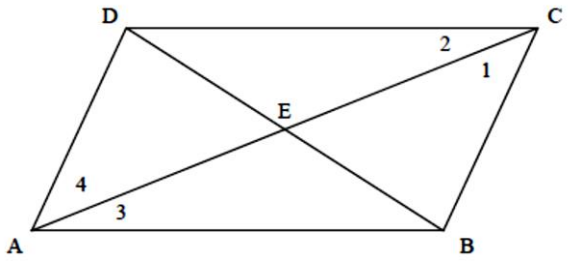
36. Given m∠A = (4x - 10)° & m∠B = (x + 15)°. If A and B are complementary, what is the m∠A?

a. 17° b. 37° c. 35° d. 58°

Short Answer – Unit 6

37. Write a system of equations and solve for x and y. **(4 pts)**

DC = 6x + y, BC = 3x + 2y, AB = 25, and AD = 14.



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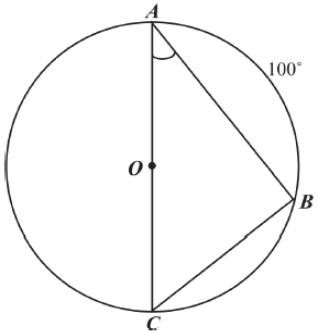
Unit 7 Part 1 – Circles, Arcs, Sectors, and Segments

Multiple Choice: Select the BEST answer for each question. (1 pt ea.)

38. Use the figure below to answer the following question. Triangle ABC is inscribed in a circle O. What is the measure of angle B?



a. 50°
b. 100°
c. 90°
d. 40°

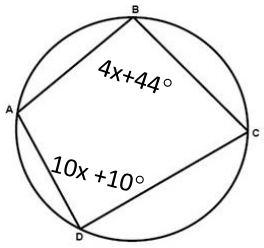
39. Rewrite $\frac{6\pi}{5}$ radians in degree measure.

a. 216° b. 108° c. $\frac{-4\pi}{5}$ d. $\frac{16\pi}{5}$

40. What is area of a sector formed by 40° in a circle with radius of 9-in?

a. 9π in. b. 9π in.^{2} c. 2π in. d. 2π in.^{2}

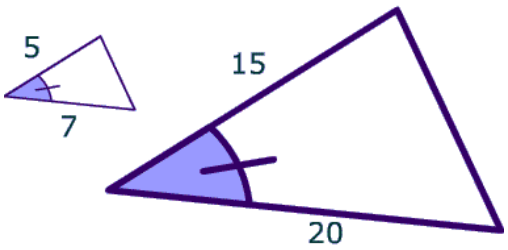
41. Find ∠B.



a. 1°
b. 18°
c. 80°
d. 49°

Short Answer – Unit 7 Pt 1

42. Determine if the following triangles are similar. If so, by what criterion? If not, why? Write a similarity statement for the triangles, if possible. **(4 pts)**



Unit 7 Part 2

Multiple Choice: Select the BEST answer for each question. (1 pt ea.)

43. The equation of a circle is given as $x^2 + y^2 + 2x + 6y + 3 = 0$. What are the center, *C*, and the radius, *r*, of the circle?

a. $C(-1,-3);\quad r = \sqrt{7}$ b. $C(1,3);\quad r = \sqrt{7}$ c. $C(-1,-3);\quad r = 7$ d. $C(-1,-3);\quad r = 7$

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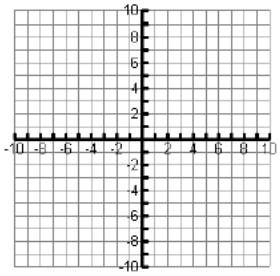
44. Which angle is coterminal to 150°?

a. -30° b. 520° c. 510° d. 330°

45. Convert 82.346° into degrees, minutes, and seconds.

a a. 82° 53’ 8” b. 82° 19’ 30” c. 82° 19’ 50” d. 82° 20’ 45.6”

46. Suppose θ is an angle in standard position whose terminal side lies on the given quadrant. If $sin\theta = \frac{4}{5}$, and θ lies in quadrant 2, find $tan\theta$.



a. $\frac{4}{3}$ b. $\frac{5}{4}$ c. $-\frac{3}{4}$ d. $\frac{3}{4}$

47. Find the exact value of tan45°.

a. $\frac{\sqrt{2}}{2}$ b. $-\frac{\sqrt{2}}{2}$ c. 1 d. -1

48. Short answer: Simplify $\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x}$.

a. $\sec x \csc x$ b. $1 + \cot x$ c. $-2\tan^2 x$ d. $\sin x \tan x$

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Practice Exam Key

1. A
2. B
3. C
4. D
5. 95%
6. C
7. A
8. Days 8 through 28
9. B
10. B
11. A
12. C
13. C
14. $x^2 + 2x - 8$
15. D
16. B
17. A
18. C
19. D
20. Fall, fall
21. A
22. A
23. C
24. A
25. B
26. a) 172 b) After 117 years
27. C
28. C
29. A
30. D
31. C
32. 5/4, -6, -3/4
33. A
34. D
35. B
36. D
37. x=4, y=1
38. C
39. A
40. B
41. C
42. No, one side is not proportional.
43. A
44. C
45. D
46. A
47. C
48. A