AFM: Mixed Review of FE Released Questions **Name:**_____

Multiple Choice: Show all work and circle your answer.

1) Which equation is equivalent to $3 \log x + \log 2 = \log 3x - \log 2$?

A $\log x^3 + 2 = \log (3x - 2)$

B $\log (3x + 2) = \log (3x - 2)$

C $\log 6x = \log \left(\frac{3x}{2}\right)$

D $\log (2x^3) = \log \left(\frac{3x}{2}\right)$

2) The pressure, P, measured in pounds per square inch (psi), on an object under water varies directly with its depth, d, measured in feet. If the pressure on an object at a depth of 20 feet is 8.6 psi, what is the pressure on an object at a depth of 25 feet?

A 6.88 psi

B 9.85 psi

C 10.75 psi

D 13.60 psi

3) The table below represents the size, in acres, of the average farm.

Year	1950	1960	1970	1980	1997	1998
Size of Farm (acres)	213	297	374	426	436	435

- Choose which mathematical model below ***best*** fits the data.
- Using the model, predict the ***approximate*** size of the average farm in the year 2010.

A linear; 650 acres

B linear; 510 acres

C quadratic; 400 acres

D quadratic; 360 acres

4) What is the domain of $f(x) = \sqrt{-x + 2}$?

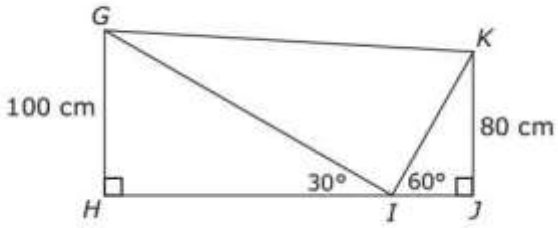
A $\{x : x \geq -2\}$

B $\{x : x \leq 2\}$

C $\{x : -2 < x < 2\}$

D $\{x : 0 < x < 2\}$

5) What is the ***approximate*** length of $\overline{HJ}$ in the diagram below?



A 292 cm

B 265 cm

C 219 cm

D 196 cm

6) Events M and N have probabilities such that $P(M) = 0.4$, $P(N) = 0.28$, $P(M \cup N) = 0.56$, and $P(M \cap N) = 0.12$. Are event M and event N independent?

A no, because $P(M) - P(N) = P(M \cap N)$

B no, because $P(M) \bullet P(N) \neq P(M \cap N)$

C yes, because $P(M) + P(N) = P(M \cup N)$

D yes, because $P(M) \bullet P(N) \neq P(M \cup N)$

7) There are 250 students in a senior class.

- Of the 250 students, 102 are boys.
- There are 20 senior girls and 18 senior boys on the track team.

What is the probability a randomly chosen student from the senior class is a girl who does not run track?

A 0.920

B 0.512

C 0.497

D 0.135

8) Twenty-one students at a school have an allergy to peanuts, shellfish, or both.

- Fourteen students at the school are allergic to peanuts.
- Twelve students at the school are allergic to shellfish.

How many of the students are allergic to both peanuts and shellfish?

A 12

B 7

C 5

D 2

9) Angles F and G are complementary angles.

- As the measure of angle F varies from a value of x to a value of y, $\sin(F)$ increases by 0.2.

How does $\cos(G)$ change as F varies from x to y?

A It increases by a greater amount.

B It increases by the same amount.

C It increases by a lesser amount.

D It does not change.

10) Which is the solution set for x if $2e^{2x} + 5e^{x} - 12 = 0$?

A $\left\{\ln\frac{3}{2}, \ln 4\right\}$

B $\left\{\ln\frac{3}{2}, \ln^{-}4\right\}$

C $\{\ln 4\}$

D $\left\{\ln\frac{3}{2}\right\}$

11) Samantha invested $10,000 in each of two different financial plans in 2013. The predicted value of each plan is modeled below.

- Plan M: a rate of 7.5%, compounded continuously.
- Plan N: The value is determined by the function $y = 5x^3 - 50x^2 + 4x + 10{,}000$, where x is the number of years after 2013.

Plan N has a greater predicted value than Plan M during which years?

A from 2014 to 2041

B from 2028 to 2055

C from 2042 to 2073

D Plan N never has a greater value than Plan M.

12) A student wants to determine the most liked professor at her college. Which type of study would be the ***most*** practical to obtain this information?

A a simulation

B an experiment

C a survey

D an observation

13) A town has 685 households. The number of people per household is normally distributed with a mean, μ, of 3.67 and a standard deviation, σ, of 0.34. ***Approximately*** how many households have between 2.99 and 4.01 people?

A 493 households

B 520 households

C 558 households

D 575 households

14) The scores on a recent test are normally distributed. John's test score of 69 was 1 standard deviation below the mean. Betty's test score of 99 was 3 standard deviations above the mean. What are the mean and standard deviation for the test score distribution?

A The mean is 76.5, and the standard deviation is 7.5.

B The mean is 79, and the standard deviation is 10.

C The mean is 84, and the standard deviation is 15.

D The mean is 91, and the standard deviation is 2.5.

15) The recursive formula for a sequence is $U_n = U_{n-1} + 12$, where U_n is the nth term of the sequence and $U_0 = 7$. Which explicit formula can be used to determine the nth term of the sequence?

A $7n + 19$

B $7n + 12$

C $7 + 19n$

D $7 + 12n$

16) The volume, V, of a certain gas varies inversely with the amount of pressure, P, placed on it. The volume of this gas is 175 cm^3 when 3.2 kg/cm^2 of pressure is placed on it. What amount of pressure must be placed on 400 cm^3 of this gas?

A 1.31 kg/cm^2

B 1.40 kg/cm^2

C 2.86 kg/cm^2

D 7.31 kg/cm^2

17) For a carnival game, a jar contains 20 blue marbles and 80 red marbles.

- Children take turns randomly selecting a marble from the jar.
- If a blue marble is chosen, the child wins a prize.
- After each turn, the marble is replaced.
- Casey has drawn six red marbles in a row.

Which statement is true?

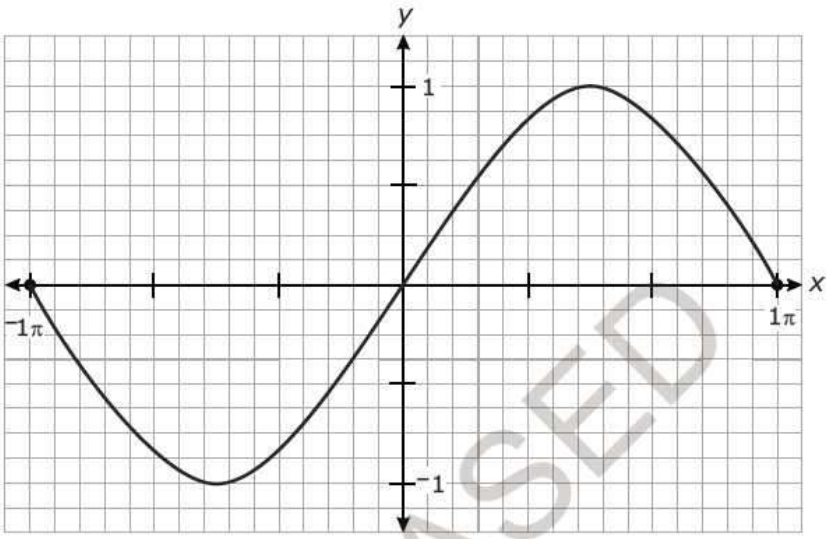
A If Casey selects another red marble, then 2 of her next 3 picks will be blue marbles because 2 blue marbles are selected for every 8 red marbles selected.

B The probability that Casey selects a blue marble on the next turn is higher than it was on her last turn because she has chosen so many red marbles in a row.

C The probability that Casey selects a blue marble on her next turn is the same as it was on the last turn because selections are independent of each other.

D If Casey draws 4 more times, she will select 2 blue marbles because the probability that a blue marble will be selected is 2 out of every 10 turns.

18) Which function is graphed below?



A $y = \sin x$

B $y = \cos x$

C $y = \tan x$

D $y = \cot x$

19) An investment has a balance of $2,000 and earns 3.2% interest each year. If $150 is added at the end of each year by the account holder and no money is withdrawn from the investment, which represents a function that can be used to calculate the investment balance for successive years?

A $B_n = 0.032B_{n-1} + 2{,}000,\ B_0 = 150$

B $B_n = 0.032B_{n-1} + 150,\ B_0 = 2{,}000$

C $B_n = 1.032B_{n-1} + 2{,}000,\ B_0 = 150$

D $B_n = 1.032B_{n-1} + 150,\ B_0 = 2{,}000$