ACTAAP

Arkansas Comprehensive Testing, Assessment, and Accountability Program

Released Item Booklet

Arkansas Augmented Benchmark Examination
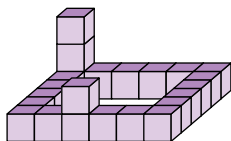
APRIL 2009 ADMINISTRATION

GRADE

8

Arkansas Department of Education

CALCULATOR NOT PERMITTED—ITEMS 1–4

1

Below is a picture of a model made of cubes.

Which of the following most accurately shows the top view of this model?

☞ **A**
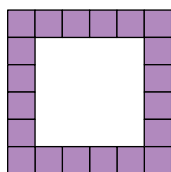
B
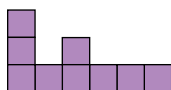
C

D

2

The diagonal of a rectangle has a length of $\sqrt{79}$. Between which two integers is the value $\sqrt{79}$?

A   7 and 8
☞ **B**   8 and 9
C   39 and 40
D   78 and 80

3

What is the greatest common factor (GCF) of the two terms below?

$$3x^2y \text{ and } 12xy^2$$

A $3x^2y^2$
B $12xy$
☞ **C** $3xy$
D $12x^2y^2$

4

Mr. Klein gave the same quiz to two mathematics classes he taught. The box-and-whisker plots below were created using the quiz scores the students earned in each class.

Class 1

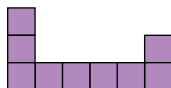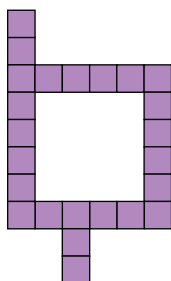25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100 105 110
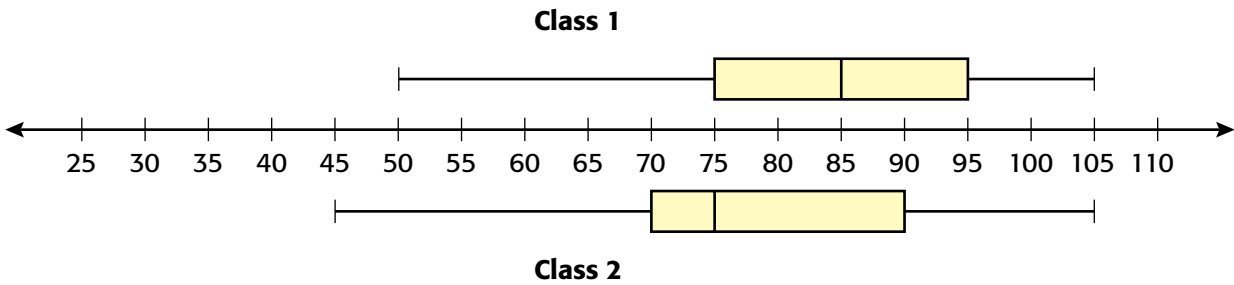
Class 2

If Mr. Klein decided that each student needed to score 75 points on this quiz to pass, according to the plots, what percent of each class would pass the quiz?

A	50% of Class 1 and 50% of Class 2
B	50% of Class 1 and 75% of Class 2
☞ **C**	75% of Class 1 and 50% of Class 2
D	75% of Class 1 and 75% of Class 2

CALCULATOR PERMITTED—ITEMS 5–10 and A–B

5

The diagram of ΔPQR below shows the lengths of two sides and an altitude.
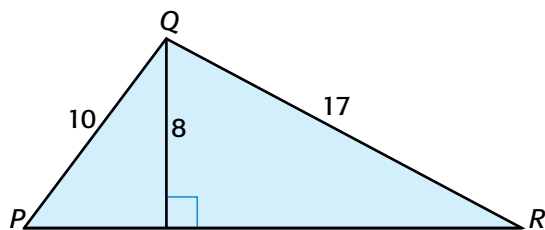
What is the length of side $\overline{PR}$?

  A   19 units
☞ **B**   21 units
  C   27 units
  D   35 units

6

What is the equation of the line graphed below?
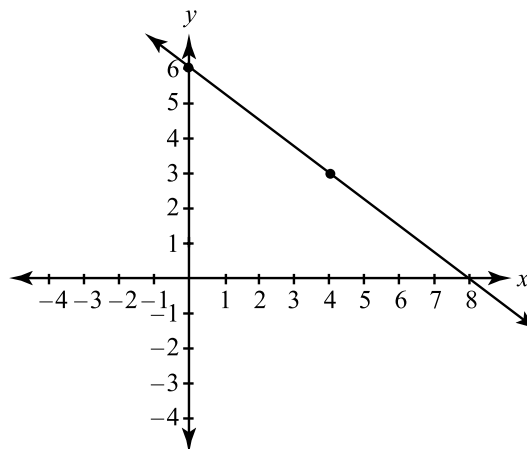
  A $y = \dfrac{3}{4}x + 6$

☞ **B** $y = -\dfrac{3}{4}x + 6$

  C $y = -\dfrac{4}{3}x + 6$

  D $y = \dfrac{4}{3}x + (-6)$

7

Brian has a box filled with different-colored markers that are the same size and shape. Below is a list of each color of marker and the number of each in the box.

- Red - 3
- Purple - 2
- Green - 2
- Black - 2
- Yellow - 2
- Orange - 3

Brian will randomly choose 1 marker, record the color, and not put the marker back.

> If Brian does this two times, what is the probability that both markers will be black?

A $\dfrac{1}{49}$

B $\dfrac{1}{72}$

☞ **C** $\dfrac{1}{91}$

D $\dfrac{1}{98}$

8

The volume of a right square pyramid is 50 cubic inches. If the height of this pyramid is 6 inches, what is the length of one side of its base?

A $4\dfrac{1}{4}$ inches

☞ **B** 5 inches

C 8 inches

D $12\dfrac{1}{2}$ inches

9

The scale on Mark's map is 0.5 inch represents 8 miles. The route from Mark's house to his friend's house is 3.25 inches on his map.

What is the actual distance of Mark's route?

A   11.75 miles
B   13.00 miles
C   20.31 miles
☞ **D**   52.00 miles

10

Mr. Lehman is a piano tuner. He charges his clients a fixed amount for a house call plus his labor, which is based on an hourly rate. The graph below shows how much Mr. Lehman charges as a function of the time required to tune a piano.

PIANO-TUNING CHARGES
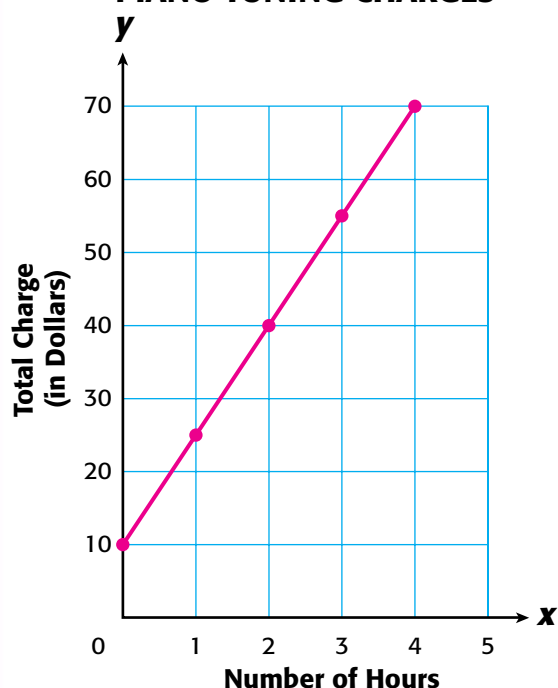
Which of the following best represents Mr. Lehman's hourly rate for labor?

A $10
☞ **B** $15
C $20
D $25

MATHEMATICS OPEN-RESPONSE ITEM A

A

Freda has a bag of 3 tennis balls that are all the same size and shape. Each tennis ball is a different color: orange, yellow, or green. Freda will randomly pick 1 tennis ball to play tennis and will not put it back in the bag. She will do this 3 times.

1. List all the possible outcomes for the order in which Freda could choose the tennis balls. You can use an organized list, tree diagram, or logic grid to show all the possibilities.

2. What is the probability that Freda will pick the yellow tennis ball first? Show your work or explain how you got your answer.

3. What is the probability that Freda will pick the green tennis ball before the orange tennis ball? Show your work or explain how you got your answer.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

RUBRIC FOR MATHEMATICS OPEN-RESPONSE ITEM A

SCORE	DESCRIPTION
4	The student earns 4 points. The response contains no incorrect work.
3	The student earns 3–$3\frac{1}{2}$ points.
2	The student earns 2–$2\frac{1}{2}$ points.
1	The student earns $\frac{1}{2}$–$1\frac{1}{2}$ points, or some minimal understanding shown.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

Solution and Scoring

| Part	Points
1	**2 Points Possible** 2 points: 6 correct outcomes listed Give credit for the following or equivalent: • Yellow, Orange, Green Yellow, Green, Orange Orange, Yellow, Green Orange, Green, Yellow Green, Yellow, Orange Green, Orange, Yellow **OR** 1 point: 3–5 of the 6 possible outcomes or The 6 possible outcomes plus more or An incomplete tree diagram that indicates the 6 possible outcomes
2	**1 Point Possible** 1/2 point: Correct answer: 1/3 or equivalent (1 out of 3, 1:3, 33.$\overline{3}$%) **AND** 1/2 point: Correct and complete explanation of how answer was determined Give credit for the following or equivalent: • There are 6 possible outcomes. Yellow can be picked first 2 times. Therefore the probability that Freda will pick the yellow ball first is 2/6 = 1/3. • There are only 3 balls. The probability of picking any one ball first is 1/3.
3	**1 Point Possible** 1/2 point: Correct answer: 1/2 or equivalent (1 out of 2, 1:2, 50%) **AND** 1/2 point: Correct and complete explanation of how answer was determined Give credit for the following or equivalent: • There are 6 possible outcomes. Green can be picked before orange 3 times. Therefore the probability that Freda will pick green before orange is 3/6 = 1/2. • Because 3 times green was before orange out of 6. • Indicated the yellow ball from Part 2 was excluded leaving only two balls.

MATHEMATICS OPEN-RESPONSE ITEM B

B

The human body is composed of many different types of cells. White blood cells are responsible for fighting infections in the body, which are caused by bacteria and viruses. The typical diameters of an example of each are shown in the table below.

Type of Cell	Typical Diameter
white blood cell	1.1×10^{-5} meters
streptococcus bacteria colony	0.001 meters
influenza virus	0.0001×10^{-3} meters

1. Change the diameters in the table above to correct scientific notation, if necessary. Label each scientific notation diameter with the first letter of its corresponding cell type.

2. Which cell in the table has the largest diameter, and which cell has the smallest diameter? Show all your work and/or explain your answer.

Red blood cells travel through the body via veins, arteries, and capillaries. Capillaries are so small that red blood cells must travel single file through them, as shown below.

Capillary

0.000007 m
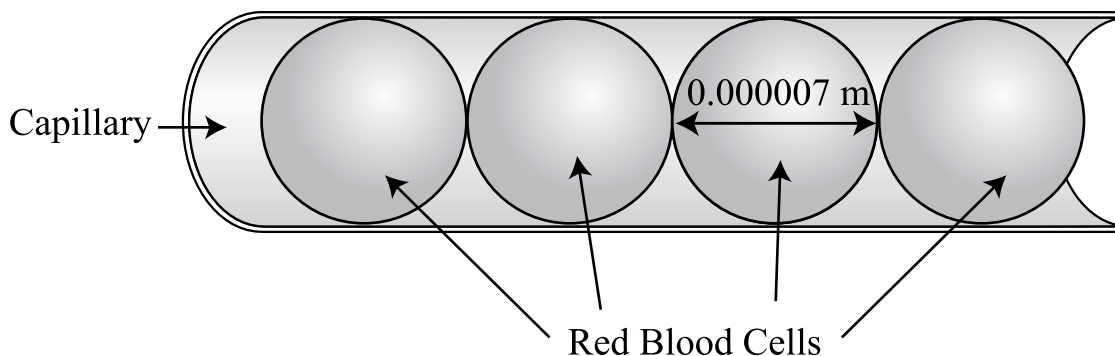
Red Blood Cells

3. **Approximately** how many red blood cells fit in a section of capillary that is 0.0049 meters long? Show all your work and/or explain your answer.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

RUBRIC FOR MATHEMATICS OPEN-RESPONSE ITEM B

SCORE	DESCRIPTION
4	The student earns 6 points. The response contains no incorrect work.
3	The student earns 4–5 points.
2	The student earns 3 points, or the student earns 2 points if points are awarded in different parts.
1	The student earns 2 points if points are awarded in the same part, or the student earns 1 point, or some minimal understanding shown.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

Solution and Scoring

Part	Points
1	**2 Points Possible** 2 points: Give credit for the following or equivalent: Correct scientific notations with labels (W, S, I) or other identifying label Ex: **W: 1.1×10^{-5}** **S: 1.0×10^{-3}** **I: 1.0×10^{-7}** Note: "meters" is required at the "4" level **OR** 1 point: Give credit for the following: • 3 correct answers without identification or • 2 out of 3 correct answers with identification
2	**2 Points Possible** 2 points: 2 correct answers with correct explanation May be based on incorrect answers in Part 1 Give credit for the following or equivalent: • "Streptococcus is the largest cell because .001 is the largest # and the smallest cell is Influenza because .0000001 is the smallest #." or • "The smallest is the one with −7 as the exponent for 10 in scientific notation. The largest is the one with −3 as the exponent for 10 in scientific notation. So "S" is the largest and "I" is the smallest." or

	• "S is the largest and I is the smallest
	    W: .000011
	    S: .001
	    I: .0000001"
	OR
	1 point: Give credit for the following:
	    • Correct largest cell (Streptococcus) with explanation
	      Smallest is incorrect or missing or
	    • Correct smallest cell (Influenza) with explanation
	      Largest is incorrect or missing or
	    • Correct largest cell and smallest cell are listed
	      Explanation is missing

3	**2 Points Possible**
	
	1 point: Correct answer: 700
	AND
	1 point: Correct and complete procedure shown and/or explained
	    Work may contain a calculation or copy error
	    Give credit for the following or equivalent:
	    • $0.0049 \div 0.000007 = \#$ or
	    • $4900 \div 7 = \#$ or
	    • $\dfrac{4.9 \times 10^3}{7.0 \times 10^6} = \#$ or
	    • $0.000007 \times 700 = 0.0049$