AFM Benchmark 3

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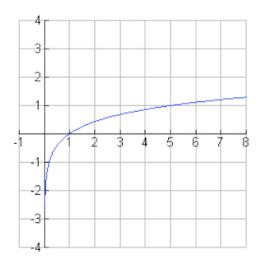
Question 1 (1 point)

Standard: 2.01a DOK: 1

The graph below shows the function

$$y = \log_b x$$

Which statement must be true about b?



- 0 < b < 1
- b < 0
- b > 1
- b < -1

Question 2 (1 point)

Standard: 1.01a

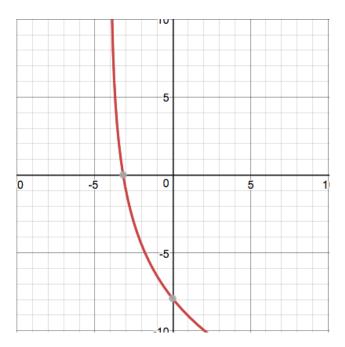
DOK: 1

Find the domain of y = In(x + 3)

- (3, 👀) (a
- (b [-3, **XX**)
- c [3, **∞**)
- (d (−3, **∞**)

Question 3 (1 point) Standard: 2.04b

Which function matches the graph?



- $y = -5\ln(x + 4) 1$
- $y = -5\ln(x 4) + 1$ b
- \bigcirc c y = 5ln(x + 4) 1
- \bigcirc d $y = -5\ln(x 4) 1$

Standard: 2.01a

Question 4 (1 point)

DOK: 2

Evaluate the logarithm function.

 $log_3 (x - 4) + log_3 (x + 4) = 2$

- $x = \pm 5$
- b x = -5
- O c $x = 3\sqrt{2}$
- (d x = 5

Standard: 1.01a

Question 5 (1 point) DOK: 2

Consider the graph of $y = \ln x$ with the limited domain (0, 5]. What is the maximum value of the function on this interval?

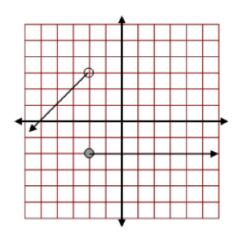
- In(5)
- b In(1)
- (c 1
- (d

Standard: 2.02a

Question 6 (1 point)

DOK:1

Which piecewise function matches the graph?



(a

$$f(x) = \begin{cases} x + 5, & x \le -2 \\ -2, & x > -2 \end{cases}$$

(b

$$f(x) = \begin{cases} x - 5, & x \le -2 \\ 2, & x > -2 \end{cases}$$

O c

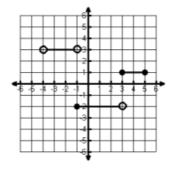
$$f(x) = \begin{cases} x + 5, & x < -2 \\ -2, & x \ge -2 \end{cases}$$

 \bigcirc d

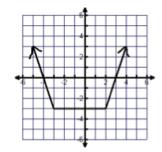
$$f(x) = \begin{cases} x - 5, x < -2 \\ 2, x \ge -2 \end{cases}$$

$$f(x) = \begin{cases} -x - 5, & x < -3 \\ -2, & -3 < x \le -1 \\ x - 1, & -1 < x \le 2 \end{cases}$$

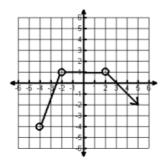
(a



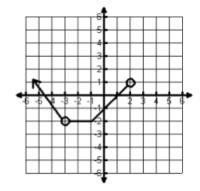
(b



(c



() d



Standard: 2.03a

Question 8 (1 point) DOK: 2

The equation $y = 2.3x^{2/7}$ is graphed on the coordinate plane. How does increasing the coefficient of the function transform the graph?

O a T	he graph	of the	function	becomes	narrower	along	the	x-axis
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- b The graph of the function becomes wider along the y-axis.
- () c The graph of the function becomes narrower along the y-axis.
- The graph of the function becomes wider along the x-axis.

Standard: 2.03a

Question 9 (1 point) DOK: 3

The equation $y = 3.2x^{3/5}$ is graphed on the coordinate plane. How does decreasing the denominator of the exponent transform the graph?

- The transformed graph will go to ∞ slower than the original graph as the value of x gets larger.
- The transformed graph will approach a horizontal asymptote while the original graph will not.
- The transformed graph will go to ∞ faster than the original graph as the value of x gets larger.
- \bigcirc d The transformed graph will not approach a horizontal asymptote while the original graph will.

Standard: 2.01a

Question 10 (1 point) DOK: 3

The maximum height, in inches, a ball reaches after its first four bounces in shown in the table below.

Bounce Number	Height (in inches)
1	48
2	38.4
3	30.72
4	24.576

Which type of function best models the data and why?

(a	a logistic function, because the height of the ball is decreasing by 80% with each bounce
(b	an exponential function, because the height of the ball is decreasing by 20% with each bounce

- b a logistic function, because the height of the ball is decreasing by 20% with each bounce ○ c
- an exponential function, because the height of the ball is decreasing by 80% with each bounce

In an alternating current circuit, voltage can be modeled by a sine function. For a particular circuit, the maximum voltage is 80 volts above the midline, and the frequency is 50 cycles per second. Which equation best represents V, the voltage, as a function of t, the time in seconds?

(a	
	$V = 160 \sin(100\pi t)$
O b	
	$V = 100 \sin(160\pi t)$
○ c	
	$V = 80 \sin(100\pi t)$
(d	
	$V = 50 \sin(80\pi t)$

Question 12 (1 point) Standard: 1.02d DOK: 1

The mean of the monthly utility bills in a town is \$183.00, with a standard deviation of \$17.00. Based on the normal distribution, which value best represents the percentage of utility bills between \$166.00 and \$217.00?

a 95.0%b 47.5%c 68.0%d 81.5%

Standard: 1.02d

Question 13 (1 point) DOK: 2

A large random sample was taken of body temperatures of women at a university. The data from the sample were normally distributed with a mean body temperature of 98.52°F and a standard deviation of 0.727°F. Based on this sample, which percentage is the best estimate of the proportion of all women at this university who have a body temperature more than 2 standard deviations above the mean?

a 2.28%b 97.72%c 0.30%d 72.70%

Standard: 2.05a

Question 14 (1 point) DOK: 2

Which of these expressions can be used to find the sum of the first 12 terms of the series below?

$$-3+1-\frac{1}{3}+\frac{1}{9}-\frac{1}{27}+\dots$$

$$\frac{-2\left(1-\left(\frac{1}{3}\right)^{12}\right)}{\left(1-\frac{1}{3}\right)}$$

(b

$$\frac{-3\left(1-\left(\frac{1}{3}\right)^{12}\right)}{\left(1-\frac{1}{3}\right)}$$

O c

$$\frac{-2\left(1-\left(\frac{-1}{3}\right)^{12}\right)}{\left(1+\frac{1}{3}\right)}$$

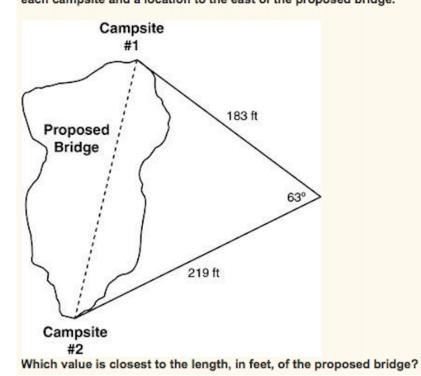
 \bigcirc d

$$\frac{-3\left(1-\left(\frac{-1}{3}\right)^{12}\right)}{\left(1+\frac{1}{3}\right)}$$

Standard: 2.04c

Question 15 (1 point) DOK: 2

A surveyor used the diagram below to calculate the distance of a proposed bridge between two campsites by a lake. The diagram shows three locations: each campsite and a location to the east of the proposed bridge.



(a	100.2
() b	148.0
() c	285.4
() d	212.3
O u	212.3
	Standard: 2.04c
Questio	n 16 (1 point) DOK: 3
	ted an 8-foot ladder against his house reaching the top of his house. The base of the ladder was 2 feet away from the verical be house along a straight downward-sloped surface. The measure of the angle between the ladder and the house is 14°. How house?
O a	8.3 feet
b	6.9 feet
○ c	7.7 feet
O d	7.3 feet
	Standard: 1.03b
Questio	n 17 (1 point) DOK: 3
people to	politicians are having a tea party, 6 Democrats and 14 Republicans. To prepare, they need to choose 3 to set the table, 2 people to boil the water, and 6 people to make the scones. Each person can only do 1 task. of the people do not help. In how many different ways can they choose which people preform these tasks?
O a	300
(b	6704425728000
O c	167960
O d	29841411600
Questio	Standard: 1.03a/b n 18 (1 point) DOK: 3
people to The rest	politicians are having a tea party, 6 Democrats and 14 Republicans. To prepare, they need to choose 3 to set the table, 2 people to boil the water, and 6 people to make the scones. Each person can only do 1 task. of the people do not help. If they only give tea to 10 of the 20 people, what is the probability that they give Republicans and 1 Democrat?
O a	0.0065
() b	184756
O c	0.065
O d	12012
	Standard: 1.03 a and b
	n 19 (1 point) DOK:3
	est has 20 multiple choice questions with four choices containing one correct answer each. If you randlomly neach of the 20 questions, what is the probability that you get exactly twelve questions correct?
(a	0.000001193
O b	0.00000005967
O c	0.06089
O d	0.000752
_	

Question 20 (1 point)

DOK: 3

At Tucson Raceway Park, your horse, Soon-to-be-Glue, has a probability of 1/20 of coming in first place, a probability of 1/10 of coming in second place, and a probability of 1/4 of coming in third place. First place pays \$4,500 to the winner, second place \$3,500 and third place \$1,500. What is your expected amount of win or lose, if you make a \$1,000 bet?

a \$950

O b \$-50

O c \$550

Od \$350

Standard: 1.03d

Question 21 (1 point) DOK: 3

A construction company want to submit a bid for remodeling a school. The research and planning needed to make the bid cost \$4,000. If the bid were accepted, the company would make \$26,000. Would you advise the company to spend the \$4,000 if the bid has only 20% probability of being accepted? Explain your reasoning.

a Yes, the expected value of making this bid is \$4800.

b No, the expected value of making this bid is \$-3200

C Yes, the expected value of making tho bid is \$1600

d Yes, the expected value of making this bid is \$1200.

Standard: 2.05a

Question 22 (1 point) DOK: 1

A theater has 22 seats in the first row, 25 seats in the second row, 28 seats in the third row, and so on. How many seats are in the fifteenth row?

a 64 seats

O b 67 seats

c 350 seats

d 375 seats

Standard: 2.04b

Question 23 (1 point)

DOK: 3

A Ferris wheel at the local fair has a diameter of 36 feet and a midline of 22 feet. This Ferris wheel makes one revolution every 60 seconds. If Jamie and Cody are riding on this Ferris wheel, which equation could be used to model, d, the distance Jamie and Cody are from the ground as they ride the Ferris wheel as a function of time, t?

() a

$$d(t) = 22 + 18\sin\left(\frac{36t}{\pi}\right)$$

(b

$$d(t) = 18 + 22sin\left(\frac{\pi t}{36}\right)$$

O c

d(t)	= 22 +	18sin($\frac{\pi t}{36}$

() d

$$d(t) = 18 + 22\sin\left(\frac{36t}{\pi}\right)$$

Standard: 1.03a

Question 24 (1 point) DOK: 3

In a particular city, 78% of the residents have a desktop computer, 44% have a desktop and a laptop computer, and 6% have neither a desktop nor a laptop computer. What is the probability that this home does not have a laptop computer given that the randomly selected home has a desktop computer?

O a 0.564

O b 0.436

oc 0.077

Od 0.830

Standard: 1.03a

Question 25 (1 point) DOK: 1

A 4 digit PIN number can begin with any digit (except zero) and the remaining digits have no restriction. What is the probability of the PIN code beginning with a 2 and ending with an 9, if repeated digits are allowed?

O a 0.011

O b 0.2

O c 0.9

Od 0.012

Question 26 (1 point) Standard: 2.05d DOK: 1

Find a_2 and a_3 .

$$a_1 = 9$$

$$a_n = a_{n-1} - 2$$

a 6 and 4

b 7 and 5

o c 3 and 1

Od 9 and 7

Standard: 2.03b

Question 27 (1 point)

DOK: 2

If you write an equation for the power function that passes through the points (2, 1) and (5, 6), in the format of: $y = ax^b$ What is the approximate value of y when x = 9

a 3.4

(b	16.4
(c	21.5
O d	23.3

Standard: 2.01a

Question 28 (1 point) DOK: 1

The interest equation $A = Pe^{rt}$ can be used to determine the final value, A, of a continuously compounded interest-bearing account for t years after an initial amount of money, P, was deposited. If \$1,830 is the initial deposit in an account that earns 3.4% interest, which expression can be used to determine the number of years required for the value of the account to triple?

- \bigcirc a $\frac{log3}{.034}$
- b <u>ln3</u> .034
- \cap d $\frac{ln5490}{.034 (log1830)}$

Standard: 1.02d Question 29 (1 point) DOK: 1

The lifetime of a particular type of car tire is normally distributed. The mean lifetime is 50,000 miles, with a standard deviation of 5,000 miles. Of a random sample of 15,000 tires, how many of the tires are expected to last for between 45,000 and 55,000 miles?

- a 7,125
- o b 10,200
- o c 14,250
- O d 14,850

Question 30 (1 point)

DOK: 1

The following function models a monthly cellphone bill B in dollars as a function of the time t in minutes that the customer has used the phone. How much is the bill if you talk on the phone for 130 minutes?

	(0.10t + 12,	$0 \le t < 30$
B(t) =	$\begin{cases} 0.10t + 12, \\ 0.08(t - 30) + 15, \end{cases}$	$30 \le t < 150$
	(0.02(t-150)+24.6,	$150 \le t < 600$

- O a \$25
- o b \$23
- O c \$24.20
- O d \$72.20

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