

**0109ia**

1 On a certain day in Toronto, Canada, the temperature was  $15^{\circ}$  Celsius (C). Using the formula  $F = \frac{9}{5}C + 32$ , Peter converts this temperature to degrees Fahrenheit (F). Which temperature represents  $15^{\circ}\text{C}$  in degrees Fahrenheit?

- 1) -9
- 2) 35
- 3) 59
- 4) 85

2 What is the speed, in meters per second, of a paper airplane that flies 24 meters in 6 seconds?

- 1) 144
- 2) 30
- 3) 18
- 4) 4

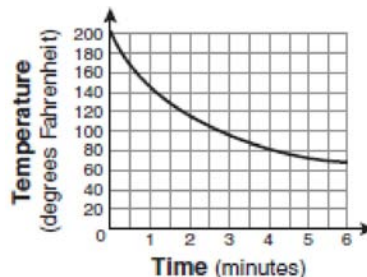
3 The faces of a cube are numbered from 1 to 6. If the cube is rolled once, which outcome is *least* likely to occur?

- 1) rolling an odd number
- 2) rolling an even number
- 3) rolling a number less than 6
- 4) rolling a number greater than 4

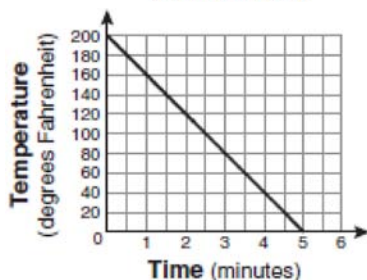
4 Tamara has a cell phone plan that charges \$0.07 per minute plus a monthly fee of \$19.00. She budgets \$29.50 per month for total cell phone expenses without taxes. What is the maximum number of minutes Tamara could use her phone each month in order to stay within her budget?

- 1) 150
- 2) 271
- 3) 421
- 4) 692

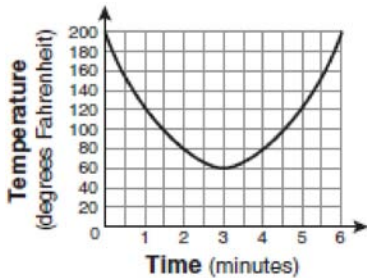
5 Antwaan leaves a cup of hot chocolate on the counter in his kitchen. Which graph is the best representation of the change in temperature of his hot chocolate over time?



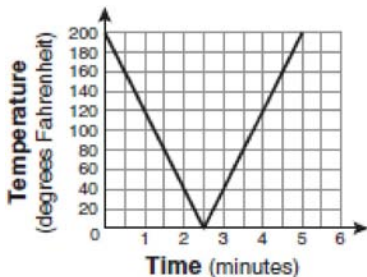
1)



2)



3)

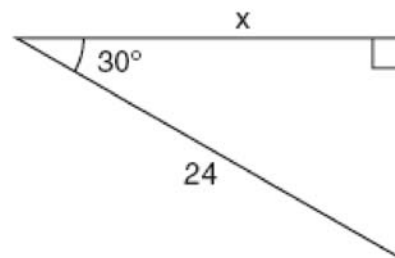


4)

- 6 What is the solution of  $\frac{k+4}{2} = \frac{k+9}{3}$ ?
- 1) 1
  - 2) 5
  - 3) 6
  - 4) 14
- 7 Alex earned scores of 60, 74, 82, 87, 87, and 94 on his first six algebra tests. What is the relationship between the measures of central tendency of these scores?
- 1) median < mode < mean
  - 2) mean < mode < median
  - 3) mode < median < mean
  - 4) mean < median < mode
- 8 The New York Volleyball Association invited 64 teams to compete in a tournament. After each round, half of the teams were eliminated. Which equation represents the number of teams,  $t$ , that remained in the tournament after  $r$  rounds?
- 1)  $t = 64(r)^{0.5}$
  - 2)  $t = 64(-0.5)^r$
  - 3)  $t = 64(1.5)^r$
  - 4)  $t = 64(0.5)^r$
- 9 The expression  $9x^2 - 100$  is equivalent to
- 1)  $(9x - 10)(x + 10)$
  - 2)  $(3x - 10)(3x + 10)$
  - 3)  $(3x - 100)(3x - 1)$
  - 4)  $(9x - 100)(x + 1)$

- 10 What is an equation of the line that passes through the points  $(3, -3)$  and  $(-3, -3)$ ?
- 1)  $y = 3$
  - 2)  $x = -3$
  - 3)  $y = -3$
  - 4)  $x = y$
- 11 If the formula for the perimeter of a rectangle is  $P = 2l + 2w$ , then  $w$  can be expressed as
- 1)  $w = \frac{2l - P}{2}$
  - 2)  $w = \frac{P - 2l}{2}$
  - 3)  $w = \frac{P - l}{2}$
  - 4)  $w = \frac{P - 2w}{2l}$

- 12 In the right triangle shown in the diagram below, what is the value of  $x$  to the *nearest whole number*?



- 1) 12
- 2) 14
- 3) 21
- 4) 28

13 What is the slope of the line that passes through the points (2,5) and (7,3)?

- 1)  $-\frac{5}{2}$
- 2)  $-\frac{2}{5}$
- 3)  $\frac{8}{9}$
- 4)  $\frac{9}{8}$

14 What are the roots of the equation

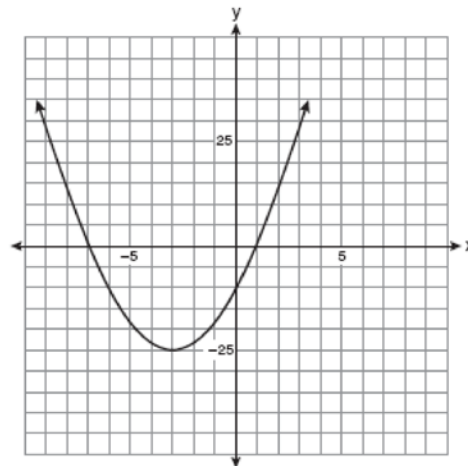
$$x^2 - 10x + 21 = 0?$$

- 1) 1 and 21
- 2) -5 and -5
- 3) 3 and 7
- 4) -3 and -7

15 Rhonda has \$1.35 in nickels and dimes in her pocket. If she has six more dimes than nickels, which equation can be used to determine  $x$ , the number of nickels she has?

- 1)  $0.05(x + 6) + 0.10x = 1.35$
- 2)  $0.05x + 0.10(x + 6) = 1.35$
- 3)  $0.05 + 0.10(6x) = 1.35$
- 4)  $0.15(x + 6) = 1.35$

16 Which equation represents the axis of symmetry of the graph of the parabola below?



- 1)  $y = -3$
- 2)  $x = -3$
- 3)  $y = -25$
- 4)  $x = -25$

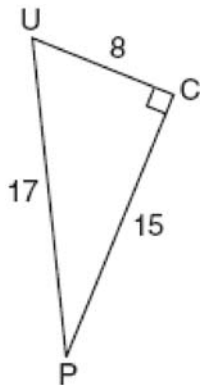
17 The set {1,2,3,4} is equivalent to

- 1)  $\{x \mid 1 < x < 4, \text{ where } x \text{ is a whole number}\}$
- 2)  $\{x \mid 0 < x < 4, \text{ where } x \text{ is a whole number}\}$
- 3)  $\{x \mid 0 < x \leq 4, \text{ where } x \text{ is a whole number}\}$
- 4)  $\{x \mid 1 < x \leq 4, \text{ where } x \text{ is a whole number}\}$

18 What is the value of  $x$  in the equation  $\frac{2}{x} - 3 = \frac{26}{x}$ ?

- 1) -8
- 2)  $-\frac{1}{8}$
- 3)  $\frac{1}{8}$
- 4) 8

19 The diagram below shows right triangle  $UPC$ .



Which ratio represents the sine of  $\angle U$ ?

- 1)  $\frac{15}{8}$
- 2)  $\frac{15}{17}$
- 3)  $\frac{8}{15}$
- 4)  $\frac{8}{17}$

20 What is  $\sqrt{72}$  expressed in simplest radical form?

- 1)  $2\sqrt{18}$
- 2)  $3\sqrt{8}$
- 3)  $6\sqrt{2}$
- 4)  $8\sqrt{3}$

21 What is  $\frac{6}{5x} - \frac{2}{3x}$  in simplest form?

- 1)  $\frac{8}{15x^2}$
- 2)  $\frac{8}{15x}$
- 3)  $\frac{4}{15x}$
- 4)  $\frac{4}{2x}$

22 Which ordered pair is a solution of the system of equations  $y = x^2 - x - 20$  and  $y = 3x - 15$ ?

- 1)  $(-5, -30)$
- 2)  $(-1, -18)$
- 3)  $(0, 5)$
- 4)  $(5, -1)$

23 A survey is being conducted to determine which types of television programs people watch. Which survey and location combination would likely contain the most bias?

- 1) surveying 10 people who work in a sporting goods store
- 2) surveying the first 25 people who enter a grocery store
- 3) randomly surveying 50 people during the day in a mall
- 4) randomly surveying 75 people during the day in a clothing store

24 The length of a rectangular room is 7 less than three times the width,  $w$ , of the room. Which expression represents the area of the room?

- 1)  $3w - 4$
- 2)  $3w - 7$
- 3)  $3w^2 - 4w$
- 4)  $3w^2 - 7w$

25 The function  $y = \frac{x}{x^2 - 9}$  is undefined when the value of  $x$  is

- 1) 0 or 3
- 2) 3 or  $-3$
- 3) 3, only
- 4)  $-3$ , only

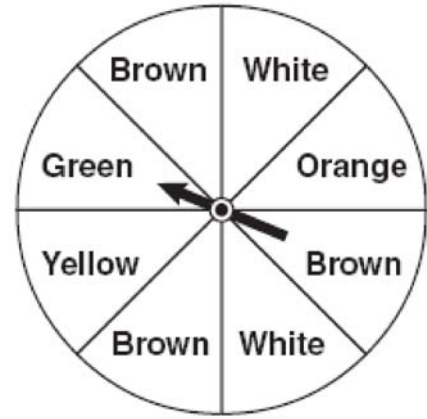
26 Which equation represents a line that is parallel to the line  $y = 3 - 2x$ ?

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

27 What is the product of  $8.4 \times 10^8$  and  $4.2 \times 10^3$  written in scientific notation?

- 1)  $2.0 \times 10^5$
- 2)  $12.6 \times 10^{11}$
- 3)  $35.28 \times 10^{11}$
- 4)  $3.528 \times 10^{12}$

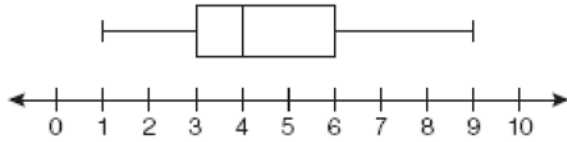
28 Keisha is playing a game using a wheel divided into eight equal sectors, as shown in the diagram below. Each time the spinner lands on orange, she will win a prize.



If Keisha spins this wheel twice, what is the probability she will win a prize on *both* spins?

- 1)  $\frac{1}{64}$
- 2)  $\frac{1}{56}$
- 3)  $\frac{1}{16}$
- 4)  $\frac{1}{4}$

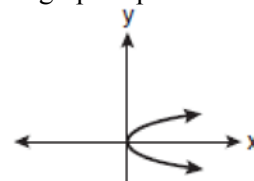
- 29 A movie theater recorded the number of tickets sold daily for a popular movie during the month of June. The box-and-whisker plot shown below represents the data for the number of tickets sold, in hundreds.



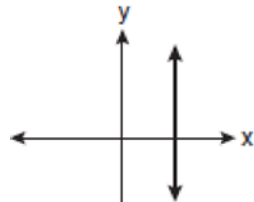
Which conclusion can be made using this plot?

- 1) The second quartile is 600.
- 2) The mean of the attendance is 400.
- 3) The range of the attendance is 300 to 600.
- 4) Twenty-five percent of the attendance is between 300 and 400.

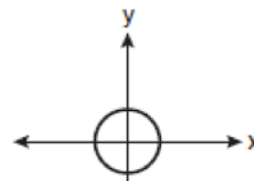
- 30 Which graph represents a function?



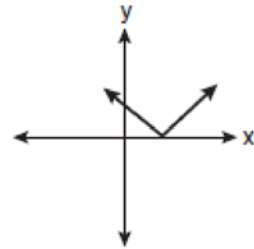
1)



2)

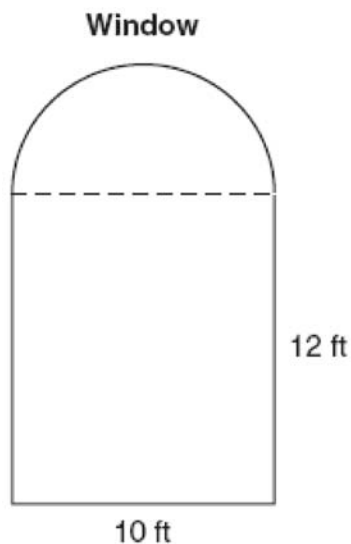


3)



4)

- 31 A window is made up of a single piece of glass in the shape of a semicircle and a rectangle, as shown in the diagram below. Tess is decorating for a party and wants to put a string of lights all the way around the outside edge of the window.



To the *nearest foot*, what is the length of the string of lights that Tess will need to decorate the window?

32 Simplify:  $\frac{27k^5 m^8}{(4k^3)(9m^2)}$

- 33 The table below represents the number of hours a student worked and the amount of money the student earned.

Number of Hours ( $h$ )	Dollars Earned ( $d$ )
8	\$50.00
15	\$93.75
19	\$118.75
30	\$187.50

Write an equation that represents the number of dollars,  $d$ , earned in terms of the number of hours,  $h$ , worked. Using this equation, determine the number of dollars the student would earn for working 40 hours.

- 34 Sarah measures her rectangular bedroom window for a new shade. Her measurements are 36 inches by 42 inches. The actual measurements of the window are 36.5 inches and 42.5 inches. Using the measurements that Sarah took, determine the number of square inches in the area of the window. Determine the number of square inches in the actual area of the window. Determine the relative error in calculating the area. Express your answer as a decimal to the *nearest thousandth*.

- 35 Perform the indicated operation and simplify:

$$\frac{3x+6}{4x+12} \div \frac{x^2-4}{x+3}$$

36 A soup can is in the shape of a cylinder. The can has a volume of  $342 \text{ cm}^3$  and a diameter of 6 cm. Express the height of the can in terms of  $\pi$ . Determine the maximum number of soup cans that can be stacked on their base between two shelves if the distance between the shelves is exactly 36 cm. Explain your answer.

37 Solve the following system of equations algebraically:

$$3x + 2y = 4$$

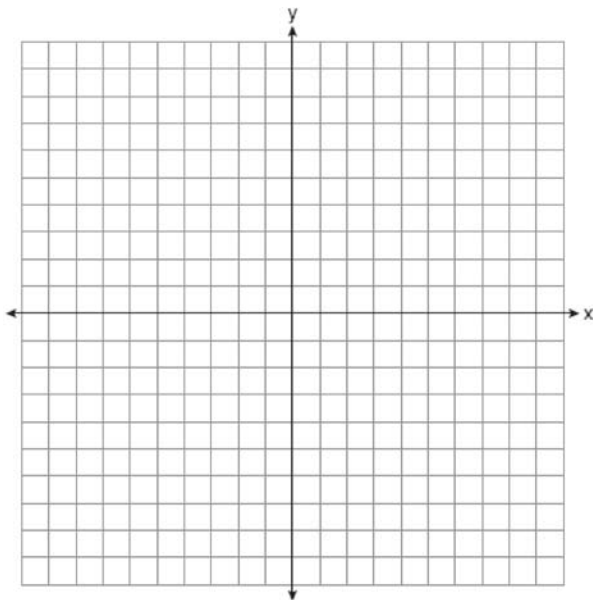
$$4x + 3y = 7$$

[Only an algebraic solution can receive full credit.]

38 On the set of axes below, graph the following system of inequalities and state the coordinates of a point in the solution set.

$$2x - y \geq 6$$

$$x > 2$$



39 A restaurant sells kids' meals consisting of one main course, one side dish, and one drink, as shown in the table below.

Kids' Meal Choices

Main Course	Side Dish	Drink
hamburger	French fries	milk
chicken nuggets	applesauce	juice
turkey sandwich		soda

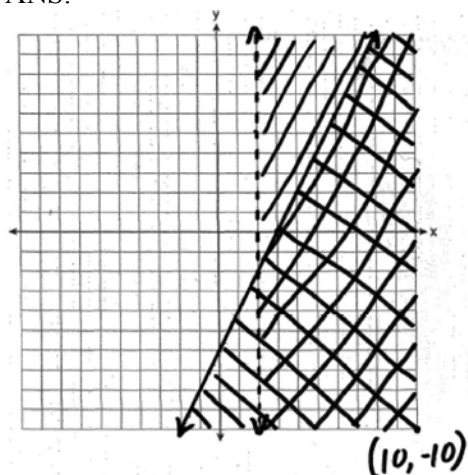
Draw a tree diagram or list the sample space showing all possible kids' meals. How many different kids' meals can a person order? Jose does not drink juice. Determine the number of different kids' meals that do *not* include juice. Jose's sister will eat *only* chicken nuggets for her main course. Determine the number of different kids' meals that include chicken nuggets.

**0109ia****Answer Section**

1	ANS: 3 TOP: Conversions	PTS: 2	REF: 010901ia	STA: A.M.2
2	ANS: 4 TOP: Speed	PTS: 2	REF: 010902ia	STA: A.M.1
3	ANS: 4 TOP: Theoretical Probability	PTS: 2	REF: 010903ia	STA: A.S.22
4	ANS: 1 TOP: Modeling Inequalities	PTS: 2	REF: 010904ia	STA: A.A.6
5	ANS: 1 TOP: Graphing Functions and Relations	PTS: 2	REF: 010905ia	STA: A.G.4
6	ANS: 3 TOP: Solving Equations with Fractional Expressions	PTS: 2	REF: 010906ia	STA: A.A.26
7	ANS: 4 TOP: Central Tendency	PTS: 2	REF: 010907ia	STA: A.S.4
8	ANS: 4 TOP: Exponential Functions	PTS: 2	REF: 010908ia	STA: A.A.9
9	ANS: 2 TOP: Factoring the Difference of Perfect Squares	PTS: 2	REF: 010909ia	STA: A.A.19
10	ANS: 3 TOP: Writing Linear Equations	PTS: 2	REF: 010910ia	STA: A.A.35
11	ANS: 2 TOP: Transforming Formulas	PTS: 2	REF: 010911ia	STA: A.A.23
12	ANS: 3 TOP: Using Trigonometry to Find a Side	PTS: 2	REF: 010912ia	STA: A.A.44
13	ANS: 2 TOP: Slope	PTS: 2	REF: 010913ia	STA: A.A.33
14	ANS: 3 TOP: Solving Quadratics by Factoring	PTS: 2	REF: 010914ia	STA: A.A.28
15	ANS: 2 TOP: Modeling Equations	PTS: 2	REF: 010915ia	STA: A.A.5
16	ANS: 2 TOP: Identifying the Vertex of a Quadratic Given Graph	PTS: 2	REF: 010916ia	STA: A.G.10
17	ANS: 3 TOP: Set Theory	PTS: 2	REF: 010917ia	STA: A.A.29
18	ANS: 1 TOP: Solving Rationals	PTS: 2	REF: 010918ia	STA: A.A.26
19	ANS: 2 TOP: Basic Trigonometric Ratios	PTS: 2	REF: 010919ia	STA: A.A.42
20	ANS: 3 TOP: Simplifying Radicals	PTS: 2	REF: 010920ia	STA: A.N.2
21	ANS: 2 TOP: Addition and Subtraction of Rationals	PTS: 2	REF: 010921ia	STA: A.A.17
22	ANS: 2 TOP: Quadratic-Linear Systems	PTS: 2	REF: 010922ia	STA: A.A.11

- 23 ANS: 1                   PTS: 2                   REF: 010923ia           STA: A.S.3  
TOP: Analysis of Data
- 24 ANS: 4                   PTS: 2                   REF: 010924ia           STA: A.A.1  
TOP: Geometric Applications of Quadratics
- 25 ANS: 2                   PTS: 2                   REF: 010925ia           STA: A.A.15  
TOP: Undefined Rationals
- 26 ANS: 1                   PTS: 2                   REF: 010926ia           STA: A.A.38  
TOP: Parallel and Perpendicular Lines
- 27 ANS: 4                   PTS: 2                   REF: 010927ia           STA: A.N.4  
TOP: Operations with Scientific Notation
- 28 ANS: 1                   PTS: 2                   REF: 010928ia           STA: A.S.23  
TOP: Probability of Independent Events
- 29 ANS: 4                   PTS: 2                   REF: 010929ia           STA: A.S.6  
TOP: Box-and-Whisker Plots
- 30 ANS: 4                   PTS: 2                   REF: 010930ia           STA: A.G.3  
TOP: Defining Functions
- 31 ANS:  
50
- PTS: 2                   REF: 010931ia           STA: A.G.1           TOP: Compositions of Polygons and Circles
- 32 ANS:  
 $\frac{3k^2m^6}{4}$
- PTS: 2                   REF: 010932ia           STA: A.A.12           TOP: Division of Powers
- 33 ANS:  
 $d = 6.25h, 250$
- PTS: 2                   REF: 010933ia           STA: A.N.5           TOP: Direct Variation
- 34 ANS:  
1,512, 1,551.25, 0.025
- PTS: 3                   REF: 010934ia           STA: A.M.3           TOP: Error
- 35 ANS:  
 $\frac{3}{4x-8}$
- PTS: 3                   REF: 010935ia           STA: A.A.18           TOP: Multiplication and Division of Rationals
- 36 ANS:  
 $\frac{38}{\pi}, 2$
- PTS: 3                   REF: 010936ia           STA: A.G.2           TOP: Volume
- 37 ANS:  
(-2,5)
- PTS: 4                   REF: 010937ia           STA: A.A.10           TOP: Solving Linear Systems

38 ANS:



PTS: 4

REF: 010938ia

STA: A.G.7

TOP: Systems of Linear Inequalities

39 ANS:

(H,F,M), (H,F,J), (H,F,S), (H,A,M), (H,A,J), (H,A,S), (C,F,M), (C,F,J), (C,F,S), (C,A,M), (C,A,J), (C,A,S), (T,F,M), (T,F,J), (T,F,S), (T,A,M), (T,A,J), (T,A,S). There are 18 different kids' meals, 12 do not include juice and 6 include chicken nuggets.

PTS: 4

REF: 010939ia

STA: A.S.19

TOP: Sample Space