

# AFM - Final Exam Review

Name: \_\_\_\_\_

## Functions:

Solve each equation. Remember to check for extraneous solutions.

$$1) \frac{1}{a} - \frac{1}{a^2 - 5a} = \frac{4}{a^2 - 5a}$$

$$2) \frac{2}{p^2 - 2p + 1} = \frac{6}{p - 1} - \frac{1}{p^2 - 2p + 1}$$

$$3) \frac{n + 5}{n} + \frac{5n - 30}{n^2 - n} = 1$$

$$4) \frac{1}{n^2 - 3n} = \frac{6n + 1}{n - 3} - 1$$

Solve each equation.

$$5) \log_{11} 5v = \log_{11} (3v + 9)$$

$$6) \log_{16} (v^2 + 2v) = \log_{16} (54 - v)$$

$$7) \log_7 (x + 1) + \log_7 x = \log_7 20$$

$$8) \log_2 (x - 4) - \log_2 7 = 3$$

$$9) 7.1e^{x+7} = 20$$

$$10) 4^{9x-6} + 1 = 9.2$$

11. Given the function:  $f(x) = \begin{cases} 2x - 5 & \text{if } x \leq 1 \\ 4 - 3x^2 & \text{if } x > 1 \end{cases}$

Find:  $f(4) + 2f(-3) - 5f(1)$

**Sequences & Series:**

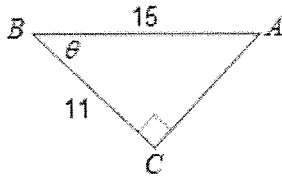
12. For the following arithmetic sequence, find the 18<sup>th</sup> term of 1.4, 1.9, 2.4
13. Find the three arithmetic means between 2 and 5.
14. Find the sum of the first 35 terms of the arithmetic sequence when  $a_1 = 5$  and  $d = 4$
15. Find the sum of the arithmetic series in which  $a_1 = 5$  and  $a_{34} = 71$
16. Evaluate:  $\sum_{n=1}^4 (2n - 7)$
17. Find the sixth term of the geometric sequence:  $1, \frac{3}{4}, \frac{9}{16}, \dots$
18. Find the sixth term of the geometric sequence if  $a_1 = 48$  and  $r = -2$
19. Find the 8<sup>th</sup> term of the geometric sequence when  $a_1 = 9$  and  $r = -2$
20. Find the sum of the first five terms of the geometric series:  $\frac{1}{3} + 2 + 12 + \dots$
21. Find the sum of the infinite geometric series, if it exists.  $\sum_{n=1}^{\infty} 2k$

22. Find the sum of the infinite geometric series, if it exists:  $20 - 2 + \frac{1}{5} - \dots$

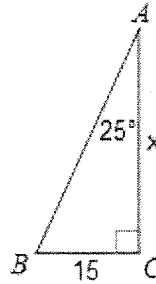
### Trigonometry & Triangles:

23. Find the missing side or angle using trigonometry.

a.



b.



24. A ramp in a park is 48 feet long and rises 6 feet. Estimate the angle to the nearest tenth that the ramp makes with the ground.

25. Given triangle ABC with  $a = 14$ ,  $A = 40^\circ$ , and  $B = 28^\circ$ , what is the measure of  $c$ ?

26. Given triangle ABC with  $a = 7$  cm,  $b = 9$  cm, and  $c = 14$  cm. Find the measure of angle C.

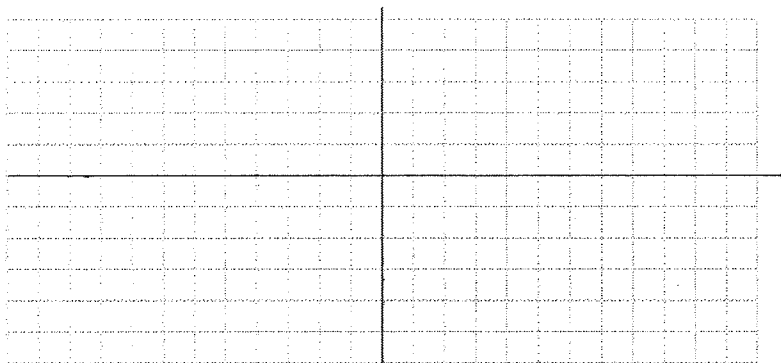
27. Determine the number of triangles. (Use Law of Sines)

a.  $m\angle B = 18^\circ$ ,  $a = 10$  m,  $b = 4$  m

b.  $m\angle B = 78^\circ$ ,  $b = 29$  ft,  $a = 24$  ft

28. In a paintball game, there are only three players left. Darnell and Gunner are on the same side and 20 ft apart. Josh forms an angle of  $75^\circ$  between Gunner and Darnell. Gunner forms a  $68^\circ$  angle between Darnell and Josh. How far is Josh from **both** Darnell and Gunner?

29. Rick and Carl want to plant corn along the edges of a triangular plot of land at the prison. Two of the angles of the triangle measure  $95^\circ$  and  $40^\circ$ . The side between these two angles is 80 feet long.
- Find the measure of the third angle.
  - Find the length of the other two sides of the triangle.
  - What is the perimeter of this triangular plot of land?
30. A ship is sighted from two radar stations 43 km apart. The angle between the line segment joining the two stations and the radar beam of the first station is  $37^\circ$ . The angle between the line segment joining the two stations and the beam from the second station is  $113^\circ$ . How far is the ship from the second station?
31. During a figure skating routine, Jessica and Shannon skate apart with an angle of  $15^\circ$  between them. Jessica skates for 5 meters and Shannon for 7 meters. How far apart are the skaters?
32. Graph  $y = 2 \sin \theta - 4$



33. State the amplitude, period, vertical shift, and horizontal shift for:  $y = 6 \sin(4\theta) + 5$

### Statistics:

For questions 19 – 21, use the following information: On a normal curve, the mean on the Algebra II Final is 54, with a standard deviation of 11.8

34. What percent of students are within 2 standard deviations of the mean?

35. If 120 students took the test, how many scored higher than 65.8?

36. What percent scored lower than 54?

### Probability:

37. A 9-member committee is selecting a president, vice-president, secretary, and treasurer from the committee. No person can serve in two positions. In how many ways can the four positions be filled?

38. Teddy is buying a sports car. He can buy red or black, convertible or hard-top, straight drive or automatic. How many possible models does he have to choose from?

39. How many possible ways can you choose 3 library books to check out from 8?

40. How many ways can you arrange 8 candles on the top of a birthday cake?

41. How many ways are there to arrange the letters in "Trigonometry"?

42. How many ways can Mrs. Smith's preschool class of 12 students line-up to go outside and play?

43. How many groups of 5 students can be chosen from 25?
44. How many ways can you choose a group of 5 men and 7 women from 12 men and 13 women?
45. Suppose you select 3 letters from the word CLEMSON. What is the probability of selecting 2 vowels at the same time?
46. A bag contains 8 orange marbles and 5 purple marbles. If a marble is chosen at a random, what is the probability that it is not purple?
47. Billy breaks his piggy bank and finds 5 pennies, 8 nickels, and 9 dimes. What is the probability that he will selection 1 dime and 1 nickel at the same time?
48. What is the probability he will select 2 pennies at the same time?
49. A die is thrown twice. What is the probability that a 4 is thrown followed by a 6?

For questions 35 – 37, 12 playing cards (3 Aces, 4 Kings, 2 Queens, and 3 Jacks) are placed on the table face down. If four cards are selected at random, find the probability that:

50. You select Ace, Jack, King, King, without replacement.
51. You select a Queen, King, Jack, Ace, with replacement.
52. You select Queen, Queen, Ace, any card other than Ace, without replacement.

**Mixed Review – Multiple Choice:**

53. Find the value of  ${}_6P_4$ .

a) 15

b) 2

c) 24

d) 360

54. Find the standard deviation for the given data: 5, 6, 8, 11, 10

a) 3.28

b) 1.28

c) 2.28

d) 4.28

55. Solve:  $\frac{x+9}{x+8} = \frac{x-7}{x-6}$

a)  $x = -1$

b)  $x = 0$

c)  $x = 2$

d)  $x = -3$

56. Evaluate:  $\log_9 729$

a) 3

b) 5

c) 4

d) 2

57. Evaluate:  $\log 94$

a) 9.4

b) 1.97

c) .51

d) 3.95

58. Solve  $e^{4x} = 5.7$  for  $x$  to four decimal places.

a) -0.4030

b) 0.4351

c) 0.7559

d) -0.7559

59.  $\log_9(x^2 + 7) = \log_9(43)$

a)  $\pm 36$

b)  $\pm 6$

c)  $\pm 6.56$

d)  $\pm 5$

60.  $\ln(-2y + 5) - \ln(y + 4) = \ln(-11y - 2)$

a) (-3.68, -.32)

b) infinite solutions

c) (3.68, .32)

d) no solution

61. Find an exponential function to model the data.

- a)  $f(x) = 116.4 - 42.8 \ln x$   
 b)  $f(x) = 2.204 (3.56)^x$   
 c)  $f(x) = 3.56(2.04)^x$   
 d)  $f(x) = -42.8 + 116.4 \ln x$

x	y
1	7
2	16
3	30
4	61
5	124
6	271
7	522

62. Find the best fit regression model for the data according to the given model.

x	y
1	50
2	140
3	260
4	400
5	560
6	750
7	925
8	1130

- a)  $49.79x^{1.50}$   
 b)  $5.48x^{32}$   
 c)  $156.13x - 175.71$   
 d)  $1.5x + 3.91$

63. What is the explicit form of the equation:  $a_1 = a_{n-1} + 2(n-1)$  ;  $a_1 = 1$

- A  $a_n = 2n - 1$   
 B  $a_n = n^2 - n + 1$   
 C  $a_n = n^2 - 2n + 2$   
 D  $a_n = 2n^2 - 2n - 1$

64. Which function has an amplitude that is twice the size and a period that is three times the size of the function

$$y = 3 \cos\left(\frac{x}{4} - 1\right) + 2$$

- A  $y = 6 \sin\left(\frac{x}{12} - 3\right) + 1$   
 B  $y = \frac{3}{2} \cos\left(\frac{3x}{4} + 1\right) - 3$   
 C  $y = 6 \cos\left(\frac{3x}{4} - 1\right) + 3$   
 D  $y = \frac{3}{2} \sin\left(\frac{x}{12} + 3\right) - 1$