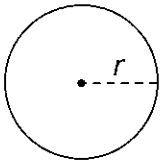
Grade 7 Formula Sheet

Formulas that you may need to work questions on this test are found below.
You may refer back to this page at any time during the mathematics test. 2017
You may use calculator π or the number 3.14. Grade 7

Simple Interest

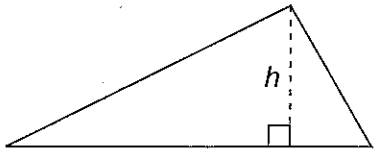
$I = Prt$

Circle



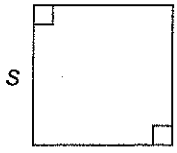
$C = 2\pi r$ $A = \pi r^2$

Triangle



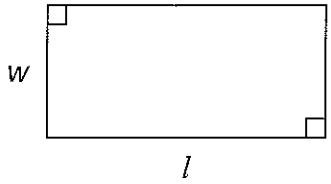
$A = \frac{1}{2}bh$

Square



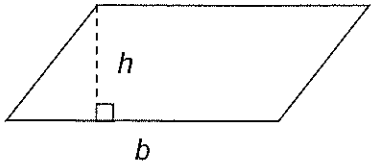
$A = s^2$

Rectangle



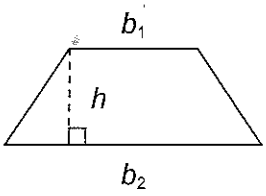
$A = lw$ $P = 2l + 2w$

Parallelogram



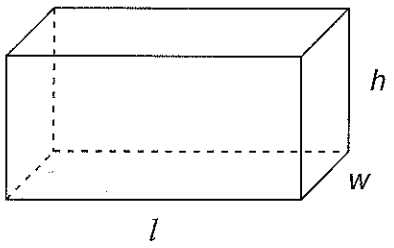
$A = bh$

Trapezoid



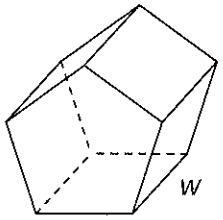
$A = \frac{1}{2}h(b_1 + b_2)$

Rectangular Prism



$V = lwh$ $SA = 2lw + 2lh + 2wh$

Polygonal Prism



$V = Bw$, where B = area of the base
$SA = Pw + 2B$, where P = perimeter of base

General Description of Scoring Guidelines for Mathematics Open-Ended Questions

4— The response demonstrates a *thorough* understanding of the mathematical concepts and procedures required by the task.

The response provides correct answer(s) with clear and complete mathematical procedures shown and a correct explanation, as required by the task. Response may contain a minor "blemish" or omission in work or explanation that does not detract from demonstrating a *thorough* understanding.

3— The response demonstrates a *general* understanding of the mathematical concepts and procedures required by the task.

The response and explanation (as required by the task) are mostly complete and correct. The response may have minor errors or omissions that do not detract from demonstrating a *general* understanding.

2— The response demonstrates a *partial* understanding of the mathematical concepts and procedures required by the task.

The response is somewhat correct with *partial* understanding of the required mathematical concepts and/or procedures demonstrated and/or explained. The response may contain some work that is incomplete or unclear.

1— The response demonstrates a *minimal* understanding of the mathematical concepts and procedures required by the task.

0— The response has no correct answer and *insufficient* evidence to demonstrate any understanding of the mathematical concepts and procedures required by the task for that grade level.

Response may show only information copied from the question.

Special Categories within zero reported separately:

BLK (blank).....Blank, entirely erased, or written refusal to respond

OT.....Off task

LOE.....Response in a language other than English

IL.....Illegible

Question 1 in this sampler is to be solved without the use of a calculator.

MULTIPLE-CHOICE ITEMS

1. Multiply: $1\frac{3}{7} \bullet \frac{-3}{7}$

A. $-4\frac{2}{7}$

B. $-2\frac{2}{7}$

C. $\frac{-30}{49}$

D. 1

2. The price of a company stock that Meredith owns is \$31.89 on the morning of day 1. At the end of each day for five days, Meredith records the change in the price of the stock. The changes she records are shown in the chart below, but some information is missing.

The change in the price for day 2 is $\frac{1}{3}$ of the change in the price for day 3. At the end of day 5, the price of Meredith's stock is \$32.05. What is the change, in dollars, in the price of the stock for day 5?

Meredith's Stock

Day	Change in Price (\$)
1	+0.13
2	
3	−0.45
4	+0.37
5	

A. −0.04

B. +0.11

C. +0.16

D. +0.26

3. Jellybeans cost \$0.80 per pound. Howard buys $4\frac{1}{2}$ pounds of jellybeans for himself and 1 pound for his friend. What is the total cost of the jellybeans Howard buys?

A. \$4.00

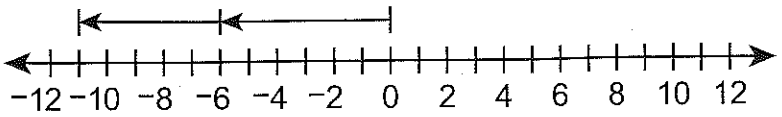
B. \$4.40

C. \$4.50

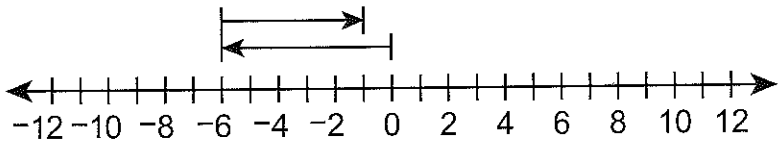
D. \$4.60

4. Which number line represents $^{-}6 - 5$?

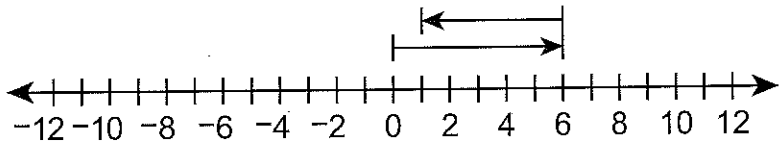
A.



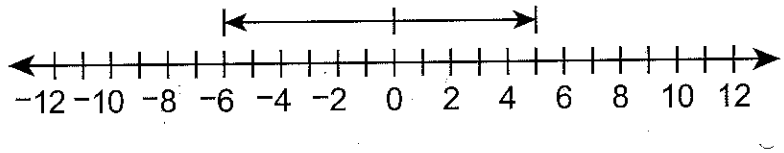
B.



C.



D.



5. Coach Patrick is ordering football jerseys for his team. The table below shows the relationship between the number of jerseys ordered and the total cost of the jerseys.

Based on the information shown in the table, what is the total cost of ordering 52 jerseys?

A. $352
B. $375
C. $390
D. $450

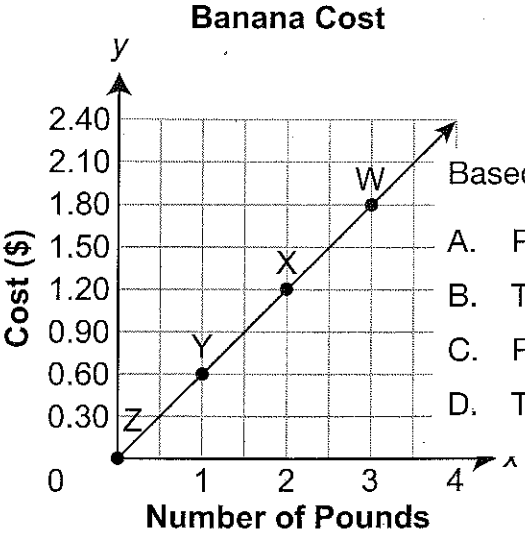
Football Jerseys

Number of Jerseys	Total Cost ($)
10	75
20	150
30	225
40	300

6. A turtle traveled $\frac{1}{10}$ mile in $\frac{1}{2}$ hour. What was the turtle's rate in miles per hour?

A. $\frac{1}{20}$
B. $\frac{1}{12}$
C. $\frac{1}{6}$
D. $\frac{1}{5}$

7. The graph below shows the relationship between the number of pounds of bananas purchased and the cost of the bananas. Four points on the graph are labeled.



Based on the graph, which statement about the unit price of the bananas is true?

A. Point Z indicates that the unit price is $0.00 per pound.

B. Together, point W and point X indicate that the unit price is $0.50 per pound.

C. Point Y indicates that the unit price is $0.60 per pound.

D. Together, point X and point Z indicate that the unit price is $2.40 per pound.

8. A principal buys x small tables and y large tables for a computer lab.

- Each small table costs $34.
- Each large table costs $52.
- The total cost of the tables is less than $3,500.
- The principal buys fewer than 50 tables.

Which two inequalities could represent this situation?

A. $34x + 52y < 3{,}500$
$x + y < 50$

B. $34x + 52y < 3{,}500$
$x + y > 50$

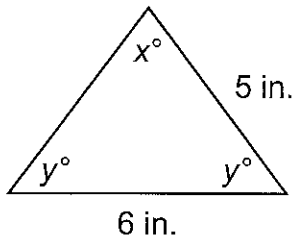
C. $52x + 34y < 3{,}500$
$x + y < 50$

D. $52x + 34y < 3{,}500$
$x + y > 50$

9. Nadia is selling tickets for a school event. She has already sold 17 tickets. Her goal is to sell at least 100 tickets. Each day she is able to sell up to 10 tickets. What is the **minimum** number of days Nadia will need to sell tickets to reach her goal?

A. 5 B. 6 C. 8 D. 9

10. A scale drawing of a triangle that will be used on a banner is shown below.



Scale
1 in. : $1\frac{1}{2}$ ft

What is the perimeter, in feet, of the actual triangle used on the banner?

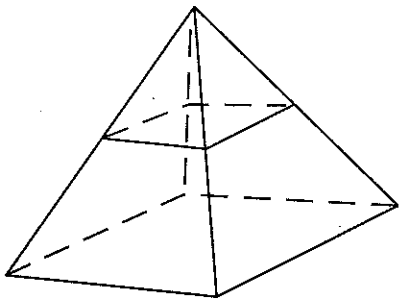
A. $20\frac{1}{2}$

B. 24

C. $25\frac{1}{2}$

D. 27

11. Barb has a jewelry box in the shape of a rectangular pyramid. The top opens at a cross section parallel to the base.



What is the shape of the opening of the jewelry box?

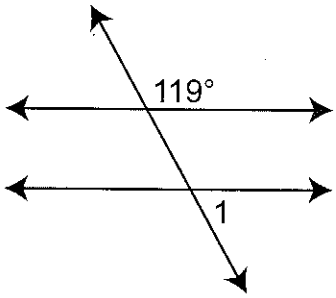
A. rectangle

B. rhombus

C. trapezoid

D. triangle

12. Two parallel lines are intersected by another line, as shown below.



What is the measure of $\angle 1$?

A. 61°

B. 74°

C. 81°

D. 119°

13. Concrete is poured to create a slab in the shape of a rectangular prism. The slab is 50 yards long, 1.5 yards wide, and 0.25 yard thick. How many cubic yards of concrete are needed to create the slab?

A. 18.75 B. 25.75 C. 155.25 D. 175.75

14. Customers in two randomly selected groups at a yogurt shop are asked their preference of yogurt flavors. The responses for the customers in each group are summarized in the table below.

Customer Yogurt Flavor Preference

	Peach	Strawberry	Vanilla	Total
Group 1	40	25	10	75
Group 2	50	10	15	75

Based on the information shown in the table, which statement **best** describes the preferences of the customers in the two groups?

A. In both groups, more customers prefer peach-flavored yogurt than either of the other two flavors.

B. In both groups, fewer customers prefer vanilla-flavored yogurt than either of the other two flavors.

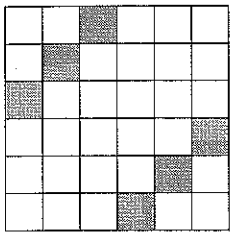
C. In group 2, the same number of customers prefer strawberry-flavored yogurt and vanilla-flavored yogurt.

D. In group 1, more customers prefer either strawberry-flavored yogurt or vanilla-flavored yogurt than peach-flavored yogurt.

15. A team of 10 basketball players have their heights recorded to make a data set. The mean, median, mode, and range of the data set are recorded. Then, the height of the team's coach is included to make a new data set. The coach is shorter than all but one of the basketball players. Which measure **must** be the same when the coach's height is included?

A. mean B. median C. mode D. range

16. Some of the squares on the grid below are shaded.



One square on the grid is randomly selected. What is the probability that the square is **not** shaded?

A. $\frac{1}{36}$ B. $\frac{1}{30}$ C. $\frac{29}{36}$ D. $\frac{5}{6}$

Question 1 in this sampler is to be solved without the use of a calculator.

MULTIPLE-CHOICE ITEMS

1. Subtract: $-10 - 21$ A. -31 B. -11 C. 11 D. 31

2. Laura has a board that measures $6\frac{11}{12}$ feet in length. She will cut the board into pieces that are each $\frac{11}{12}$ foot long. How many full pieces can Laura cut from her board, and how much of her board will be remaining?

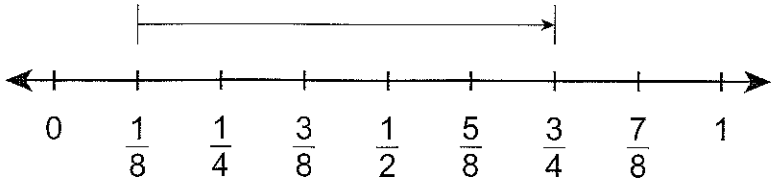
A. Laura can cut the board into 6 pieces with nothing remaining.

B. Laura can cut the board into 6 pieces with $\frac{11}{12}$ foot remaining.

C. Laura can cut the board into 7 pieces with $\frac{1}{12}$ foot remaining.

D. Laura can cut the board into 7 pieces with $\frac{1}{2}$ foot remaining.

3. The gas tank in Phil's car was $\frac{1}{8}$ full. He put more gasoline in the car's gas tank. The number line below shows how full the car's gas tank was before and after Phil put in more gasoline.



Which equation represents the change in the amount of gasoline in the car's tank?

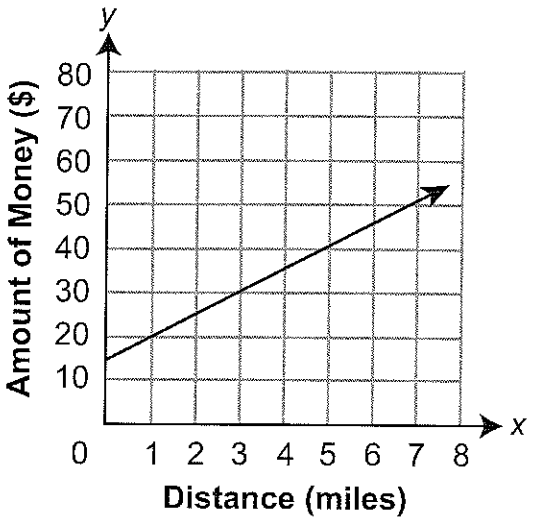
A. $\frac{1}{8} + \frac{2}{4} = \frac{3}{4}$ B. $\frac{1}{8} + \frac{5}{8} = \frac{3}{4}$ C. $\frac{1}{8} + \frac{3}{4} = \frac{7}{8}$ D. $\frac{1}{8} + \frac{3}{4} = \frac{4}{12}$

4. For a science experiment, Annie removes a cold liquid from a refrigerator and measures its temperature every $\frac{1}{2}$ minute. Annie finds that the temperature increases by $1\frac{3}{4}$ degrees Fahrenheit (°F) between each measurement for three minutes. What is the rate per minute of the temperature increase?

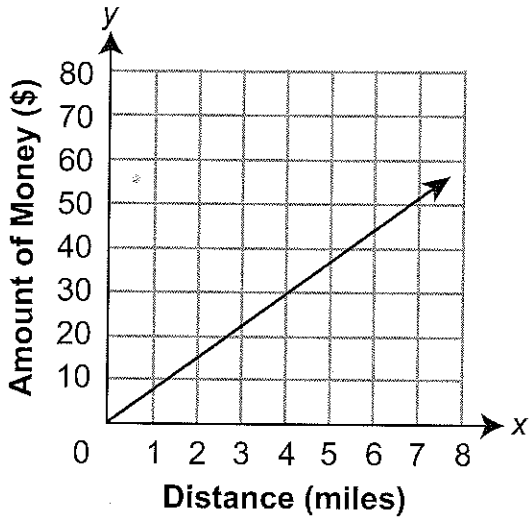
A. $\frac{7}{8}$ °F per minute B. $1\frac{1}{4}$ °F per minute C. $2\frac{1}{4}$ °F per minute D. $3\frac{1}{2}$ °F per minute

5. Clark and Phil are each running to raise money. The amount of money (y), in dollars, they each raise is based on the distance (x), in miles, they each run. Clark has an initial donation that he has received regardless of how many miles he runs. The graphs shown below model the amount of money each will raise based on the distance they each run.

Clark's Running Donations



Phil's Running Donations



What is the unit rate for the person for whom the amount of money and the number of miles are proportionally related?

A. $5.00 per mile B. $7.50 per mile C. $15.00 per mile D. $30.00 per mile

6. Joe has a picture that measures 8 centimeters by 12 centimeters. He creates four enlargements of the picture. The table below shows the width and the length of each enlargement.

Joe's Picture Enlargements

Width (cm)	Length (cm)
10	15
12	18
20	30
25	37.5

What is the constant of proportionality between the width and the length of the pictures?

A. 0.5
B. 1.2
C. 1.5
D. 2.5

7. Jaya is painting her room. She mixes 2 pints of blue paint with 5 pints of red paint to get her desired color. Which equation can be used to find the number of pints of blue paint (x) Jaya should mix with 18 pints of red paint?

A. $\frac{2}{x} = \frac{18}{5}$ B. $\frac{2}{5} = \frac{x}{18}$ C. $\frac{2}{18} = \frac{5}{x}$ D. $\frac{x}{18} = \frac{5}{2}$

8. Ernesto made a graph of the distance (y), in miles, he can ride a bicycle in x hours. Ernesto can ride 5.5 miles in 0.5 hour. Which point on the graph represents Ernesto's rate of travel, in miles per hour?

A. (0, 5.5) B. (0, 11) C. (1, 5.5) D. (1, 11)

9. The ratio of the number of students in the chess club to the number of students on the math team is 1 : 3. The ratio of the number of students on the math team to the number of students on the quiz bowl team is 1 : 2. There are 4 students in the chess club. How many students are on the quiz bowl team?

A. 7 B. 9 C. 12 D. 24

10. Arnie buys $2\frac{2}{5}$ pounds of red grapes for \$1.95 per pound. He buys $2\frac{2}{5}$ pounds of green grapes for \$2.20 per pound. Which expression can be used to determine the total cost, in dollars, of the grapes Arnie buys?

A. $2.4(1.95 + 2.20)$
B. $2.4 \cdot 1.95 \cdot 2.20$
C. $(2.4 + 2.4)(1.95 + 2.20)$
D. $(2.4 \cdot 2.4) + (1.95 \cdot 2.20)$

11. An author receives \$0.75 for each hardcover book or paperback book that is sold. There were x hardcover books and 42,000 paperback books sold of her most recent book. The author received a total of \$60,000 for the book sales. The equation below can be used to determine the number of hardcover books that were sold. How many hardcover books were sold?

$0.75(x + 42{,}000) = 60{,}000$

A. 18,000 B. 24,000 C. 28,500 D. 38,000

12. Tasha sells gift boxes and cookies at her bakery.

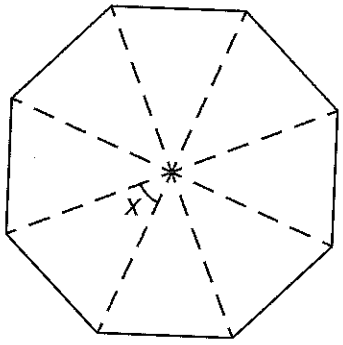
- Gift boxes sell for \$26.00 each.
- Cookies sell for \$1.50 each.
- Tasha would like her total sales to be at least \$50.00 from the sale of one gift box and some cookies.

Which inequality describes all the numbers of cookies (x) that Tasha needs to sell?

A. $x \geq 2$
B. $x \geq 8$
C. $x \geq 16$
D. $x \geq 24$

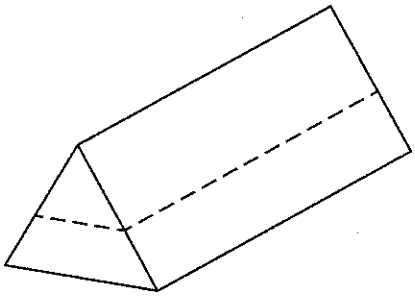
13. A stained glass window is in the shape of a regular octagon as shown below.

The window is separated into sections by drawing straight, dashed lines that intersect in the center of the octagon. What is the value of x?

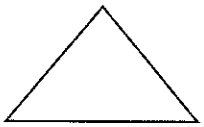


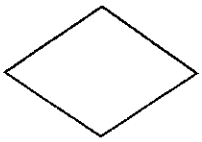
A. 22.5°
B. 37.5°
C. 45°
D. 50°

14. Melinda's candy bar is in the shape of a triangular prism. She cuts her candy bar parallel to its bottom. The dotted line in the picture below represents Melinda's cut.



What is the shape of the cross section of Melinda's cut?

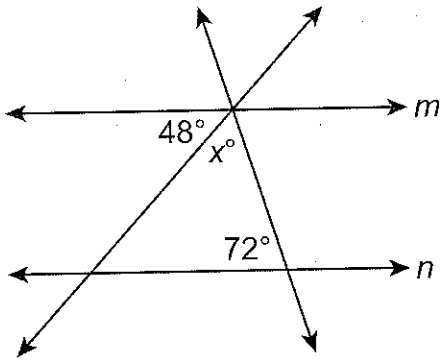
A. 

B. 

C. 

D. 

15. Two lines intersect parallel lines m and n as shown below.



What is the value of x?

A. 24
B. 48
C. 60
D. 66

16. The diameter of Jacob's circular tabletop is 6 feet. What is the area, in square feet, of Jacob's tabletop?

A. 6π
B. 9π
C. 12π
D. 36π

You may not use a calculator for questions 1–4.

1. Joslyn built the shelf shown below to fit into a narrow closet.

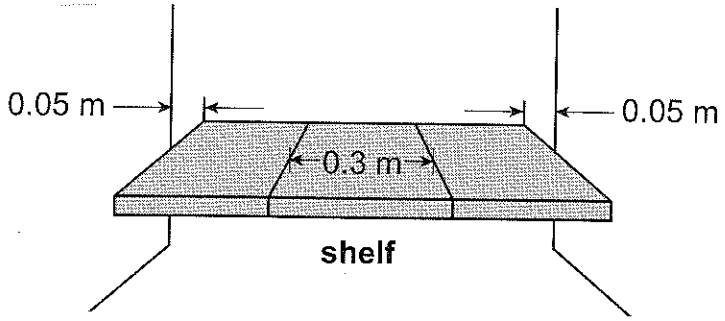
The shelf is made of 3 pieces of wood, each 0.3 meter wide. There is also 0.05 meter of space between the shelf and the wall on each side. What is the width, in meters, of Joslyn's closet?

A. 0.4

B. 0.8

C. 1

D. 1.9



2. Multiply: $\frac{7}{8} \times 1\frac{2}{3}$

A. $1\frac{11}{24}$

B. $1\frac{7}{12}$

C. $1\frac{19}{21}$

D. $2\frac{1}{3}$

3. Which value is equivalent to $0.45 \div \frac{9}{10}$?

A. $\frac{81}{200}$

B. $\frac{1}{2}$

C. 40.5

D. 50

4. Which estimate is **closest** to the value of $3\frac{7}{8} \times 5\frac{1}{16}$?

A. 15

B. 18

C. 20

D. 24

5. Ty is determining the value of the expression below.

$$-0.25(-3.25 + 5.65)$$

Which shows two expressions that are equivalent to Ty's expression?

A. $-0.25(8.9)$

$\frac{-5.65}{4} + \frac{3.25}{4}$

B. $13 + 22.6$

$-25(2.4) \div 100$

C. $-\left(\frac{2}{4} + \frac{0.4}{4}\right)$

$-25(-325 + 565)$

D. $2.4 \div (-4)$

$-0.25[(-3.25 + 3.25) + 2.4]$

6. After a party, there are parts of three pizzas remaining. There is $\frac{3}{4}$ of a pepperoni pizza remaining, $\frac{5}{8}$ of a cheese pizza remaining, and $\frac{11}{12}$ of a sausage pizza remaining. The 5 friends who organized the party split the remaining pizza equally. What fraction of a whole pizza does each person get?

A. $\frac{5}{24}$

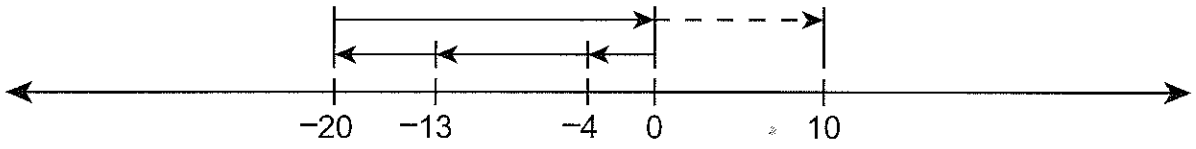
B. $\frac{11}{24}$

C. $\frac{1}{2}$

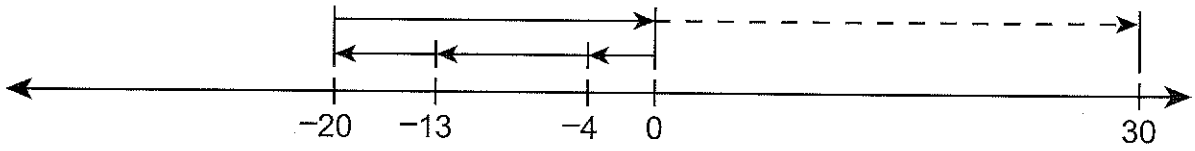
D. $\frac{11}{20}$

7. Corrine plans to spend $20 on a new shirt, $13 on dinner, and $4 on a bus ticket. She knows that she will earn $30 for baby-sitting. Which number line represents a strategy for determining how many more dollars Corrine needs to earn so that she earns exactly as much as she plans to spend?

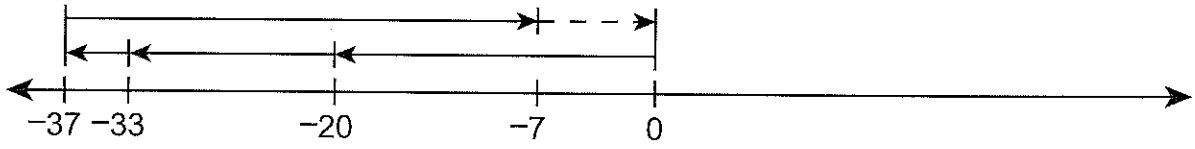
A.



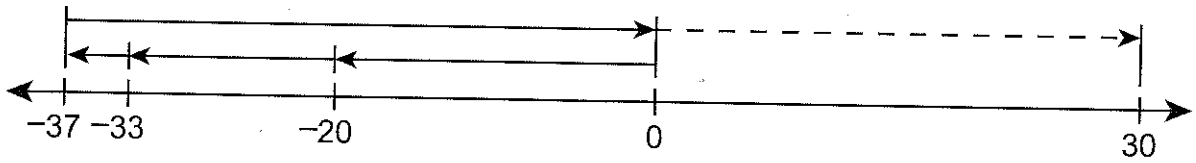
B.



C.



D.



8. Keyana put 0.83 liter of water into a bucket. Matt put 0.98 liter of water into another bucket. When they combined their water into a bigger bucket, 10% of the water spilled out. The water they collected had a weight of 1.021 kilograms per liter of water. The expression shown below represents the weight, in kilograms, of the water in the bigger bucket.

$$[0.9(0.83 + 0.98)] \times 1.021$$

Rounded to the nearest thousandth, what is the weight, in kilograms, of the water in the bigger bucket?

A. 1.663

B. 1.748

C. 1.763

D. 1.848

9. Simon is filling the water tank shown below.

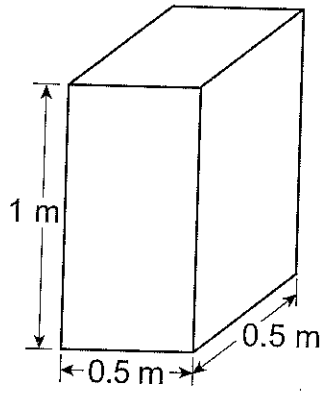
After 2 minutes, the tank is filled up to $\frac{1}{5}$ of its height. What is the rate, in cubic meters per minute, at which Simon is filling up the water tank?

A. 0.025

B. 0.050

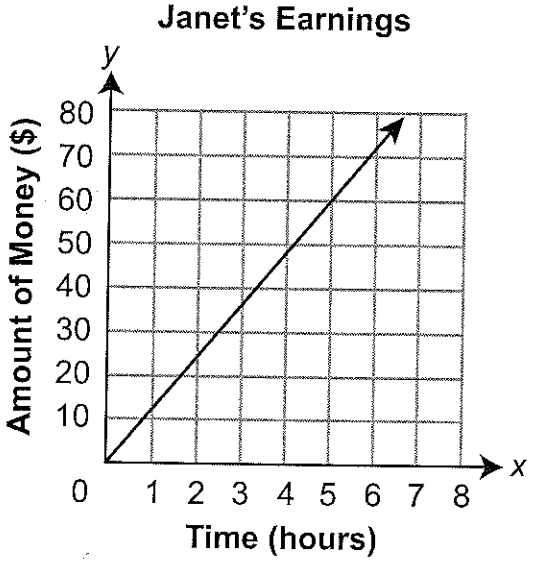
C. 0.100

D. 0.125



10. The graph below models the relationship between the time (x), in hours, Janet works and the amount of money (y), in dollars, she earns.

Which statement explains how Janet knows that the number of hours she works and the amount of money she earns are proportionally related?



A. The graph is a straight line with a positive slope.

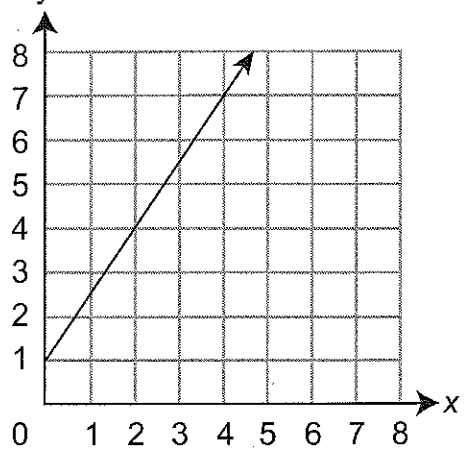
B. The graph is a straight line that passes through (0, 0).

C. The graph is a straight line that passes through (1, 12.5).

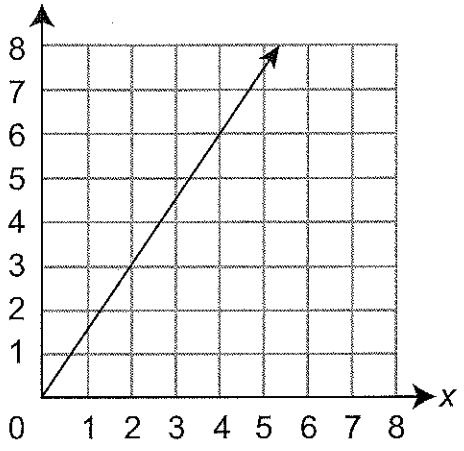
D. The graph is a straight line with no negative x or y values.

11. Which graph shows a proportional relationship with a unit rate of $\frac{3}{2}$?

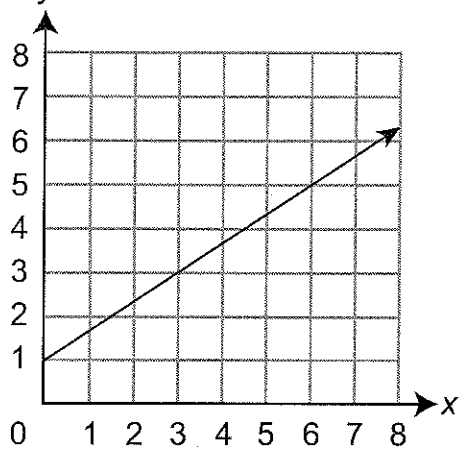
A.



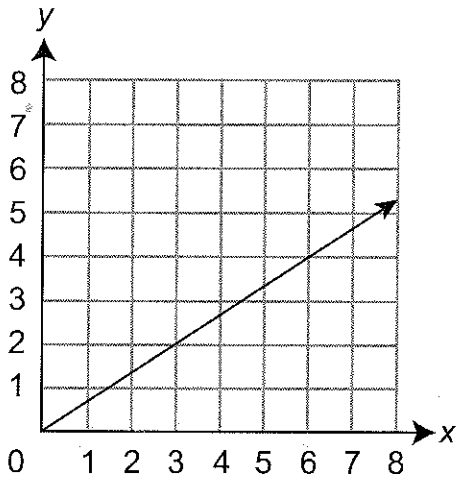
B.



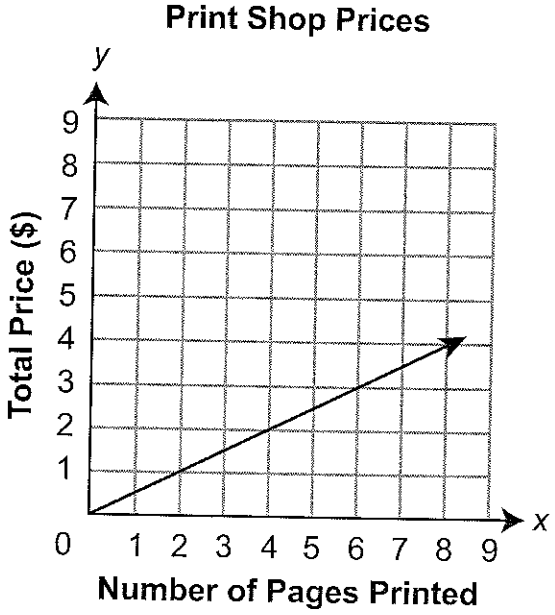
C.



D.



12. The graph below shows the relationship between the number of pages printed (x) at a print shop and the total price (y), in dollars.



Based on the graph, what is the unit price at the print shop?

A. $0.10 per page

B. $0.20 per page

C. $0.25 per page

D. $0.50 per page

13. The table below shows the relationship between the number of water bottles at a park that are thrown away and the number of water bottles at the park that are recycled for each of five months.

Water Bottles at a Park

Month	Water Bottles Thrown Away	Water Bottles Recycled
1	40	12
2	50	15
3	80	24
4	110	33
5	140	42

Which statement correctly describes the relationship between the number of water bottles that are thrown away and the number of water bottles that are recycled at the park each month?

A. The relationship is proportional. For every 3 bottles that are thrown away each month, 10 bottles are recycled.

B. The relationship is proportional. For every 10 bottles that are thrown away each month, 3 bottles are recycled.

C. The relationship is not proportional. The number of water bottles that are thrown away increases more from month to month than the number of water bottles that are recycled.

D. The relationship is not proportional. The difference between the number of bottles that are thrown away and the number of bottles that are recycled is not the same for each month.

14. A technician tests batteries for a battery manufacturer several times each week. She determines that the number of defective batteries is proportional to the number of batteries tested. The table below shows the numbers of batteries the technician tested at two different times during week 1 and the number of defective batteries she found each time.

Battery Test Results for Week 1

Number Tested	Number Defective
160	4
600	15

Between week 1 and week 2, the battery manufacturer changed its process. The number of defective batteries is still proportional to the number of batteries tested, but the constant of proportionality is greater. The technician tested 480 batteries during week 2 and found that 18 were defective. By what percent did the constant of proportionality increase?

A. $33\frac{1}{3}\%$

B. 50%

C. $66\frac{2}{3}\%$

D. 125%

15. A concert hall sells tickets in three different price ranges. For each price range, there are both adult and child rates.

Concert Hall Prices

Adult Tickets	Child Tickets
$82.00	$20.50
$56.00	$14.00
$36.00	$9.00

Which statement describes the relationship between the adult ticket prices (a), in dollars, and the child ticket prices (c), in dollars?

A. The relationship is proportional. It can be represented as $c = \frac{1}{4}a$.

B. The relationship is proportional. It can be represented as $c = 4a$.

C. The relationship is not proportional. The change in a is not constant, and therefore the relationship cannot be expressed as one equation.

D. The relationship is not proportional. The change in c is not constant, and therefore the relationship cannot be expressed as one equation.

16. When Rachel exceeds the number of minutes on her cell phone plan, she is charged an extra cost for each minute. The graph below shows the total cost (y), in dollars, for exceeding her cell phone plan's minutes by x minutes.

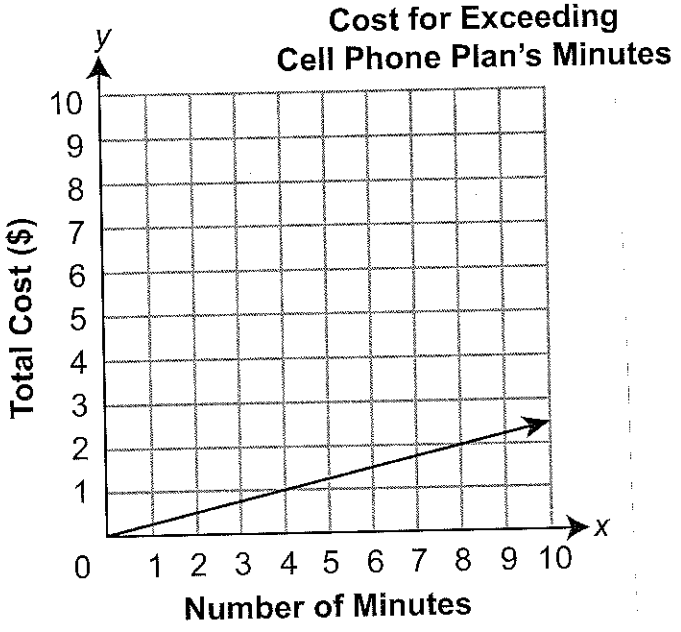
What does the y-coordinate represent when the x-coordinate has a value of 1?

A. Rachel pays $0.25 for each minute she exceeds her cell phone plan's minutes.

B. Rachel pays $0.50 for each minute she exceeds her cell phone plan's minutes.

C. Rachel pays $1.00 for each minute she exceeds her cell phone plan's minutes.

D. Rachel pays $4.00 for each minute she exceeds her cell phone plan's minutes.

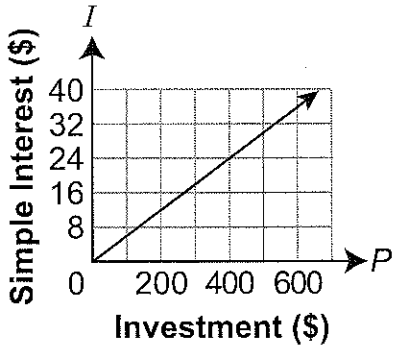


17. Kenneth is making chocolate cakes. For each cup of milk he uses, he needs to use $1\frac{3}{4}$ cups of flour. For each cup of flour he uses, he needs to use $\frac{3}{7}$ cup of cocoa powder. Kenneth is making enough cakes that he needs to use 4 cups of milk. How many cups of cocoa powder does Kenneth need to use?

A. $\frac{3}{28}$ B. $\frac{12}{7}$ C. 3 D. 7

18. The graph below represents the amount of simple interest (I), in dollars, earned on an investment of P dollars over one year. The interest rate is r.

Interest Earned over One Year



An investment of \$600 at a different interest rate (q) will earn \$24 in simple interest over one year. Which statement about interest rates r and q is true?

A. Interest rate r is 2% greater than interest rate q.

B. Interest rate r is 8% less than interest rate q.

C. Interest rate q is 12% less than interest rate r.

D. Interest rate q is the same as interest rate r.

19. Ryan is training for a bicycle race.

Which estimate is **closest** to the distance, in miles, Ryan rides to cool down?

- The distance he rides is $44\frac{1}{2}$ miles long.
- He rides a portion of the distance at a slow speed both to warm up and to cool down.
- Ryan rides $\frac{4}{5}$ of the distance at a fast speed for training.
- Of the slow-speed portion, $\frac{1}{3}$ is for the warm-up.

A. 3 B. 6 C. 9 D. 12

20. Kyle sold an antique through an online auction website. The website host charged Kyle \$15, plus 2.5% of the final selling price of the antique. After selling the antique, Kyle had to pay the website host \$32. What was the final selling price of the antique?

A. \$68

B. \$600

C. \$680

D. \$1,280

21. The pressure on an object that is underwater increases by 4.3 pounds per square inch for every 10 feet the depth of the object increases. The equation below represents this relationship.

$$y = 0.43x + 14.7$$

Based on the relationship, which statement about the variable x in the equation is true?

A. The variable x is the dependent variable in the relationship and represents the depth, in feet, of the object.

B. The variable x is the independent variable in the relationship and represents the depth, in feet, of the object.

C. The variable x is the dependent variable in the relationship and represents the pressure, in pounds per square inch, on the object.

D. The variable x is the independent variable in the relationship and represents the pressure, in pounds per square feet, on the object.

22. Mary earned \$35.00 for walking her neighbor's dogs.

- Mary charged a flat fee of \$5.00 to walk the dogs.
- Mary also charged \$2.50 for each $\frac{1}{4}$ hour she walked the dogs.

For exactly how many hours did Mary walk her neighbor's dogs?

A. 3

B. 4

C. 6

D. 12

23. Mr. Jones is taking his family to see a play. There are 10 people going to the play, and they take 2 cars. Mr. Jones pays \$5.50 for parking for each car. He pays the same price for each ticket. Mr. Jones is charged a total of \$142.00 for tickets and parking. What is the price of each ticket to the play?

A. \$6.55 B. \$13.10 C. \$13.65 D. \$14.20

24. Students in a dance class filled out a survey. There were 25 girls and some boys who participated in the survey. The results showed that 20% of the students prefer tap dance to ballroom dance. There are 9 students who prefer tap dance. Which equation can be used to find the number of boys (x) who participated in the survey?

A. $0.2x + 25 = 9$

B. $0.2(x + 25) = 9$

C. $0.2(25 - 9) = x$

D. $25 + x = 0.2 \times 9$

25. A real estate agent earns $2,000 per month plus 5% of the selling price of each house sold. The agent wants to earn more than $60,000 this year. Which inequality represents the possible combined selling price (x) of all the houses sold during the year for the real estate agent to meet his goal?

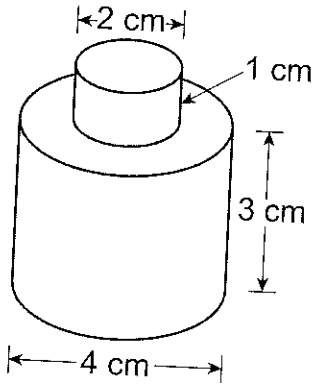
A. $x > 11{,}600$ B. $x > 180{,}000$ C. $x > 720{,}000$ D. $x > 1{,}160{,}000$

26. Heidi must correctly answer at least 80% of the questions on an exam to advance to the next level in her online course. Heidi has already correctly answered 26 questions and incorrectly answered 4 questions. How many of the 15 questions remaining must Heidi correctly answer to advance to the next level?

A. at least 10 B. at least 11 C. at least 12 D. at least 13

27. A machine part consists of two cylinders aligned along the same vertical axis. A scale drawing of the part is represented below.

The part is cut in half through the vertical axis. What is the total area, in square inches, of the actual two-dimensional cross-section that is the result of the cut?



Scale
1 cm : 3 in.

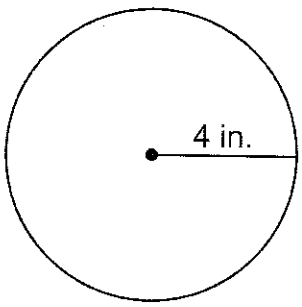
A. 42 sq in.

B. 72 sq in.

C. 126 sq in.

D. 216 sq in.

28. A city is building a new pool. A scale drawing of the pool is shown below.



Scale
1 in. : 3 ft

What is the area, in square feet, of the pool?

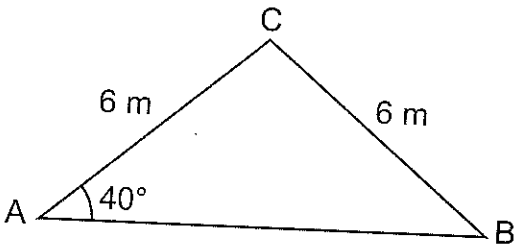
A. 16π

B. 24π

C. 48π

D. 144π

29. Triangle ABC is shown below.



What is the measure of angle C?

A. 40°

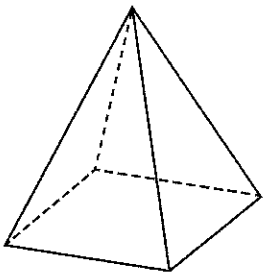
B. 90°

C. 100°

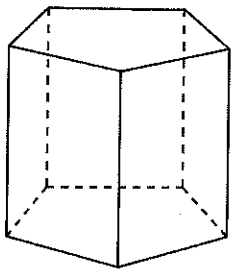
D. 140°

30. A three-dimensional solid is sliced by a plane perpendicular to a base of the solid. The result of the slice is an isosceles trapezoid. Which figure could be the three-dimensional solid?

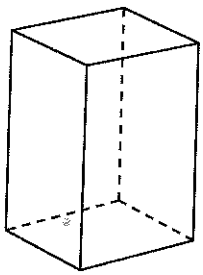
A.



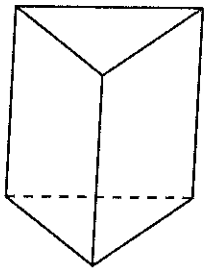
B.



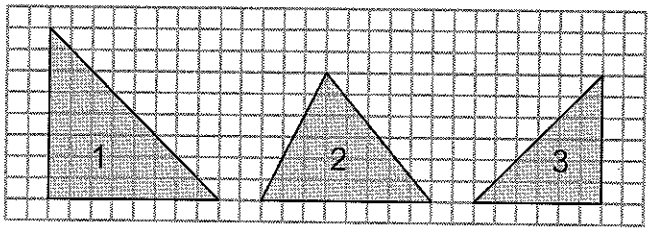
C.



D.



31. Mika will use copies of one of the triangles shown in the diagram below to cover a rectangular poster as completely as possible.



Key
□ = 1 square inch

The poster is 12 inches wide and has an area of 480 square inches. The triangle Mika will use is isosceles. The copies are all full size and do not overlap on the poster. Which set of statements identify the triangle Mika should use to cover the poster as completely as possible and the area of the poster that will remain uncovered?

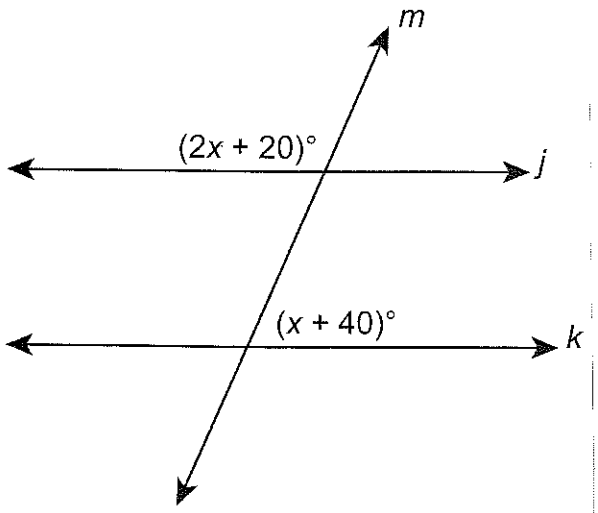
A. Mika should use triangle 1, and no portion of the poster will remain uncovered.

B. Mika should use triangle 2, and no portion of the poster will remain uncovered.

C. Mika should use triangle 3, and 48 square inches of the poster will remain uncovered.
*

D. Mika should use triangle 3, and 12 square inches of the poster will remain uncovered.

32. In the figure shown below, lines j and k are parallel.



Which equation can be used to find the value of x in the figure?

A. $(x + 40) = (2x + 20)$

B. $2(x + 40) = 2x + 20$

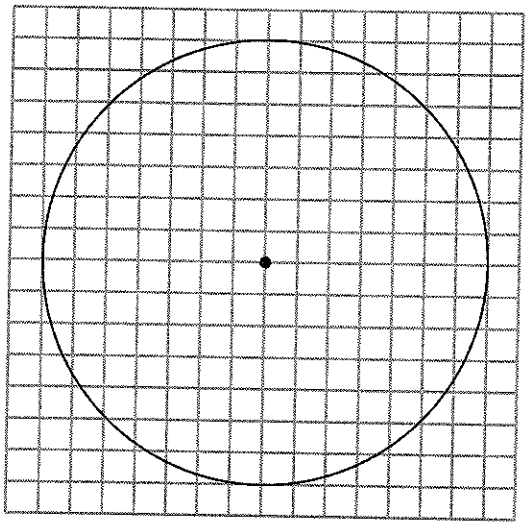
C. $(x + 40) + (2x + 20) = 90$

D. $(x + 40) + (2x + 20) = 180$

33. A circular lampshade with a diameter of 14 inches has a length of wire that goes around it exactly one time. How many inches of wire are needed to go around the lampshade exactly one time?

A. 7π B. 14π C. 49π D. 196π

34. The figure below represents a circular fountain.



Rounded to the nearest square foot, what is the area of the fountain?

A. 10

B. 11

C. 38

D. 44

Key
$\square$ = $\frac{1}{4}$ foot

35. Shannon has several cubes. Each cube is 3 feet high. Shannon covers all but one face of each cube with foil. She uses a total of 360 square feet of foil to cover the faces. How many cubes does Shannon have?

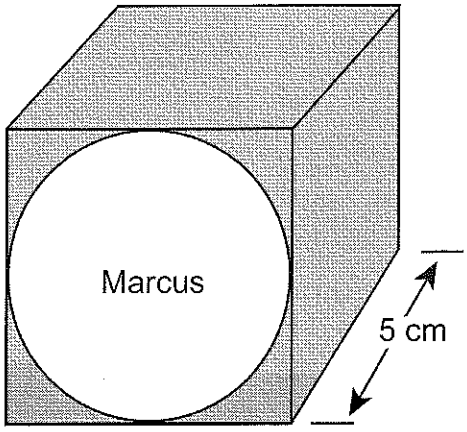
A. 8

B. 10

C. 24

D. 40

36. Marcus wants to decorate his box that is in the shape of a cube. He decides to cover the entire box with red colored paper except the circle with his name on it. The box is shown below. Rounded to the nearest square centimeter, how much red paper is needed to cover Marcus's box?



A. 72

B. 105

C. 130

D. 150

37. Four candidates are running for school president. A random sample of students at the school are surveyed about which of the candidates they are likely to choose. The chart below shows the number of students from the random sample who chose each candidate.

School Election Survey

Deb	Janelle	Rasheed	Terry
10	20	12	8

A total of 800 students are expected to vote in the election for school president. Based on the information shown in the chart, which election outcome is **most likely**?

A. Rasheed will win with 192 votes.

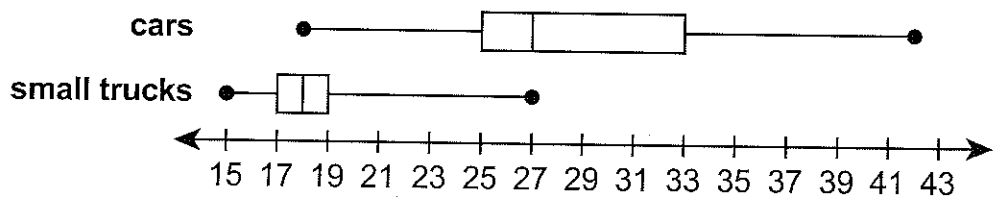
B. Rasheed will win with 189 more votes than he had in the survey.

C. Janelle will win with 8 more votes than the second-place finisher, Rasheed.

D. Janelle will win with 128 more votes than the second-place finisher, Rasheed.

38. The miles-per-gallon averages for random samples of cars and of small trucks are shown in the box-and-whisker plots below.

Cars and Small Trucks
Average Miles per Gallon



Based on the box-and-whisker plots, which statement about the miles-per-gallon averages of the cars and small trucks is **most likely** true?

A. About 50% of the cars and 50% of the small trucks get between 18 and 27 miles per gallon.

B. About 50% of the cars and 25% of the small trucks get between 25 and 33 miles per gallon.

C. About 75% of the cars get a greater average number of miles per gallon than any small truck in the small truck sample.

D. About 75% of the small trucks get a lesser average number of miles per gallon than the least number of average miles per gallon of any car in the car sample.

39. A computer scientist writes a program to generate single-digit and double-digit numbers using the digits 1 and 2. The probabilities the scientist used in the program are shown in the table below. Which statement about the likelihood of a number being generated by the program is true?

Numbers Generated

Description	Probability
single-digit number containing only 1	$\frac{3}{10}$
single-digit number containing only 2	$\frac{3}{10}$
double-digit number containing only 1s	$\frac{1}{10}$
double-digit number containing only 2s	$\frac{1}{10}$
double-digit number containing a 1 and a 2	$\frac{1}{5}$

A. The program is unlikely to generate a double-digit number.

B. The program is more likely to generate a single-digit number than a double-digit number.

C. The program is equally likely to generate a single-digit number as a double-digit number.

D. The program is more likely to generate a double-digit number containing only 1s or only 2s than a double-digit number containing a 1 and a 2.

40. The table below shows the numbers of game chips of different colors in a bag.

Chips in a Bag

Chip Color	Number of Chips
yellow	8
green	5
blue	4
red	3

Danielle randomly selects one chip from the bag. Which statement about the selection is true?

A. The probability of selecting a red chip is $\frac{1}{3}$.

B. Selecting a yellow, green, or blue chip is certain.

C. The probability of selecting a green chip is $\frac{1}{20}$.

D. Selecting a blue or red chip is less likely than selecting a yellow chip.

41. The number of paper clips of each color in a box is shown in the table below.

Paper Clips in a Box

Color	Number of Paper Clips
red	50
blue	75
green	100

Margo randomly selects 1 paper clip from the box, records its color, and returns it to the box. She does this 10 times. Which table shows experimental results from Margo's selections that are **closest** to the expected results when based on the probabilities of selecting a paper clip of each color from the box?

A. **Margo's Selections**

Color	Number of Times Selected
red	3
blue	3
green	4

B. **Margo's Selections**

Color	Number of Times Selected
red	1
blue	4
green	5

C. **Margo's Selections**

Color	Number of Times Selected
red	0
blue	2
green	8

D. **Margo's Selections**

Color	Number of Times Selected
red	1
blue	5
green	4

42. Charlene has 12 plastic cups. Of the 12 plastic cups, 3 are green, 4 are red, and 5 are blue. She stacks the cups into a single stack in random order. What is the probability that the cup on top of the stack is **not** green?

A. $\frac{1}{4}$

B. $\frac{2}{5}$

C. $\frac{2}{3}$

D. $\frac{3}{4}$

43. A carpenter will make a single, straight cut through the rectangular prism shown below by randomly choosing a face and cutting parallel to that face. The cut will be a whole number of centimeters from the chosen face.

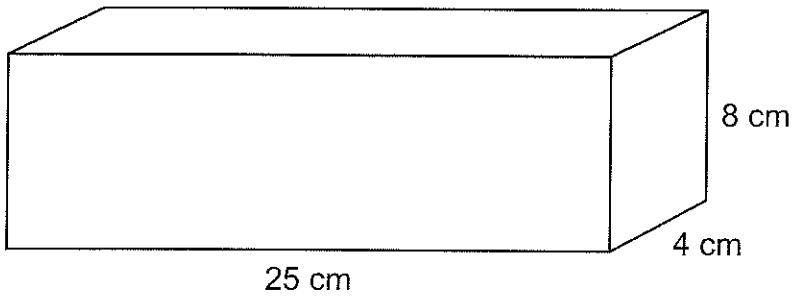
What is the probability that the area, in square centimeters, of the cross section created by the cut will **not** be a multiple of 100?

A. 0

B. $\frac{1}{3}$

C. $\frac{2}{3}$

D. 1



44. Keisha has a bag containing blue, green, orange, and red marbles. The number of marbles of each color is shown in the table below.

Keisha randomly selects 1 marble from the bag, records its color, and returns the marble to the bag. She does this three times. What is the probability Keisha selects a red marble, then a green marble, and then a blue or orange marble?

A. $\frac{3}{500}$

B. $\frac{7}{500}$

C. $\frac{7}{108}$

D. $\frac{4}{25}$

Marble Colors

Color	Number of Marbles
blue	75
green	50
orange	100
red	25

45. Carla uses a special 12-sided number polyhedron for some experiments. Some information about the polyhedron is listed below.

- There is a $\frac{1}{3}$ probability that Carla will roll a number that is a multiple of 3.
- There is a $\frac{5}{12}$ probability that Carla will roll a prime number.

Carla rolls her 12-sided number polyhedron two times. What is the probability that Carla rolls a multiple of 3 on her first roll, and a number that is **not** a prime number on her second roll?

A. $\frac{5}{36}$

B. $\frac{7}{36}$

C. $\frac{5}{18}$

D. $\frac{7}{18}$