

MATHEMATICS B

Print Your Name:

Print Your School's Name:

Scrap paper is not permitted for any part of this examination, but you may use the blank spaces in this booklet as scrap paper. A perforated sheet of scrap graph paper is provided at the end of this booklet for any question for which graphing may be helpful but is not required. Any work done on this sheet of scrap graph paper will *not* be scored. Write all your work in pen, except graphs and drawings, which should be done in pencil.

Notice . . .

A graphing calculator, a straightedge (ruler), and a compass must be available for you to use while taking this examination.

Formulas

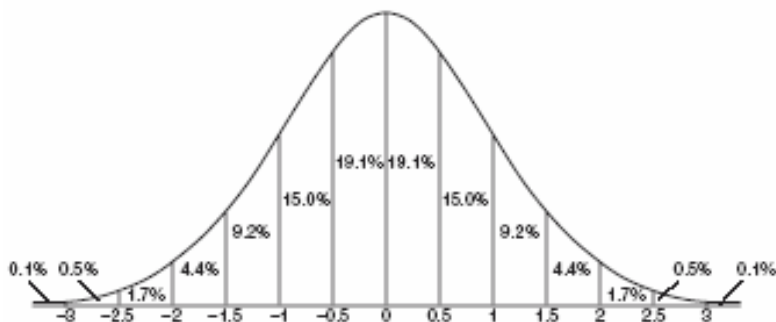
Area of Triangle

$$K = \frac{1}{2}ab \sin C$$

Law of Cosines

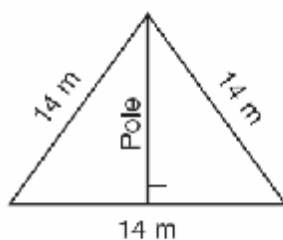
$$a^2 = b^2 + c^2 - 2bc \cos A$$

Normal Curve
 Standard Deviation



The accompanying diagram shows two cables of equal length supporting a pole. Both cables are 14 meters long, and they are anchored to points in the ground that are 14 meters apart.

Use this space for computations.



What is the exact height of the pole, in meters?

- (1) 7
(2) $7\sqrt{2}$
(3) $7\sqrt{3}$
(4) 14

Ileana buys a large circular pizza that is divided into eight equal slices. She measures along the outer edge of the crust from one piece and finds it to be $5\frac{1}{2}$ inches. What is the diameter of the pizza to the nearest inch?

- (1) 14
(2) 8
(3) 7
(4) 4

A function is defined by the equation $y = 5x - 5$. Which equation defines the inverse of this function?

- (1) $y = 5x - 5$
(2) $y = 5x + 5$
(3) $x = 5y - 5$
(4) $x = 5y + 5$

The image of the origin under a certain translation is the point (2, 6). The image of point (−3, 2) under the same translation is the point

- (1) (−6, 12)
(2) (−5, 4)
(3) $(-\frac{3}{2}, \frac{1}{3})$
(4) (−1, −8)

Which condition does *not* prove that two triangles are congruent?

- (1) $SSS \cong SSS$
(2) $SSA \cong SSA$
(3) $SAS \cong SAS$
(4) $ASA \cong ASA$

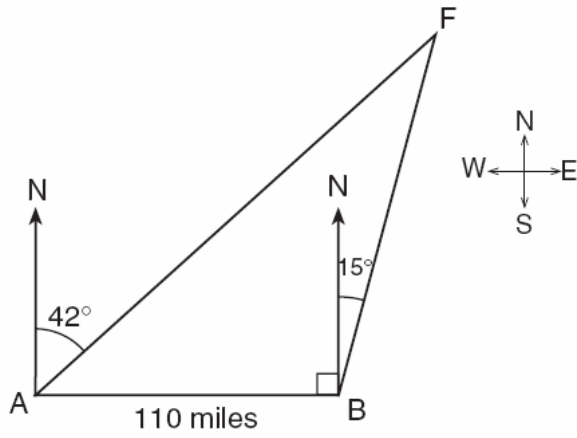
The mean of a normally distributed set of data is 56, and the standard deviation is 5. In which interval do approximately 95.4% of all cases lie?

- (1) 46–56
(2) 46–66
(3) 51–61
(4) 56–71

Find the value of $(x + 2)^0 + (x + 1)^{\frac{2}{3}}$ when $x = 7$.

Tom scored 23 points in a basketball game. He attempted 15 field goals and 6 free throws. If each successful field goal is 2 points and each successful free throw is 1 point, is it possible he successfully made all 6 of his free throws? Justify your answer.

As shown in the accompanying diagram, two tracking stations, A and B , are on an east-west line 110 miles apart. A forest fire is located at F , on a bearing 42° northeast of station A and 15° northeast of station B . How far, to the *nearest mile*, is the fire from station A ?



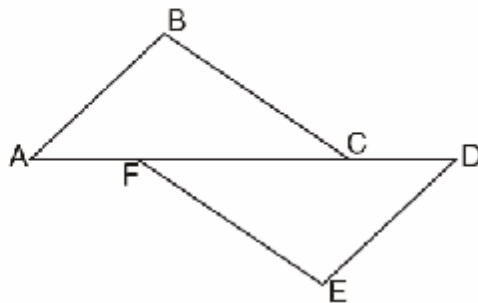
The probability that a planted watermelon seed will sprout is $\frac{3}{4}$. If Peyton plants seven seeds from a slice of watermelon, find, to the *nearest ten thousandth*, the probability that *at least* five will sprout.

A toy truck is located within a circular play area. Alex and Dominic are sitting on opposite endpoints of a chord that contains the truck. Alex is 4 feet from the truck, and Dominic is 3 feet from the truck. Meira and Tamara are sitting on opposite endpoints of another chord containing the truck. Meira is 8 feet from the truck. How many feet, to the *nearest tenth of a foot*, is Tamara from the truck? Draw a diagram to support your answer.

A rectangular piece of cardboard is to be formed into an uncovered box. The piece of cardboard is 2 centimeters longer than it is wide. A square that measures 3 centimeters on a side is cut from each corner. When the sides are turned up to form the box, its volume is 765 cubic centimeters. Find the dimensions, in centimeters, of the original piece of cardboard.

Complete the partial proof below for the accompanying diagram by providing reasons for steps 3, 6, 8, and 9.

Given: \overline{AFCD}
 $\overline{AB} \perp \overline{BC}$
 $\overline{DE} \perp \overline{EF}$
 $\overline{BC} \parallel \overline{FE}$
 $\overline{AB} \cong \overline{DE}$



Prove: $\overline{AC} \cong \overline{FD}$

Statements	Reasons
1 \overline{AFCD}	1 Given
2 $\overline{AB} \perp \overline{BC}$, $\overline{DE} \perp \overline{EF}$	2 Given
3 $\angle B$ and $\angle E$ are right angles.	3
4 $\angle B \cong \angle E$	4 All right angles are congruent.
5 $\overline{BC} \parallel \overline{FE}$	5 Given
6 $\angle BCA \cong \angle FED$	6 _____
7 $\overline{AB} \cong \overline{DE}$	7 Given
8 $\triangle ABC \cong \triangle DEF$	8 _____
9 $\overline{AC} \cong \overline{FD}$	9 _____

Kieran is traveling from city A to city B . As the accompanying map indicates, Kieran could drive directly from A to B along County Route 21 at an average speed of 55 miles per hour or travel on the interstates, 45 miles along I-85 and 20 miles along I-64. The two interstates intersect at an angle of 150° at C and have a speed limit of 65 miles per hour. How much time will Kieran save by traveling along the interstates at an average speed of 65 miles per hour?

