

**End-of-Course
Sample Item Booklet**



October 2010

Mathematics Formula Sheets for End-of-Course Exams

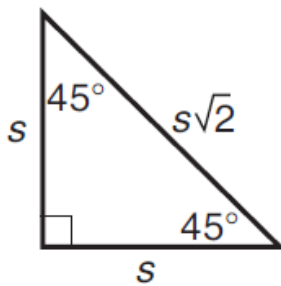
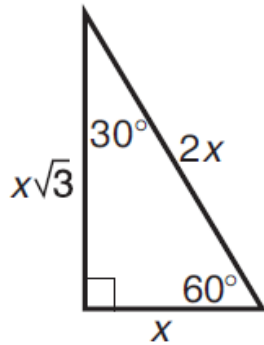
Use at least two decimal place values when approximating square roots or trigonometric ratios.

Description	Formula	Variables
Arc Length	$L = \frac{m\widehat{BC}}{360^\circ} \pi d$	<i>L</i> : Arc Length <i>B, C</i> : endpoints of arc <i>d</i> : diameter of the circle <i>m</i> : the measure of
Area of Sector	$A = \frac{m\widehat{BC}}{360^\circ} \pi r^2$	<i>A</i> : Area of Sector <i>B, C</i> : endpoints of intercepted arc <i>r</i> : radius of the circle <i>m</i> : the measure of
Cylinder	$SA = 2\pi r^2 + 2\pi rh$	<i>SA</i> : Surface Area <i>r</i> : radius of the base <i>h</i> : height
	$V = \pi r^2 h$	<i>V</i> : Volume <i>r</i> : radius of the base <i>h</i> : height
Cone	$SA = \pi r^2 + \pi rl$	<i>SA</i> : Surface Area <i>r</i> : radius of the base <i>l</i> : slant height
	$V = \frac{1}{3} Bh$ or $V = \frac{1}{3} \pi r^2 h$	<i>V</i> : Volume <i>r</i> : radius of the base <i>h</i> : height <i>B</i> : area of the base
Prism	$V = Bh$	<i>V</i> : Volume <i>B</i> : area of base <i>H</i> : height
	$SA = 2B + Ph$ or $SA = 2B + L$	<i>SA</i> : Surface Area <i>B</i> : area of base <i>P</i> : Perimeter of the base <i>h</i> : height <i>L</i> : lateral surface area
Pyramid	$V = \frac{1}{3} Bh$	<i>V</i> : Volume <i>B</i> : area of the base <i>h</i> : height
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	<i>x</i> : solution <i>a, b, c</i> : coefficients
Sphere	$V = \frac{4}{3} \pi r^3$	<i>V</i> : Volume <i>r</i> : radius
	$SA = 4\pi r^2$	<i>SA</i> : Surface Area <i>r</i> : radius

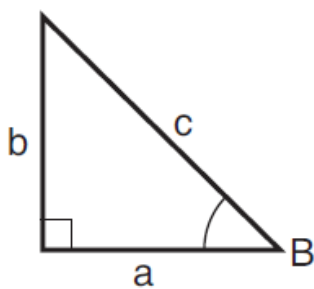
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Use at least two decimal place values when approximating square roots or trigonometric ratios.

Special Right Triangles



Trigonometric Ratios

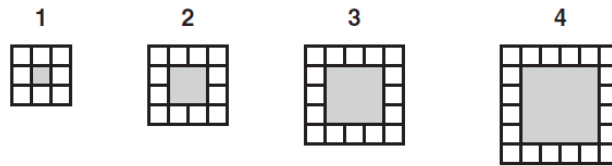


$$\sin B = \frac{b}{c}$$

$$\cos B = \frac{a}{c}$$

$$\tan B = \frac{b}{a}$$

1 Mrs. Morris gave her students this pattern of white tiles:

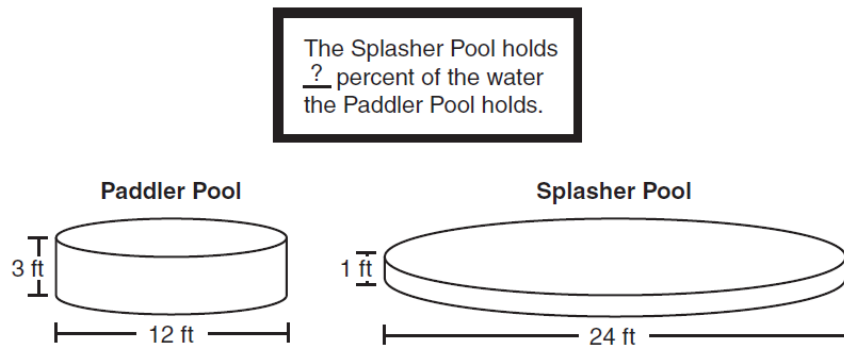


She asked her students to write an equation to represent the number of white tiles, t , for any figure number, n .

Which equation represents the number of white tiles in the pattern?

- A. $t = n + 2$
- B. $t = n + 4$
- C. $t = 4n + 4$
- D. $t = 4n + 8$

2 Silvia worked in a store that sold cylinder-shaped children's pools. She made a sign relating the volumes of these two pools.



The volume of the Paddler Pool is 108π cubic feet.

The Splasher Pool holds which percent of the water the Paddler Pool holds?

- A. 33%
- B. 75%
- C. 133%
- D. 300%

3 In parallelogram ***PQRS*** the measures of angle ***P*** and angle ***R*** are each 146° .

What is the measure of angle ***Q***?

- A. 146°
- B. 112°
- C. 68°
- D. 34°

4 The equation $2|x - 1| - 10 = -4$ has two real solutions.

Determine the negative solution of the equation.

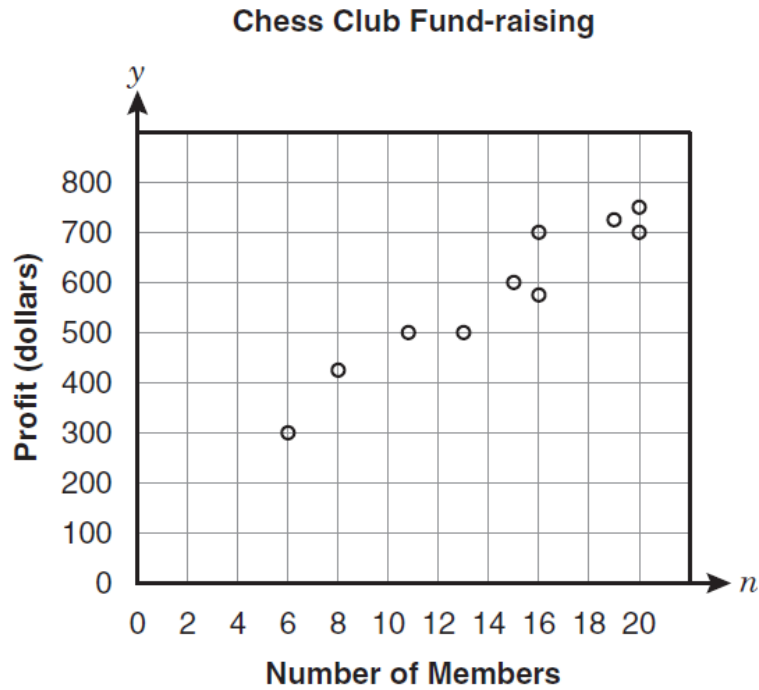
Write your answer on the line.

What is the negative solution of the equation? _____

5 Which term is a factor of $3a^2 + 12a$?

- A. $3a$
- B. $4a$
- C. $3a^2$
- D. $4a^2$

6 Vance graphed the relation between fund-raising profits for the chess club and the number of members.



Which equation represents a line that fits the data?

- A. $y = 29n + 180$
- B. $y = 60n + 180$
- C. $y = \frac{2}{3}n + 180$
- D. $y = \frac{200}{3}n + 180$

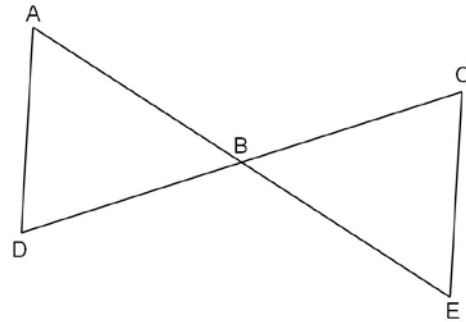
A proof is shown.

Fill in the blanks for steps 5 and 6 to complete the proof.

Given: B is the midpoint of \overline{AE} .

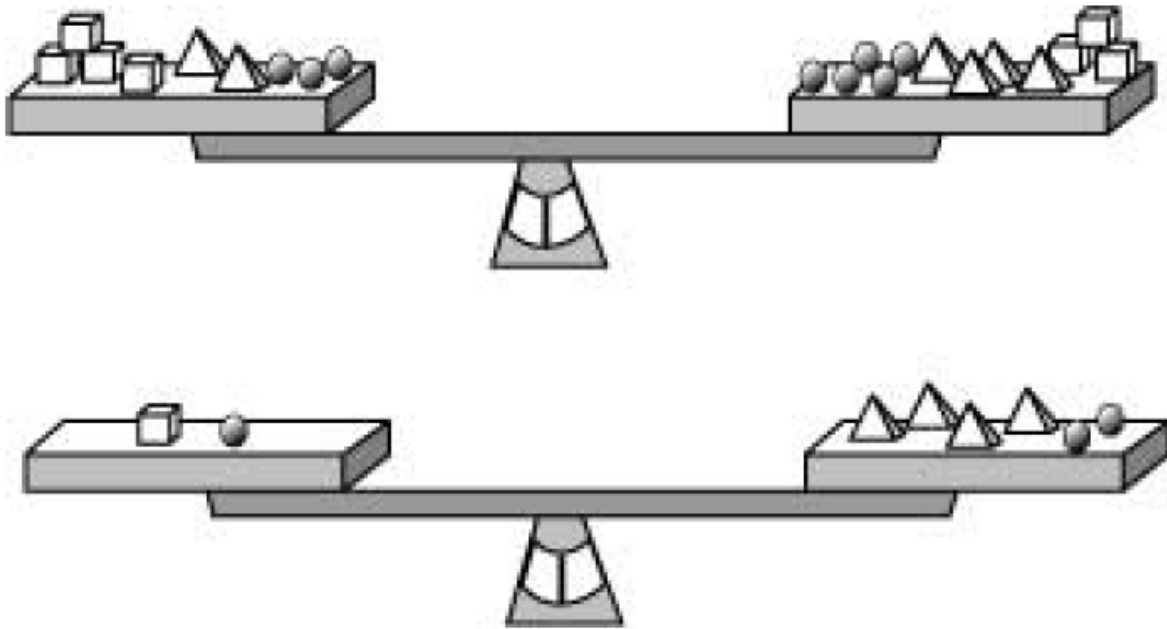
B is the midpoint of \overline{CD} .

Prove: $\triangle ABD \cong \triangle EBC$



Statements	Reasons
1. B is the midpoint of \overline{AE} .	1. Given
2. $\overline{AB} \cong \overline{BE}$	2. Definition of midpoint
3. B is the midpoint of \overline{CD} .	3. Given
4. $\overline{CB} \cong \overline{BD}$	4. Definition of midpoint
5.	5. Vertical Angles Theorem
6. $\triangle ABD \cong \triangle EBC$	6.

8 Kent is using the scale to compare the weight of various solids.



How many spheres will balance one cube?

- A. 2 spheres
- B. 3 spheres
- C. 4 spheres
- D. 5 spheres

9 Which construction represents the center of a circle that is inscribed in a triangle?

- A. The intersection of the three altitudes of the triangle.
- B. The intersection of the three medians of the triangle.
- C. The intersection of the angle bisectors of each angle of the triangle.
- D. The intersection of the perpendicular bisectors of each side of the triangle.

10 Mike kept track of the number of passengers on his bus, noticing the following:

- At the first stop, several passengers (p) got on the empty bus.
- At the second stop, the number of passengers doubled when more people got on.
- At the third stop, 3 passengers got off the bus and no passengers got on.
- At the fourth stop, 2 passengers got on the bus and no passengers got off.

Which expression represents the number of passengers on the bus after the fourth stop?

- A. $2p + 5$
- B. $2p - 1$
- C. $2p - 5$
- D. $2p + 1$

11 Triangle JKE is an obtuse isosceles triangle with $m\angle E = 10^\circ$ and $KE > JK$.

What is the measure of $\angle J$?

- A. 170°
- B. 160°
- C. 85°
- D. 10°

12 Only chocolate and vanilla ice cream cones are sold at an ice cream store. In one day, the number of chocolate cones sold was 1 more than 4 times the number of vanilla cones sold. A total of 121 cones were sold that day.

Let c = the number of chocolate cones sold.

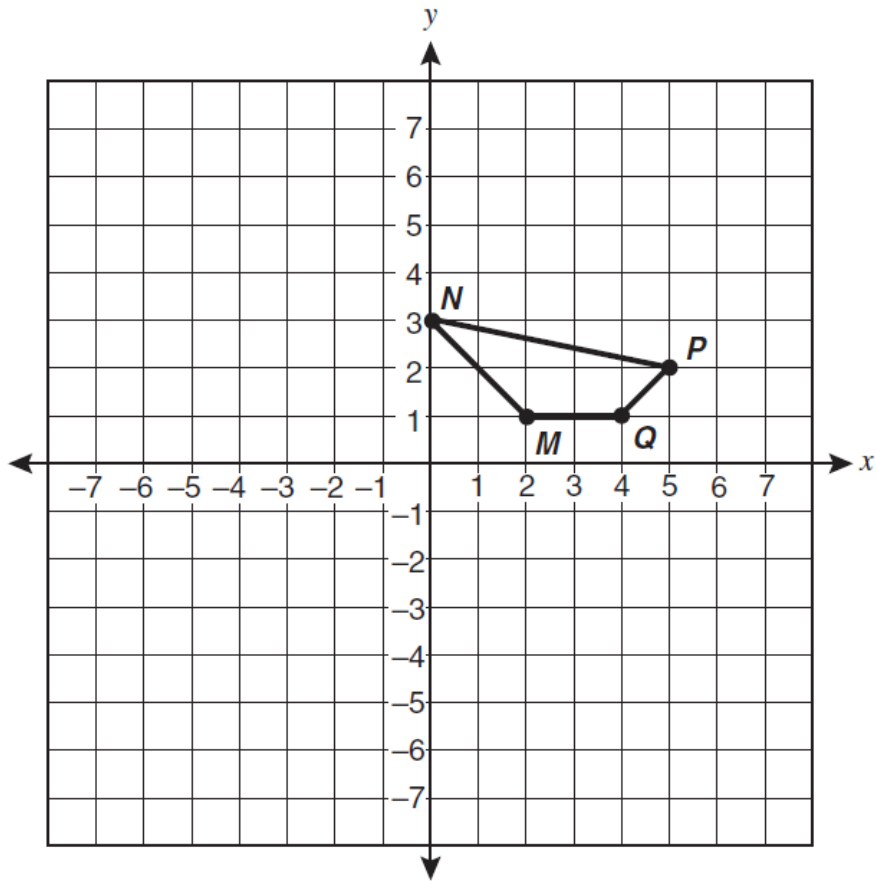
Let v = the number of vanilla cones sold.

- Write equations to determine the number of chocolate cones sold that day.
- Use the equations to determine the number of chocolate cones sold that day.

Show your work using words, numbers, and/or diagrams.

How many chocolate cones were sold that day? _____

13 Dorine drew a quadrilateral on a coordinate grid.



Dorine reflected the quadrilateral over the line $y = -2$ and then translated it left 4 units.

What are the coordinates of the image of point M ?

- A. (2, -5)
- B. (-2, -5)
- C. (-6, 1)
- D. (-2, 1)

14 Graph A is the graph of $y = 2(3)^x$ and graph B is the graph of $y = 3(2)^x$.

Which statement about the two graphs is true?

- A. Both graphs A and B rise at the same rate.
- B. Graph B rises at a faster rate than graph A.
- C. Graph A rises at a faster rate than graph B.
- D. The y-intercept of graph A is above the y-intercept of graph B.

15 Points X , Y and Z are collinear. Y is the midpoint of \overline{XZ} .

The coordinates of point X are $(4, 3)$. The coordinates of point Y are $(-1, 2)$.

Determine the coordinates of point Z .

Write your answer on the line.

What are the coordinates of point Z ? (____, ____)

- 16 At a particular company, every employee receives a 4% cost-of-living increase to their salary.

What impact does this cost-of-living increase have on the mean and on the range of employee salaries at the company?

- A. The mean increases but the range does not change.
- B. The mean does not change but the range increases.
- C. The mean and range both increase.
- D. The mean and range do not change.

- 17 Kesha is planning to rent a van for her trip to Mt. Rainier. Two of her friends each rented the same type of van from the same car rental company last week. This is what they told her:

John: “The cost of my rental was \$240. The company charged me a certain amount per day and a certain amount per mile. I had the rental for five days and I drove it 200 miles.”

Katie: “The cost of my rental was only \$100. I drove it for 100 miles and had it for two days.”

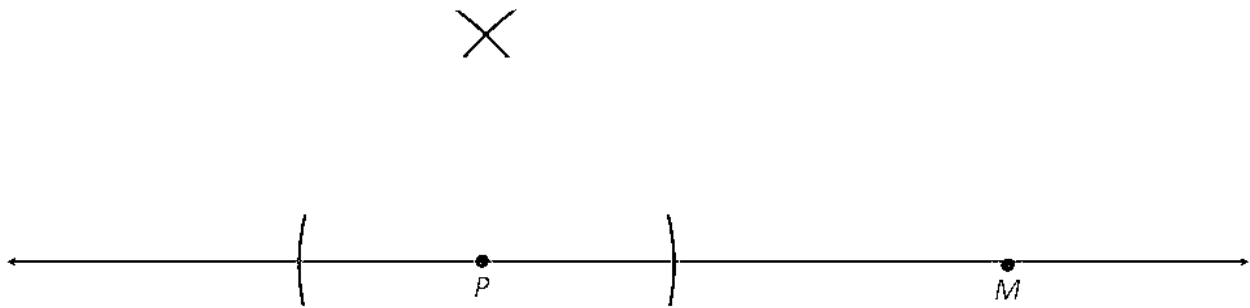
Kesha plans to get the same type of van that John and Katie had from the same car rental company. Kesha estimated her trip would be 250 miles, and she would have the vehicle for four days.

Let C = cost, M = miles, and D = days

Which equation could Kesha use to figure out how much her rental would cost?

- A. $C = 40.00M + 0.20D$
- B. $C = 40.00D + 0.20M$
- C. $C = 20.00M + 0.40D$
- D. $C = 20.00D + 0.40M$

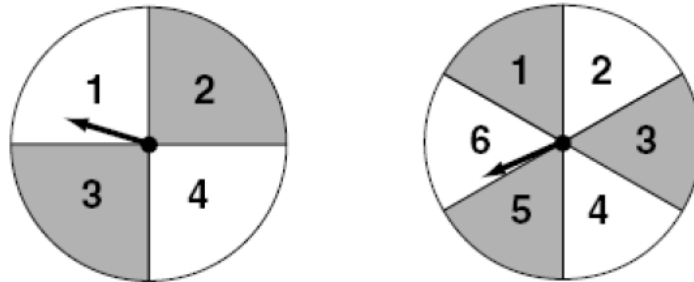
18 Given line PM , the drawing shows the beginning steps of a geometric construction.



Which construction is shown?

- A. The perpendicular bisector of line PM .
- B. A line parallel to line PM through point P .
- C. A line perpendicular to line PM at point M .
- D. A line perpendicular to line PM at point P .

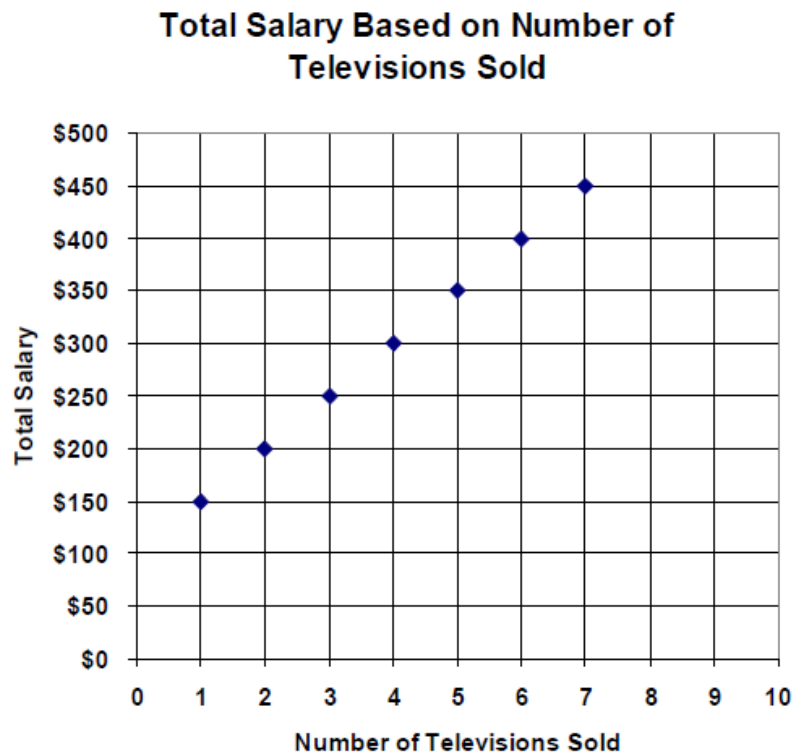
19 In a certain carnival game a player gets to spin each of the spinners once.



What is the probability of getting two numbers that have a sum of 7?

- A. $\frac{1}{4}$
- B. $\frac{1}{6}$
- C. $\frac{5}{12}$
- D. $\frac{7}{24}$

20 The chart shows the amount of total salary (commission plus base salary) paid to employees of a store that specializes in big screen televisions.



Which equation best represents the total salary (T) that an employee makes for selling any number of television sets (n)?

- A. $T = 50n + 100$
- B. $T = 100(n + 50)$
- C. $T = 100n + 50$
- D. $T = 50(n + 100)$

Answer Key	Performance Expectations
1. C	A1.1.A/M1.1.A
2. C	G.6.C/M3.5.D
3. D	G.3.F/M2.3.J
4. -2	A1.4.A/M1.3.A
5. A	A1.2.E/M2.5.A
6. A	A1.6.D/M1.3.F
7. Statement #5: $\angle ABD \cong \angle EBC$ Reason #6: SAS Congruence	G.3.B/M2.3.F
8. B	A1.8.B(A1.7.D)/M1.8.B(M1.6.D)
9. C	G.3.I/M3.7.C
10. B	A1.8.E(A1.1.B)/M1.8.E(M1.1.B)
11. B	G.3.A/M2.3.E
12. Please see rubric on next page	A1.1.C/M1.1.C
13. B	G.5.B/M3.2.B
14. C	A1.7.A/M1.7.A
15. (-6, 1)	G.4.B/M2.3.L
16. C	A1.6.C/M1.5.B
17. B	A1.1.A/M1.1.A
18. D	G.2.C/M1.4.G
19. B	M2.4.A/A2.6.A
20. A	A1.3.B/M1.2.B

NOTE: The color coding in this answer key is aligned to the information in the End-of-Course Crosswalks. The End-of-Course Crosswalks identify the performance expectations that are assessed on each end-of-course exam.

- Items aligned to performance expectations highlighted in **green** assess performance expectations common to either Algebra 1/Integrated Mathematics 1 or Geometry/Integrated Mathematics 2. These PEs will be assessed for purposes of graduation using multiple-choice, completion, and short-answer items on end-of-course exams and EOC makeup exams.
- Items aligned to performance expectations highlighted in **yellow** assess performance expectations that are reported as course-specific content but are not assessed for purposes of graduation. These performance expectations will be assessed using multiple-choice and completion items on end-of-course exams only.

To view the End-of-Course Crosswalks, please visit <http://www.k12.wa.us/Mathematics/Crosswalks.aspx>.

Scoring Guide for item number 12

A 2-point response: The student shows understanding of writing and solving a system of equations by doing the following:

- writes equations to determine the number of chocolate cones sold; $c = 1 + 4v$ and $c + v = 121$ or equivalent
- shows work that supports how the number of chocolate cones was determined
- writes 97.

NOTE: Equations can be written using variables other than c and v if the variables are defined and used consistently in both equations.

A 1-point response: The student does one of the following:

- writes $c = 1 + 4v$ or equivalent
- writes equation in one variable $1 + 4v + v = 121$, or equivalent
- writes 97.

NOTE: Allow for any variables that are used consistently in both equations.

A 0-point response: The student shows very little or no understanding of writing and solving a system of equations.

This item was previously released in the 2007 High School Released Items, item #18. For more information including the original item, scoring rubric and annotated sample student responses, please see pages 55-63 of the following document:

http://www.k12.wa.us/Mathematics/Assessment/ReleasedItems/2007/WARIDmathHS_WEB.pdf