



THE B.E.S.T. STANDARDS

Benchmarks for Excellent Student Thinking



Geometry

Sample Test Materials

The purpose of these sample test materials is to orient teachers and students to the types of paper-based B.E.S.T. Geometry questions. By using these materials, students will become familiar with the types of items and response formats they may see on a paper-based test. The sample items and answers are not intended to demonstrate the length of the actual test, nor should student responses be used as an indicator of student performance on the actual test. The sample test materials are not intended to guide classroom instruction.

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Use the space in this Test and Response Book to do your work. Then, completely fill in the bubble beside the answer you choose. For some items, filling in more than one bubble may be required, so read each item carefully. If you change your answer, be sure to erase completely.

Some items will ask you to write a response in a shaded box or boxes. See the sample item below.

Sample Item:

An expression is shown.

$$(22.4)(2.65)$$

What is the value of the expression?

Write your response in the shaded box below.



The image shows a shaded rectangular box on the left, intended for the student's answer. To its right is a smaller rectangular box with a black border containing the text "Write your response in the box." An arrow points from the right side of this smaller box to the right side of the shaded box.

Some items may have more than one box, so read each item carefully. Your answers for the items with response boxes may contain whole numbers, fractions, decimals, or negative numbers.

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B.E.S.T. Geometry EOC Mathematics Reference Sheet

Customary Conversions

1 foot = 12 inches
 1 yard = 3 feet
 1 mile = 5,280 feet
 1 mile = 1,760 yards

1 cup = 8 fluid ounces
 1 pint = 2 cups
 1 quart = 2 pints
 1 gallon = 4 quarts

1 pound = 16 ounces
 1 ton = 2,000 pounds

Metric Conversions

1 meter = 100 centimeters
 1 meter = 1000 millimeters
 1 kilometer = 1000 meters
 1 liter = 1000 milliliters

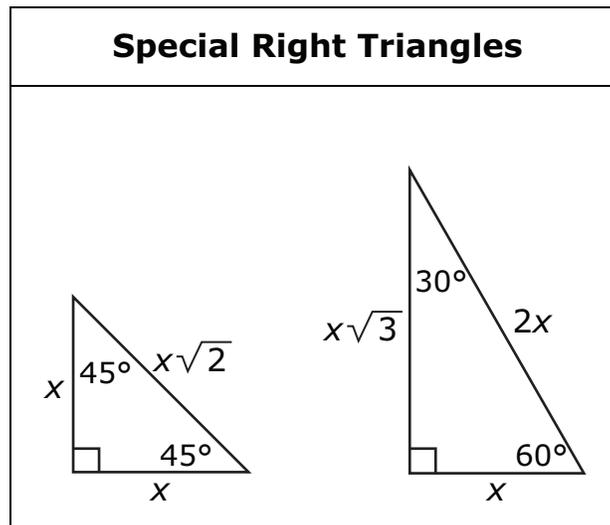
1 gram = 1000 milligrams
 1 kilogram = 1000 grams

Time Conversions

1 minute = 60 seconds
 1 hour = 60 minutes
 1 day = 24 hours
 1 year = 365 days
 1 year = 52 weeks

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Distance Formula	Midpoint Formula	Slope Formula
$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	$(x_M, y_M) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$	$m = \frac{y_2 - y_1}{x_2 - x_1}$



B.E.S.T. Geometry EOC Mathematics Reference Sheet

Formulas

Parallelogram	$A = bh$
Trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$
Circle	$C = 2\pi r$ or $C = \pi d$ $A = \pi r^2$
Regular Polygon	$A = \frac{1}{2}Pa$
Prism/Cylinder	$SA = 2B + Ph$ $V = Bh$
Cone	$SA = B + \pi r h_s$ or $SA = B + \pi r l$ $V = \frac{1}{3}Bh$
Regular Pyramid	$SA = B + \frac{1}{2}Ph_s$ or $SA = B + \frac{1}{2}Pl$ $V = \frac{1}{3}Bh$
Sphere	$SA = 4\pi r^2$ $V = \frac{4}{3}\pi r^3$

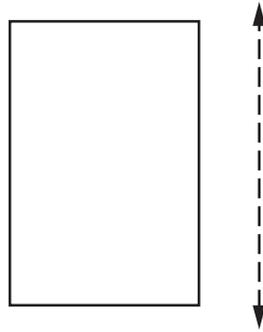
Key	
P = perimeter	A = area
a = apothem	C = circumference
h = height	SA = surface area
r = radius	V = volume
h_s = slant height	
l = slant height	
b = base	
d = diameter	
B = area of base	

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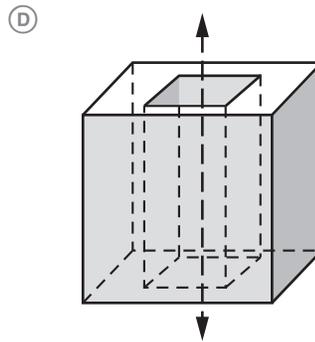
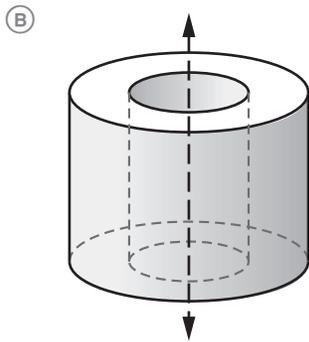
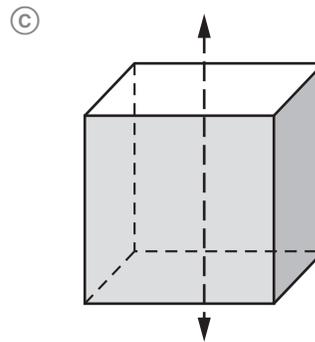
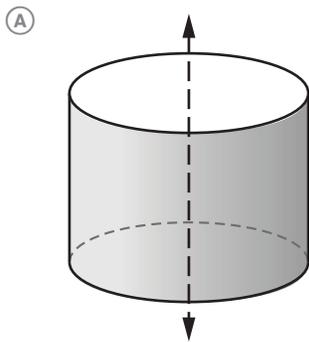
Trigonometric Ratios		
$\sin \theta = \frac{\textit{opposite}}{\textit{hypotenuse}}$	$\cos \theta = \frac{\textit{adjacent}}{\textit{hypotenuse}}$	$\tan \theta = \frac{\textit{opposite}}{\textit{adjacent}}$

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1. A rectangle and a vertical line are shown.

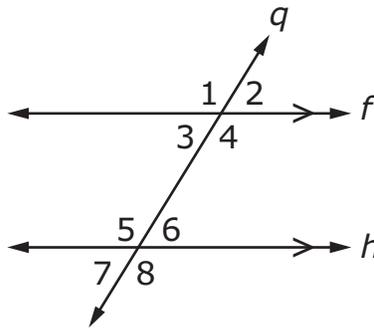


Which object is generated by rotating the rectangle about the vertical line?



B.E.S.T. Mathematics Sample Items

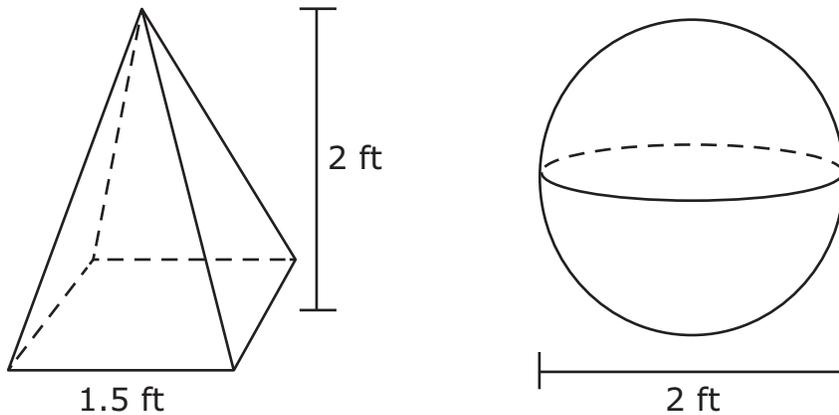
2. Lines f and h are parallel and intersected by line q , as shown.



Select statements and a reason to complete the proof showing $\angle 3 \cong \angle 6$. For each blank, fill in the bubble **before** the statement or word that is correct.

Statement	Reason
1. $f \parallel h$	1. Given
2. _____ [<input type="radio"/> A $\angle 1 \cong \angle 6$ <input type="radio"/> B $\angle 2 \cong \angle 6$ <input type="radio"/> C $\angle 5 \cong \angle 6$]	2. Corresponding angles of two parallel lines cut by a transversal are congruent.
3. _____ [<input type="radio"/> A $\angle 1 \cong \angle 3$ <input type="radio"/> B $\angle 2 \cong \angle 3$ <input type="radio"/> C $\angle 5 \cong \angle 3$]	3. Vertical angles are congruent.
4. $\angle 3 \cong \angle 6$	4. _____ [<input type="radio"/> A Reflexive <input type="radio"/> B Transitive <input type="radio"/> C Symmetric] property of congruence

3. A right square pyramid and a sphere are made of marble. The dimensions of each figure, in feet (ft), are shown.



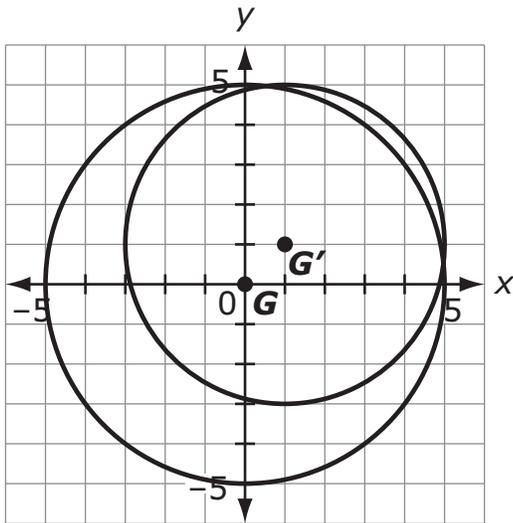
The density of marble is 160 pounds per cubic foot.

What is the difference, in pounds, between the weight of the sphere and the weight of the pyramid? Round your answer to the nearest hundredth.

Write your response in the shaded box below.

B.E.S.T. Mathematics Sample Items

4. The preimage and image of a circle are shown.



The center of circle G is at $(0, 0)$, and the center of circle G' is at $(1, 1)$. The radius of circle G is 5 units, and the radius of circle G' is 4 units.

The sequence of transformations applied to circle G to create circle G' is shown.

- $(x, y) \rightarrow (cx, cy)$
- $(x, y) \rightarrow (x + d, y + d)$

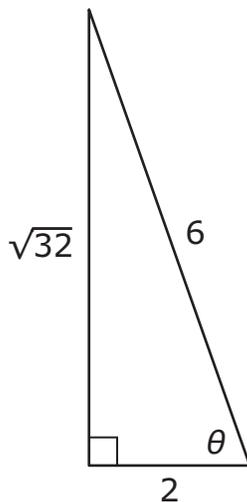
What are the values of c and d ?

Write your responses in the shaded boxes below.

$c =$

$d =$

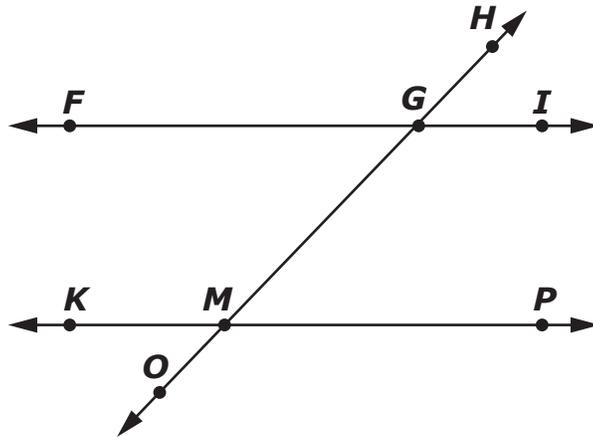
5. A figure is shown.



Select values to complete the trigonometric ratio. For each part of the ratio, fill in the bubble **before** the number that is correct.

$$\tan(\theta) = \frac{[\text{A } 2 \text{ B } \sqrt{32} \text{ C } 6]}{[\text{A } 2 \text{ B } \sqrt{32} \text{ C } 6]}$$

6. A diagram is shown.



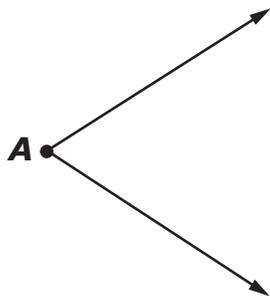
Kori uses the diagram to analyze the given statement.

“When a transversal intersects parallel lines, two angles are supplementary if and only if they are adjacent angles.”

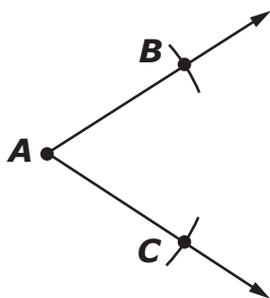
Fill in the bubble **before** one angle from each column to show a pair of angles that represents a counterexample.

Angle 1	Angle 2
(A) $\angle FGH$	(I) $\angle FGH$
(B) $\angle FGM$	(J) $\angle FGM$
(C) $\angle PMG$	(K) $\angle PMG$
(D) $\angle PMO$	(L) $\angle PMO$
(E) $\angle HGI$	(M) $\angle HGI$
(F) $\angle IGM$	(N) $\angle IGM$
(G) $\angle KMG$	(O) $\angle KMG$
(H) $\angle KMO$	(P) $\angle KMO$

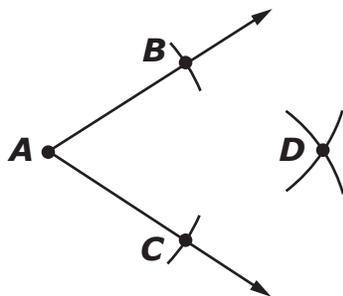
7. Angle A and two steps of a construction are shown.



Step 1: Place the compass at point A and draw arcs that intersect both rays. Label the intersections as points B and C , as shown.



Step 2: Using the same compass width from Step 1, draw intersecting arcs in the interior of the angle from points B and C . Label the intersection as point D , as shown.



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This question has **two** parts.

Part A

Select phrases to create a true statement. For each blank, fill in the bubble **before** the phrase that is correct.

Constructing \overline{AD} will create two congruent angles, _____

[A $\angle ABC$ and $\angle ACB$ B $\angle ABD$ and $\angle ACD$ C $\angle BAD$ and $\angle CAD$], because \overline{AD} is _____ [A a median B an incenter C an angle bisector].

Part B

Select all the lengths that are equivalent to AB .

- A AC
- B AD
- C BC
- D BD
- E CD

8. Angelo transforms rectangle $PQRS$ into rectangle $JKLM$. The corresponding sides of rectangles $PQRS$ and $JKLM$ are **not** congruent.

Select all the transformations that Angelo could have used.

- Ⓐ $(x, y) \rightarrow (y, x)$
- Ⓑ $(x, y) \rightarrow (3x, 3y)$
- Ⓒ $(x, y) \rightarrow (-y, x)$
- Ⓓ $(x, y) \rightarrow (1.5x, 1.5y)$
- Ⓔ $(x, y) \rightarrow (x - 2, y + 3)$

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9. Point $P(-1, 4)$ lies on line segment QR with endpoints $Q(1, 7)$ and $R(-9, -8)$.

Fill in bubbles to match each ratio of segment lengths to the correct numerical ratio.

	1:4	1:5	4:5
$QP:PR$	(A)	(B)	(C)
$QP:QR$	(D)	(E)	(F)



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