

Released Items

Student Name: _____

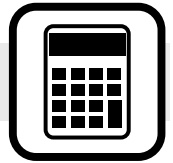
Fall 2014
NC Final Exam
Math II



Student Booklet



Public Schools of North Carolina
State Board of Education
Department of Public Instruction
Raleigh, North Carolina 27699-6314



1 Which expression is equivalent to $(8w^7x^{-5}y^3z^{-9})^{-\frac{2}{3}}$?

A $\frac{x^{\frac{10}{3}}z^6}{4w^{\frac{14}{3}}y^2}$

B $\frac{4w^{\frac{14}{3}}y^2}{x^{\frac{10}{3}}z^6}$

C $\frac{2w^{\frac{5}{3}}y^{\frac{1}{3}}}{x^{\frac{7}{3}}z^{\frac{11}{3}}}$

D $\frac{x^{\frac{7}{3}}z^{\frac{11}{3}}}{2w^{\frac{5}{3}}y^{\frac{1}{3}}}$

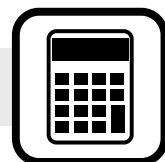
2 A marathon is roughly 26.2 miles long. Which equation could be used to determine the time, t , it takes to run a marathon as a function of the average speed, s , of the runner where t is in hours and s is in miles per hour?

A $t = 26.2 - 26.2s$

B $t = 26.2 - \frac{s}{26.2}$

C $t = 26.2s$

D $t = \frac{26.2}{s}$



- 3 The time, t , in hours, that it takes x people to plant n trees varies directly with the number of trees, and inversely with the number of people. Suppose 6 people can plant 12 trees in 3 hours. How many people are needed to plant 28 trees in 5 hours and 15 minutes?
- A 6
B 7
C 8
D 9

- 4 The force, F , acting on a charged object varies inversely to the square of its distance, r , from another charged object. When the two objects are 0.64 meter apart, the force acting on them is 8.2 Newtons. **Approximately** how much force would the object feel if it is at a distance of 0.77 meter from the other object?
- A 1.7 Newtons
B 5.7 Newtons
C 11.9 Newtons
D 12.9 Newtons

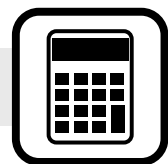
- 5 A system of equations is shown below.

$$y = x^2 + 2x + 8$$

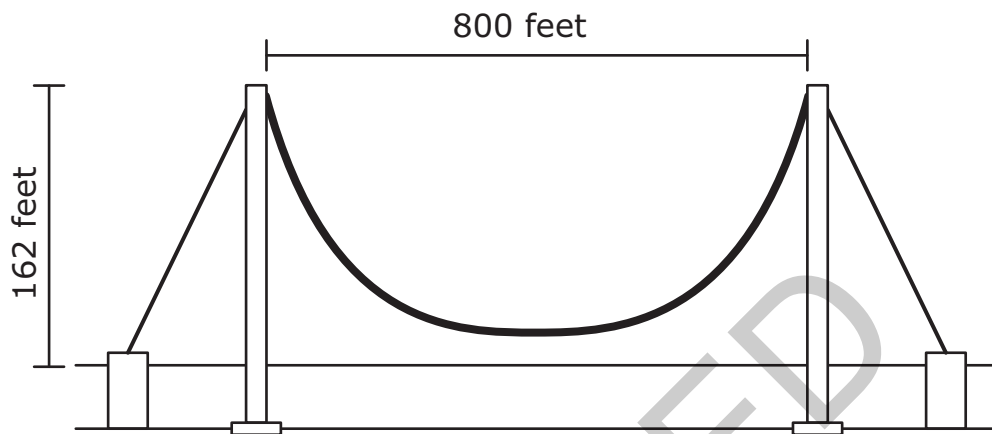
$$y = -4x$$

What is the smallest value of y in the solution set of the system?

- A -4
B -2
C 8
D 16

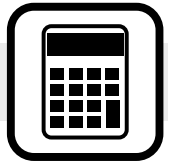


- 6 The towers of a suspension bridge are 800 feet apart and rise 162 feet higher than the road. Suppose that the cable between the towers has the shape of a parabola and is 2 feet higher than the road at the point halfway between the towers.



What is the *approximate* height of the cable 120 feet from either tower?

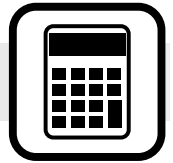
- A 80 feet
 B 74 feet
 C 22 feet
 D 16 feet
- 7 Congruent squares, with side lengths of x , are cut from the corners of a 12-inch-by-16-inch piece of cardboard to form an open box. Which equation models the surface area, y , of the open box after the corners are cut away?
- A $y = (16 - 2x)(12 - 2x)$
 B $y = (16 - 2x)(12 - 2x) + 4x^2$
 C $y = 192 - 16x^2$
 D $y = 192 - 4x^2$



- 8 The cost of a newspaper advertisement is a function of its size.
- A company wants its advertisement to have a height that is twice its width.
 - The newspaper charges a flat rate of \$50 plus an additional \$10 per square inch.
 - The company can spend no more than \$2,050 on the advertisement.

What is the maximum height of an advertisement that the company can afford?

- A 5 inches
- B 10 inches
- C 15 inches
- D 20 inches
- 9 Which function is even?
- A $f(x) = (x + 2)(x - 2)$
- B $f(x) = x(x + 2)$
- C $f(x) = (x + 1)(x - 2)$
- D $f(x) = (x - 1)(x - 1)$



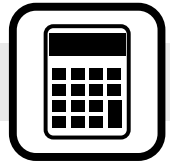
- 10 Farmer Brown built a rectangular pen for his chickens using 12 meters of fence.
- He used part of one side of his barn as one length of the rectangular pen.
 - He maximized the area using the 12 meters of fence.

Farmer Johnson built a rectangular pen for her chickens using 16 meters of fence.

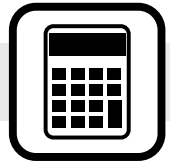
- She used part of one side of her barn as one length of the rectangular pen.
- The length of her pen was 2 meters more than the length of Farmer Brown's pen.
- The width of her pen was 1 meter more than the width of Farmer Brown's pen.

How much larger is Farmer Johnson's rectangular pen than Farmer Brown's?

- A 24 square meters
- B 18 square meters
- C 16 square meters
- D 14 square meters
- 11 The function $f(x) = \frac{85}{x}$ models the volume of a gas in a balloon under x units of pressure at a constant temperature. Which **best** describes the domain of $f(x)$?
- A $0 < x \leq 85$
- B $0 \leq x \leq 85$
- C $x > 0$
- D $x \geq 0$

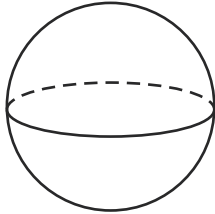


- 12 A rectangular rug is placed on a rectangular floor. The width of the floor is 4 feet greater than the length, x , of the floor. The width of the rug is 2 feet less than the width of the floor. The length of the rug is 4 feet less than the width of the rug. Which function, $R(x)$, represents the area of the floor **not** covered by the rug?
- A $R(x) = x^2 - x + 4$
- B $R(x) = 2x^2 + 4x - 4$
- C $R(x) = 12x - 4$
- D $R(x) = 4x + 4$
- 13 Which rotation will carry a regular hexagon onto itself?
- A a 30° counterclockwise rotation
- B a 90° counterclockwise rotation
- C a 120° counterclockwise rotation
- D a 270° counterclockwise rotation

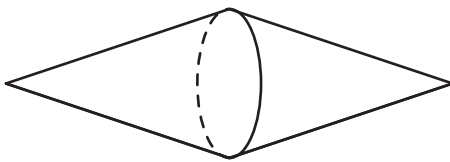


- 14 Kathleen rotated an isosceles trapezoid 360° around its longest base. Which choice could be the resulting solid?

A



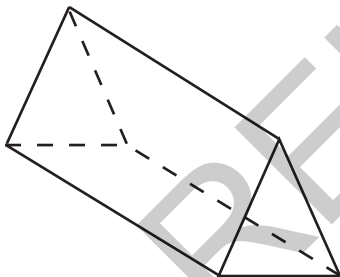
B



C

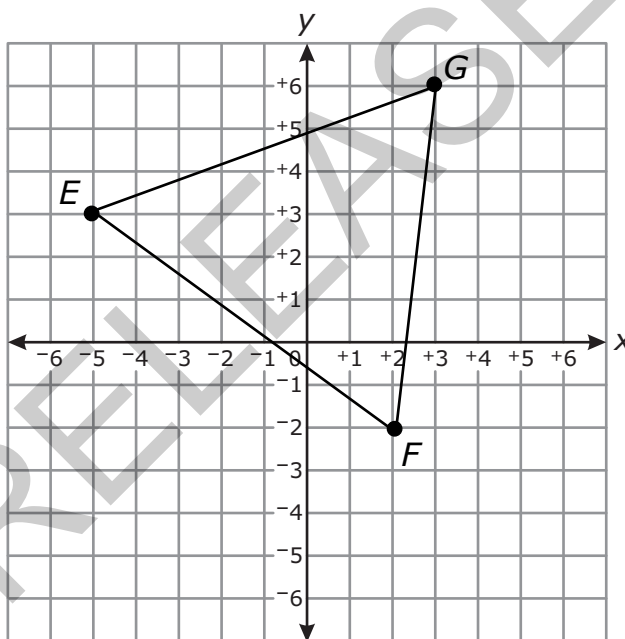


D





- 15 \overline{FG} has points $F(2, 4)$ and $G(6, 1)$. If \overline{FG} is dilated with respect to the origin by a factor of k , to produce $\overline{F'G'}$, which statement must be true?
- A The line that passes through F' and G' intersects the y -axis at $(0, 5.5 + k)$.
- B The line that passes through F' and G' intersects the y -axis at $(0, 5.5)$.
- C The line that passes through F' and G' has a slope of $\left(\frac{-3}{4}\right)k$.
- D The line that passes through F' and G' has a slope of $\frac{-3}{4}$.
- 16 Triangle EGF is graphed below.



Triangle EGF will be rotated 90° counterclockwise around the origin and will then be reflected across the y -axis, producing an image triangle. Which additional transformation will map the image triangle back onto the original triangle?

- A rotation 270° counterclockwise around the origin
- B rotation 180° counterclockwise around the origin
- C reflection across the line $y = -x$
- D reflection across the line $y = x$



- 17 Suppose that Jamal can choose to get home from work by taxi or bus.
- When he chooses to get home by taxi, he arrives home after 7 p.m. 8 percent of the time.
 - When he chooses to get home by bus, he arrives home after 7 p.m. 15 percent of the time.
 - Because the bus is cheaper, he uses the bus 60 percent of the time.

What is the *approximate* probability that Jamal chose to get home from work by bus, given that he arrived home after 7 p.m.?

- A 0.09
- B 0.14
- C 0.60
- D 0.74
- 18 A total of 540 customers, who frequented an ice cream shop, responded to a survey asking if they preferred chocolate or vanilla ice cream.
- 308 of the customers preferred chocolate ice cream.
 - 263 of the customers were female.
 - 152 of the customers were males who preferred vanilla ice cream.

What is the probability that a customer chosen at random is a male or prefers vanilla ice cream?

- A $\frac{419}{540}$
- B $\frac{119}{180}$
- C $\frac{197}{540}$
- D $\frac{38}{135}$



This is the end of the Math II Released Items.

Directions:

- 1. Look back over your answers for the test questions.**
- 2. Make sure all your answers are entered on the answer sheet. Only what is entered on your answer sheet will be scored.**
- 3. Put all of your papers inside your test book and close the test book.**
- 4. Place your calculator on top of the test book.**
- 5. Stay quietly in your seat until your teacher tells you that testing is finished.**
- 6. Remember, teachers are not allowed to discuss items from the test with you, and you are not allowed to discuss with others any of the test questions or information contained within the test.**

RELEASED