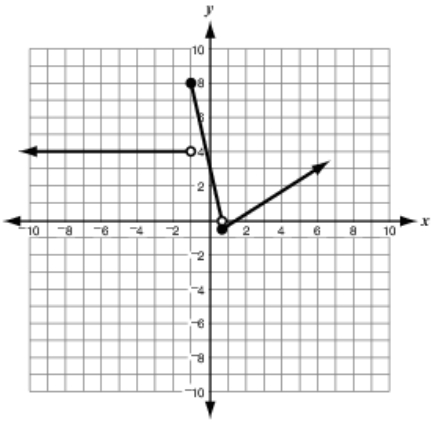
AFM Benchmark 1

Question 1 (1 point) Standard 2.02 b
DOK 2

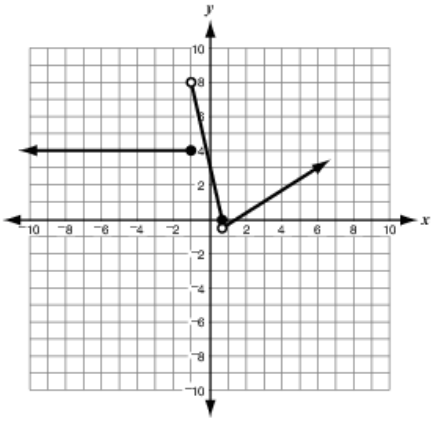
Which graph represents the function:

$$f(x) = \begin{cases} 4; & x < -1 \\ 3-5x; & -1 \le x < \frac{3}{5} \\ \frac{2}{3}x - 1; & x \ge \frac{3}{5} \end{cases}$$

a



b



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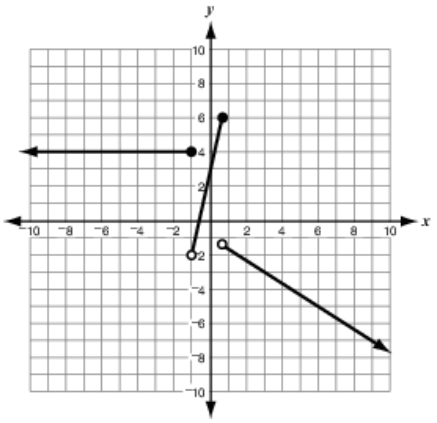

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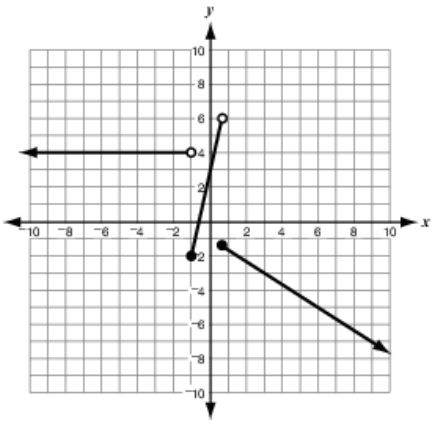


Question 2 (1 point) Standard 2.02 b DOK 3

Find the constants a and b so that the function is continuous on the entire real line:

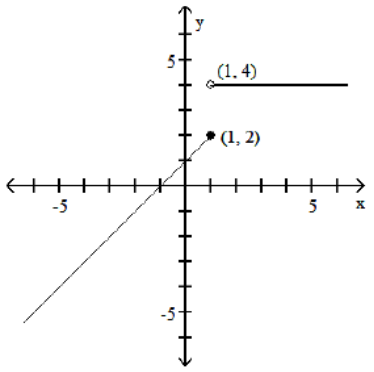
$$f(x) = \begin{cases} 18, & x \le -3 \\ ax + b, & -3 < x < 1 \\ -2, & x \ge 1 \end{cases}$$

a a = −5, b = −2
b a = 3, b = 18
c a = −5, b = 3
d none of these

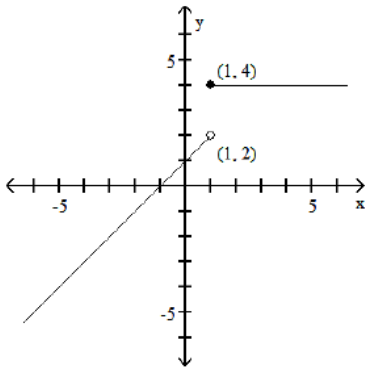
Question 3 (1 point) Standard 2.02 b DOK 1

$$f(x) = \begin{cases} x + 1 & \text{if } x < 1 \\ 4 & \text{if } x \ge 1 \end{cases}$$

A)



B)



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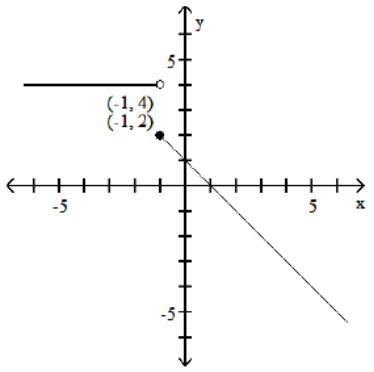
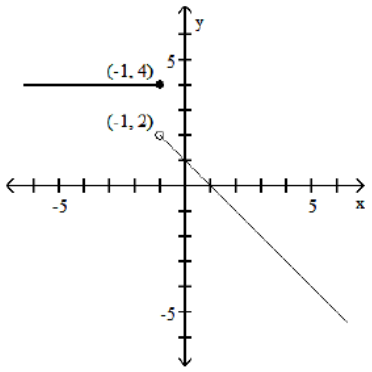


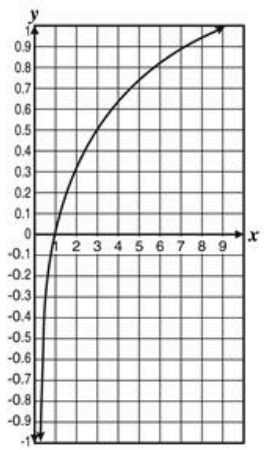
D)



- a A
- b B
- c C
- d D

Question 4 (1 point) Standard 2.01a
DOK 2

The graph of $y = \log_9 x$ is shown below.



If x is positive, what is the solution to the inequality $\log_9 x > \frac{1}{2}$?

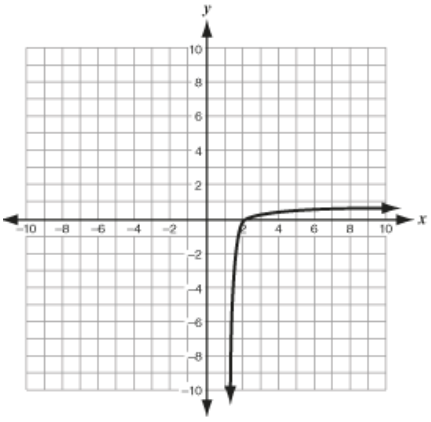
- a $x > 3$
- b $x > 4.5$
- c $0 < x < 4.5$

d $0 < x < 3$

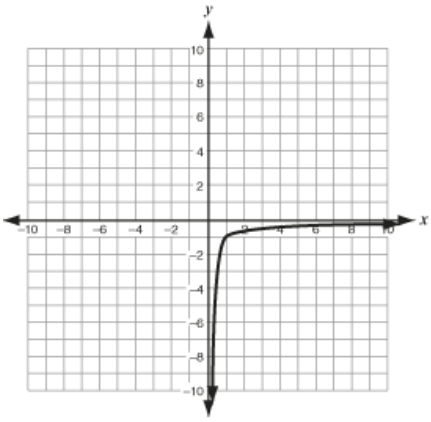
Question 5 (1 point) Standard2.01 b DOK 2

Which graph **best** represents the function $f(x) = \log(x) - 1$?

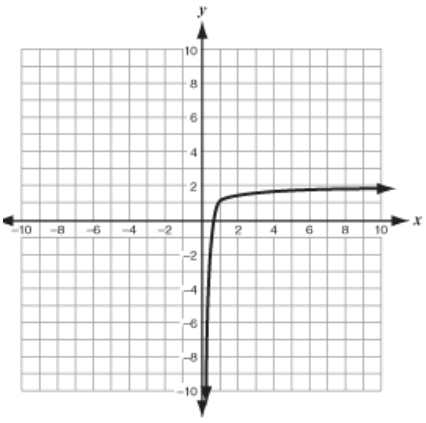
a



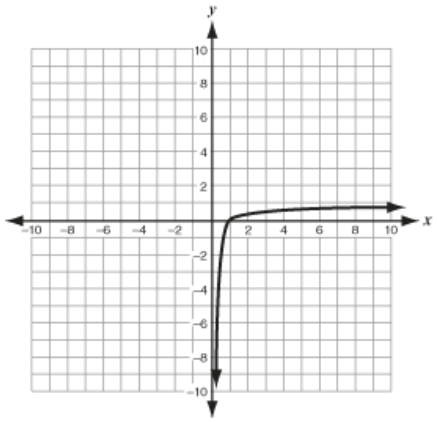
b



c



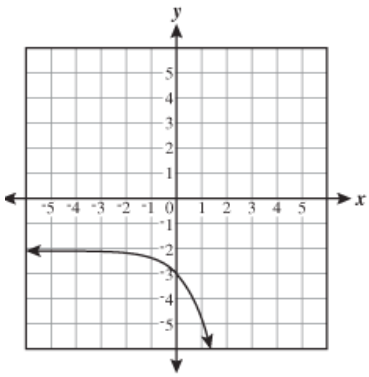
d



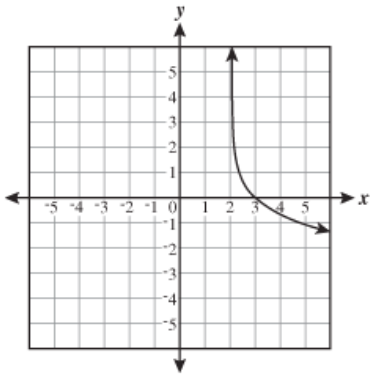
Question 6 (1 point) Standard 2.01
DOK 2

Which graph shows the function f(x) = − ln (x − 2)?

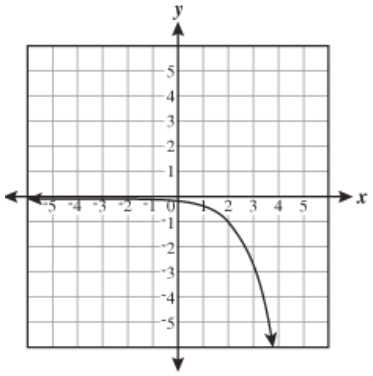
a



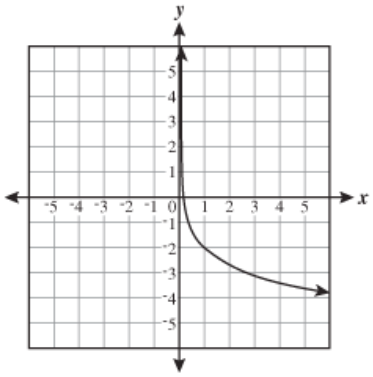
b



c



d



Question 7 (1 point) Standard 2.01 b DOK 1

What is the x-intercept of the function: y = log (x + 5) – 3?

a -1,005
b 1,002
c 995
d 4,995

Question 8 (1 point) Standard 2.04 b DOK 2

The temperature in a town over 24 hours can be modeled by a trigonometric function. The temperature was 76 degrees at 12 am and 12 pm. The lowest temperature of 70 degrees occurred at 6 am, and the highest temperature of 82 degrees occurred at 6 pm. Which function can be used to model the temperature, y, during the time in hours, x?

A $y = 12 \sin\left(\frac{\pi}{12}x + \pi\right) + 76$

B $y = 12 \sin\left(\frac{\pi}{24}x + \pi\right) + 76$

C $y = 6 \sin\left(\frac{\pi}{12}x + \pi\right) + 76$

D $y = 6 \sin\left(\frac{\pi}{24}x + \pi\right) + 76$

- a A
- b B
- c C
- d D

Question 9 (1 point) Standard 1.01 a DOK 1

Find the domain of y = log x

- a all reals less than zero
- b all reals greater than one
- c all real numbers
- d all positive real numbers

Question 10 (1 point) Standard 1.02 d DOK 1

The mean score of the students in Dr. Battle's math class on the most recent quiz was 78 points with a standard deviation of 6 points. If these scores can be modeled using a normal distribution, which percentage best represents the number of students with quiz scores between 72 and 90 points?

- a 97.5%
- b 81.5%
- c 95.0%
- d 68.0%

Question 11 (1 point) Standard 1.02 d DOK 2

A class collected data on the weight of each hardcover textbook in their backpacks. The mean weight of the books was 2.3 pounds with a standard deviation of 0.7 pound. If these textbooks were softcover editions, each would weigh 0.3 pound less. What would be the mean weight and standard deviation of the softcover editions of these same books?

- a The mean would be 2 pounds, and the standard deviation would be 0.4 pound.
- b The mean would remain at 2.3 pounds, and the standard deviation would remain at 0.7 pound.
- c The mean would remain at 2.3 pounds, nd the standard deviation would be at 0.4 pound.
- d The mean would be 2 pounds, and the standard deviation would remain at 0.7 pound.

Standard 1.02 f

Question 12 (1 point) DOK 3

A general health study survey was conducted using 142 randomly selected students from several middle schools. Each student's resting pulse rate, recorded in beats per minute, was measured. The frequency table shows the data from this survey are normally distributed.

Survey Results

Resting Pulse Rate (beats per min)	Frequency
58–62	1
63–67	5
68–72	8
73–77	19
78–82	23
83–87	33
88–92	23
93–97	14
98–102	8
103–107	5
107+	3

Based on the data in the table, which percentage is the best estimate for the proportion of students that have a resting pulse rate of at least 88 beats per minute?

- a 37.3%
- b 23.0%
- c 16.2%
- d 53.0%

Standard 2.05 b

Question 13 (1 point) DOK 1

Which value is closest to the sum of the first 100 terms of the infinite series shown below?

$$1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{16}+\ldots$$

- a 200
- b 2
- c 100
- d 1

Standard 2.04 c

Question 14 (1 point) DOK 3

A 30-foot-long ladder is leaning against an embankment inclined 64° to the horizontal line. If the angle the ladder makes with the ground is 40°, what is the distance from the top of th ladder down the embankment to the ground, to the nearest hundredth of a foot?

- a 10.34

- b 21.46
- c 18.75
- d 19.87

Standard 2.04 c

Question 15 (1 point) DOK 3

A light pole is supported by two wires that extend from near the top of the pole and are anchored to stakes on either side of the pole. The wires meet at an angle of 72º. One of the wires forms an angle of 68º with the ground and has a length of 12 meters (m). Approximately how far apart are the two stakes that anchor the two wires to the ground?

- a 12.31 m
- b 29.31 m
- c 17.75 m
- d 17.31 m

Question 16 (1 point) Standard 2.03 b DOK 2

The equation $y = 3.8x^{1/7}$ is graphed on the coordinate plane. How does increasing the denominator of the exponent transform the graph?

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

Question 17 (1 point) Standard 1.03 b DOK 1

A 5 digit PIN number can begin with any digit (except zero) and the remainig digits have no restriction. What is the probability of the PIN code beginning with a 7 and ending with an 8, if repeated digits are allowed?

- a $\frac{1}{100}$
- b $\frac{1}{90}$
- c $\frac{2}{5}$
- d $\frac{1}{10}$

Standard 2.04 b

Question 18 (1 point) DOK 3

A Ferris wheel with a diameter of 40 feet completes 2 revolutions in one minute. The center of the wheel is 30 feet above the ground. If a person taking a ride starts at the lowest point, which trigonometric function can be used to model the rider's height $h(t)$ above the ground after t seconds? (Consider the height of the rider negligible).

- a $h(t) = -20\cos\frac{\pi}{15}t + 30$
- b $h(t) = 20\cos\frac{\pi}{15}t + 30$
- c $h(t) = -40\cos\frac{\pi}{15}t + 10$
- d $h(t) = 40\cos\frac{\pi}{15}t + 10$

Question 19 (1 point) Standard 1.03 c
DOK 2

In a small town with two schools, 1000 students were asked if they had a cell phone. The results of the survey are shown below:

	Students who have a cell phone	Students who do not have a cell phone	Total
School A	365	156	521
School B	408	71	479
Total	773	227	1000

What is the probability that a random selected student has a cell phone given that the students attends School B?

- a 0.41
- b 0.21
- c 0.62
- d 0.85

Question 20 (1 point) Standard 1.03 b
DOK 2

There are 12 runners in a marathon. A person may bet on the race by correctly selecting the top three runners ***and*** the order they finish in. All runners have an equal chance of winning. The probability that a single bet will win is

a $\frac{3}{220}$

b $\frac{1}{220}$

c $\frac{1}{1320}$

d $\frac{3}{1320}$

Question 21 (1 point) Standard 1.03 a DOK 3

A survey determines that in a particular town, 33% of the residents jog, 42% bike, and 12% do both activities. The probability that a randomly selected person does neither activity is

a 0.75
b 0.29
c 0.61
d 0.37

Question 22 (1 point) Standard 1.03 b DOK 2

Seven people are randomly selected from a group of 10 men and 11 women to form a committee. The probability exactly 5 males are on the committee is

a 0.02
b 0.08
c 0.16
d 0.12

Question 23 (1 point) Standard 1.03 a DOK 2

A math test has 10 multiple choice questions with four choices containing one correct answer each. If you randlomly guess on each of the 10 questions, what is the probability that you get exactly six questions correct?

a 0.000058
b 0.145998
c 0.205078
d 0.016222

Question 24 (1 point) Standard 1.03 d DOK 2

Your company plans to invest in a particular project. There is a 35% chance that you will lose $30,000, a 40% chance that you will break even, and a 25% chance that you will make $55,000. Based solely on this information, what is the expected value of this investment?

- a $24,250
- b $3250
- c $325,004
- d $2,425,004

Question 25 (1 point) Standard 1.03 d DOK 3

The world famous gambler from Philadelphia, Senor Rick, proposes the following game of chance. You roll a fair die. If you roll a 1, then Senor Rick pays you $25. If you roll a 2, Senor Rick pays you $5. If you roll a 3, you win nothing. If you roll a 4 or 5, you must pay Senor Rick $10, and if you roll a 6 you must pay Senor Rick $15. What is the expected value of Senor Rick's game?

- a $-24.17
- b $0.83
- c $-145
- d $-0.83

Question 26 (1 point) Standard 2.02 b DOK 2

Find the range of y = log (x) + 2

- a All reals
- b [2, ∞)
- c (2, ∞)
- d [1,∞)

Question 27 (1 point) Standard 1.02 b DOK 1

Darren wants to determine the favorite sport of people living in his town. He knows that he needs a large sample size in order for the survey results to be representative of the residents of the town. Which sample should Darren use?

- a Students in a tenth grade English class
- b People entering the local grocery store one weekend
- c People playing basketball at the local community center
- d People entering the local stadium to watch a baseball game

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Question 28 (1 point) Standard 2.04 b
DOK 2

A transmitter sends a radio wave from the top of a 70-foot building. The amplitude of the wave is 1.5, the midline of the wave is 4, and the frequency of the wave is $\frac{1}{\pi}$. Which equation BEST represents this radio wave?

- a y = 1.5sin(2x)
- b y = 2sin (1.5x) + 4
- c y = 2sin(1.5x) + 4
- d y = 1.5sin(2x) + 4

Question 29 (1 point) Standard 1.01a
DOK 1

Find an exponential function to model the data.

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

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

Question 30 (1 point) Standard 2.05d
DOK 2

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 $a_n = 2n^2 -2n -1$

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