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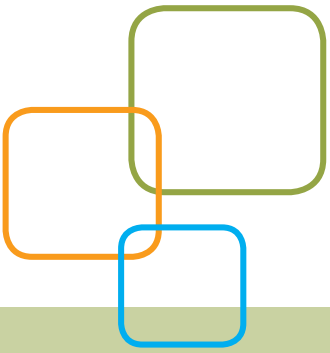


North Carolina Community College System

Diagnostic and Placement Test Sample Questions

CollegeBoard

North Carolina Community College System (NCCCS) Diagnostic and Placement Test

The NCCCS Diagnostic and Placement test contains 96 questions that measure proficiency in eight content areas. The eight content areas are as follows:

Operations with Integers — Topics covered in this category include:

- Problem events that require the use of integers and integer operations
- Basic exponents, square roots and order of operations
- Perimeter and area of rectangles and triangles
- Angle facts and the Pythagorean Theorem

Fractions and Decimals — Topics covered in this category include:

- Relationships between fractions and decimals
- Problem events that result in the use of fractions and decimals to find a solution
- Operations with fractions and decimals
- Circumference and area of circles
- The concept of π
- Application problems involving decimals

Proportions, Ratios, Rates and Percentages — Topics covered in this category include:

- Conceptual application problems containing ratios, rates, proportions and percentages
- Applications using U.S. customary and metric units of measurement
- Geometry of similar triangles

Expressions, Linear Equations and Linear Inequalities — Topics covered in this category include:

- Graphical and algebraic representations of linear expressions, equations and inequalities
- Application problems using linear equations and inequalities

Graphs and Equations of Lines — Topics covered in this category include:

- Graphical and algebraic representations of lines
- Interpretation of basic graphs (line, bar, circle, etc.)

Polynomials and Quadratic Applications — Topics in this category include:

- Graphical and algebraic representations of quadratics
- Finding algebraic solutions to contextual quadratic applications
- Polynomial operations
- Factoring polynomials
- Applying factoring to solve polynomial equations

Rational Expressions and Equations — Topics covered in this category include:

- Graphical and algebraic representations of rational equations
- Finding algebraic solutions to contextual rational applications
- Identifying and simplifying rational expressions

Radical Expressions and Equations — Topics covered in this category include:

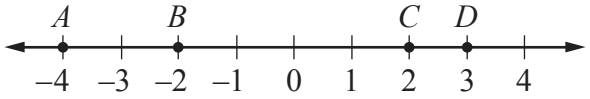
- Manipulating radicals to solve real-world applications involving radical equations
- Simplifying and performing operations with radical expressions and rational exponents

Operations with Integers

For each of the questions below, choose the best answer from the four choices given. You may use the paper you received as scratch paper.

1. On a summer day in Benton, the low temperature of 75°F was reached at 6 in the morning. The high temperature was reached 9 hours later, after the temperature rose 16°F. What was the high temperature in Benton that day?

   A. 81°F
   B. 84°F
   C. 91°F
   D. 96°F



2. Which of the four labeled points on the number line above has the greatest absolute value?

   A. *A*
   B. *B*
   C. *C*
   D. *D*

3. $(-2-4)\times 8 =$

   A. –48
   B. –16
   C. 16
   D. 48

4. The sum of Cheryl's scores on the first four quizzes in her history class was 364 points. If she scores 96 points on her next quiz, what will be her average score for the five quizzes?

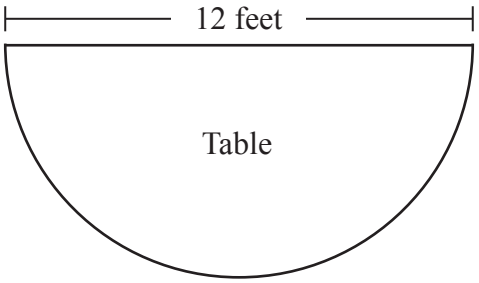
   A. 89 points
   B. 91 points
   C. 92 points
   D. 94 points

5. $\sqrt{529} =$

   A. 17
   B. 23
   C. 26
   D. 27

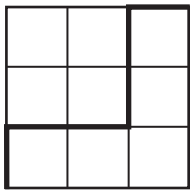
Fractions and Decimals

For each of the questions below, choose the best answer from the four choices given. You may use the paper you received as scratch paper.



1. A large dining room table is in the shape of a semicircle of diameter 12 feet, as shown above. Of the following, which is closest to the area of the table? (Use $\pi = 3.14$.)

   A. 38 square feet
   B. 57 square feet
   C. 75 square feet
   D. 113 square feet



2. The large square above has area 9 and is divided into 9 smaller squares of equal area. What is the length of the path drawn in bold?

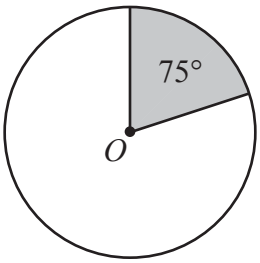
   A. 3
   B. 4
   C. 5
   D. 6

3. $0.6 \div 10^{-2} =$

   A. 60
   B. 6
   C. 0.06
   D. 0.006

4. $3,590 =$

   A. 3.59×10^{5}
   B. 3.59×10^{4}
   C. 3.59×10^{3}
   D. 3.59×10^{2}



5. The circle above has center O. The fraction of the area of the circle that is shaded represents a value on the number line between

   A. $\frac{2}{25}$ and $\frac{3}{25}$
   B. $\frac{3}{25}$ and $\frac{4}{25}$
   C. $\frac{4}{25}$ and $\frac{5}{25}$
   D. $\frac{5}{25}$ and $\frac{6}{25}$

Proportions, Ratios, Rates and Percentages

For each of the questions below, choose the best answer from the four choices given. You may use the paper you received as scratch paper.

1. During a basketball practice, two players, Sidell and Jeron, each attempted 25 free throws. Sidell made 40% of his free-throw attempts, whereas Jeron made 52% of them. How many more free-throws did Jeron make than Sidell?

   A. 3
   B. 4
   C. 5
   D. 6

2. A boy skis 4 miles down a mountain slope in 10 minutes. What is his average speed, in miles per hour (mph), over that time interval?

   A. 48 mph
   B. 36 mph
   C. 32 mph
   D. 24 mph

3. There are 23 children in a line to buy a hot dog. If every 4th child in line, starting with the fourth in line, gets a toy, what is the ratio of the number of children in line who get a toy to the number of children in line who do not get a toy?

   A. 3 : 8
   B. 5 : 23
   C. 5 : 18
   D. 6 : 23

4. 52 is what percent of 160?

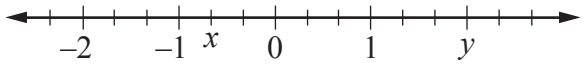
   A. 30%
   B. 32.5%
   C. 35%
   D. 38.5%

5. Jenna is driving at a speed of 65 miles per hour. What is Jenna's driving speed in kilometers per hour? (There are about 1.6 kilometers in 1 mile.)

   A. 112 kilometers per hour
   B. 104 kilometers per hour
   C. 96 kilometers per hour
   D. 92 kilometers per hour

Expressions, Linear Equations and Linear Inequalities

For each of the questions below, choose the best answer from the four choices given. You may use the paper you received as scratch paper.



1. The tick marks on the number line above are equally spaced. The expression $y^2 + 2x$ is equal to

   A. $-\frac{8}{3}$

   B. 0

   C. $\frac{8}{3}$

   D. $\frac{16}{3}$

2. A party supply store charges an initial charge of $\$20$ to rent a costume plus an additional $\$8$ per day for each day the costume is rented. Which of the following represents the cost, in dollars, to rent a costume for n days?

   A. $8n$
   B. $20 + 8n$
   C. $(20)(8n)$
   D. $20 - 8n$

3. Julie purchased a treadmill that originally cost t dollars at a discount of 8%. Which of the following represents the amount, in dollars, that Julie paid for the treadmill after the discount?

   A. $t - 0.8t$
   B. $t + 0.08$
   C. $t + 0.08t$
   D. $t - 0.08t$

4. A long distance cell phone service offers a plan that costs $\$20$ per month plus $\$0.40$ per minute of use. Which of the following represents the total cost of this service for a month in which n minutes were used?

   A. $(20)(0.04n)$
   B. $20.40n$
   C. $20 + .4n$
   D. $20 + 4n$

5. If $\frac{x}{3} - 2 = 5x - 2$, then $x =$

   A. $-\frac{3}{5}$

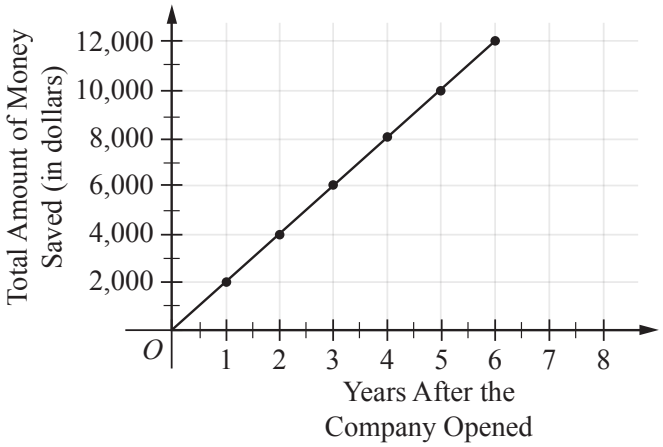
   B. 0

   C. $\frac{5}{3}$

   D. 15

Graphs and Equations of Lines

For each of the questions below, choose the best answer from the four choices given. You may use the paper you received as scratch paper.

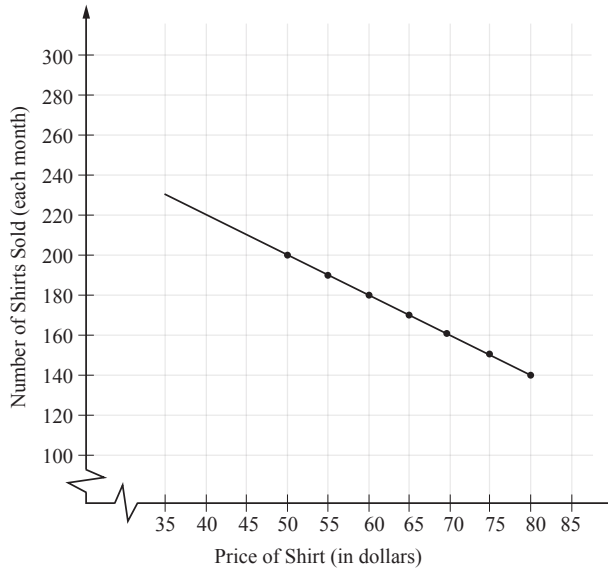


1. The linear equation graphed above gives the amount of money Company H has saved y years after the company opened. According to the graph, how many years after the company opened did they save $\$10,000$?

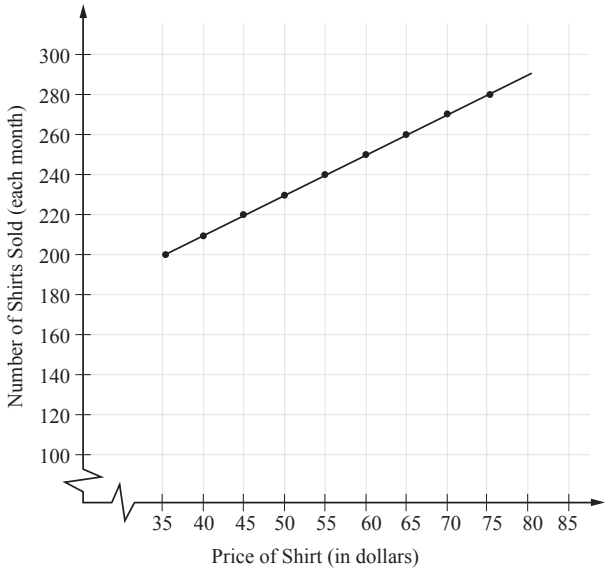
   A. 1
   B. 4
   C. 5
   D. 6

2. Anita's department store determined that if a specific shirt is priced at $\$50$ each, on average there would be 200 shirts sold each month the shirt is available for sale. The number of shirts sold per month would decrease by 10 for each $\$5$ of increase in the price. If p presents the price of the shirt, in dollars, and s represents the average number of shirts sold per month, which of the following graphs best represents the relationship between p and s?

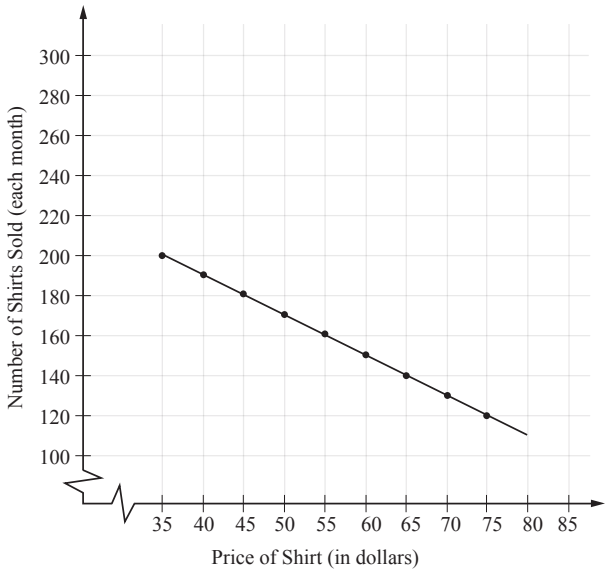
   A.



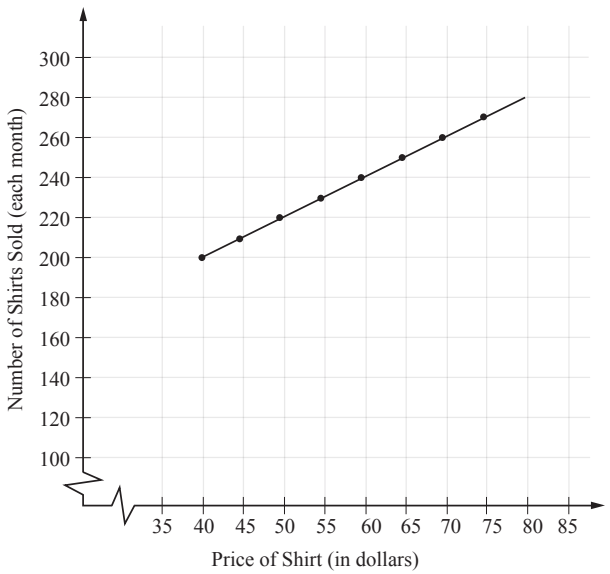
   B.



   C.



   D.



3. A computer help-service charges an initial fee to join the service plus an additional charge for each hour of help-service a customer uses. If the computer service company charges a total of $\$140$ for the initial fee and a 2-hour help session and a total of $\$220$ for the initial fee and a 4-hour help session, which of the following expressions gives the computer company's charge for each hour of help-service that a customer uses?

   A. $\dfrac{\$220-\$140}{4-2}$

   B. $\dfrac{\$220+\$140}{4+2}$

   C. $\dfrac{4-2}{\$220-\$140}$

   D. $\dfrac{4+2}{\$220+\$140}$

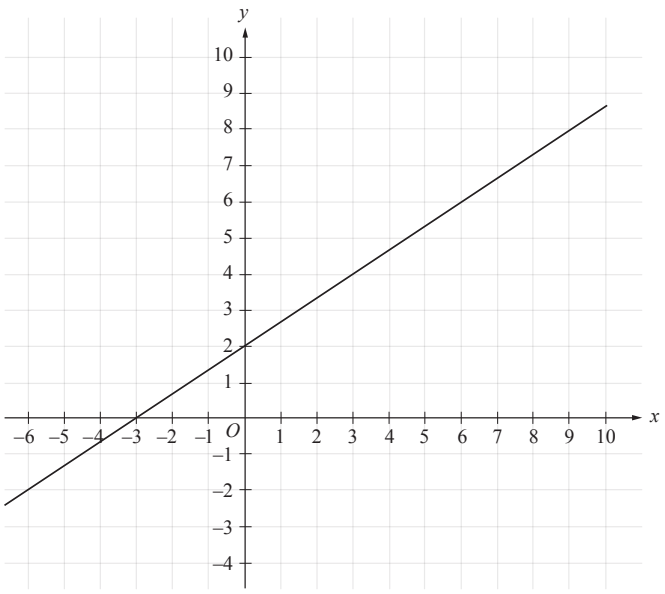
4. Jen scored 16 points in a new card game, where each player could receive either 2 or 4 points in each round. If Jen received x amount of 2 point scores, and y amount of 4 point scores, what does the x-intercept of the graph in the xy-plane of the equation $2x+4y=16$ indicate?

   A. Jen scored 2 points in 8 rounds and she didn't score 4 points in any round.

   B. Jen scored 2 points in 2 rounds and 4 points in 3 rounds.

   C. Jen scored 2 points in 4 rounds and 4 points in 2 rounds.

   D. Jen didn't score 2 points in any round, but she scored 4 points in 4 rounds.



5. Which of the following is true about the line graphed in the xy-plane above?

   A. The line has slope $\dfrac{2}{3}$ and y-intercept -3.

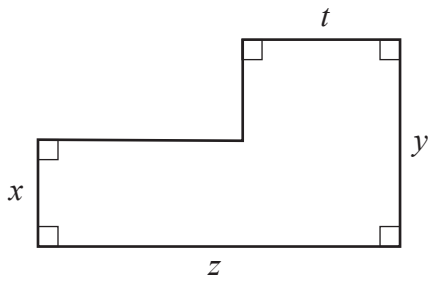
   B. The line has slope $\dfrac{2}{3}$ and y-intercept 2.

   C. The line has slope $\dfrac{3}{2}$ and y-intercept -3.

   D. The line has slope $\dfrac{3}{2}$ and y-intercept 2.

Polynomials and Quadratic Applications

For each of the questions below, choose the best answer from the four choices given. You may use the paper you received as scratch paper.



1. All of the line segments in the figure above meet at right angles, and the lengths of four of the six sides are given. Which of the following represents the area of the figure, in terms of x, t, y, and z ?

   A. $yz - xt$
   B. $xz + ty$
   C. $xz - xt + ty$
   D. $xz + xt + ty$

2. $(xy^3z^4)(x^{-4}y^{-3}z^{-1}) =$

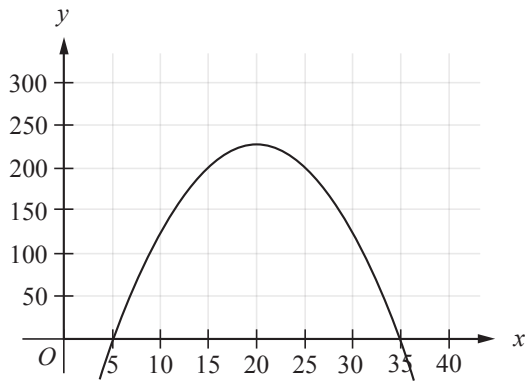
   A. $\frac{z}{x}$
   B. $\left(\frac{z}{x}\right)^3$
   C. $y\left(\frac{z}{x}\right)$
   D. $y\left(\frac{z}{x}\right)^3$

3. $\left(\frac{a}{2} - b\right)^2$

   A. $\frac{a^2}{2} - ab + b^2$
   B. $\frac{a^2}{2} - 2ab + b^2$
   C. $\frac{a^2}{4} - ab + b^2$
   D. $\frac{a^2}{4} - 2ab + b^2$

4. If $x^2 - 3x - 18 = 0$, which if the following is a possible value for of x ?

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



5. The function $f(x) = -x^2 + 40x - 175$ is graphed in the xy -plane above. For what value of x is the value of $f(x)$ greatest?

   A. 5
   B. 20
   C. 30
   D. 35

Rational Expressions and Equations

For each of the questions below, choose the best answer from the four choices given. You may use the paper you received as scratch paper.

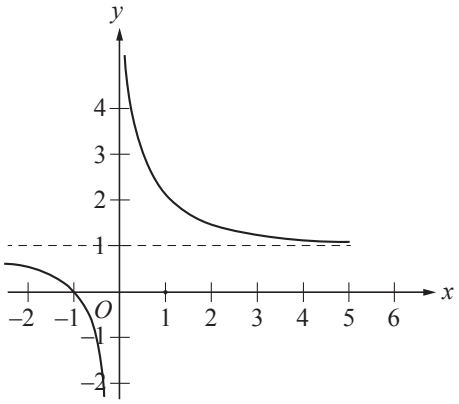
1. Kayla is going to bike the entire length of a 90-mile scenic bike path. She will take a 1-hour break during her ride. If Kayla's average speed while biking is s miles per hour, how many hours will it take from the time she leaves the start of the bike path until she reaches the end of the bike path?

   A. $\frac{90}{s-1}$

   B. $\frac{90}{s+1}$

   C. $\frac{90}{s}-1$

   D. $\frac{90}{s}+1$



2. Which of the following could be an equation of the function graphed in the xy-plane above?

   A. $y=\frac{1}{x}$

   B. $y=\frac{1}{x}+1$

   C. $y=\frac{1}{x-1}$

   D. $y=\frac{1}{x+1}$

3. $(x+9)\left(\frac{1}{x^2+2x-63}\right)=$

   A. $x-7$

   B. $x+7$

   C. $\frac{1}{x-7}$

   D. $\frac{1}{x+7}$

4. $\frac{1}{y}+\frac{1}{y^2}=$

   A. $\frac{1}{y^2+y}$

   B. $\frac{2}{y^2+y}$

   C. $\frac{y+1}{y^2}$

   D. $\frac{2y+1}{y^2}$

5. If $\frac{1}{x+1}+\frac{3}{x-3}=\frac{8}{x^2-2x-3}$, then $x=$

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

   B. 0

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

   D. 2

Radical Expressions and Equations

For each of the questions below, choose the best answer from the four choices given. You may use the paper you received as scratch paper.

1. The formula $v = \sqrt{30fd}$ is used to estimate the speed v, in miles per hour, a car was traveling if it skids d feet after the application of its brakes. The number f is a coefficient that measures the "slipperiness" of the road. If a car skids 55 feet and $f = 0.9$, how fast was the car traveling when its brakes were applied? (Round your answer to the nearest tenth of a mile per hour.)

   A. 38.5 mph
   B. 42.6 mph
   C. 45.0 mph
   D. 48.5 mph

2. $(49x)^{-\frac{1}{2}} =$

   A. $-7\sqrt{x}$
   B. $\dfrac{7}{\sqrt{x}}$
   C. $\dfrac{1}{7\sqrt{x}}$
   D. $\dfrac{1}{49\sqrt{x}}$

3. $\sqrt{27} + \sqrt{300} =$

   A. $3\sqrt{3} + 10$
   B. $3\sqrt{103}$
   C. $9\left(\sqrt{3} + 10\right)$
   D. $13\sqrt{3}$

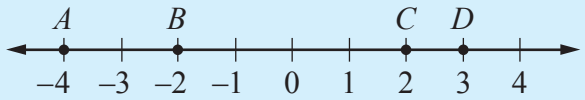
4. If x and y are positive numbers, then $\left(\sqrt{x^5 y}\right)\left(\sqrt{x^{-3} y^{-1}}\right) =$

   A. x
   B. xy
   C. $x^2 y$
   D. $\dfrac{x}{y}$

5. If $\sqrt{x^2 - 3x - 10} = x - 2$, what is the value of x?

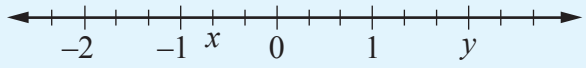
   A. 12
   B. 14
   C. 16
   D. 20

Answer Key

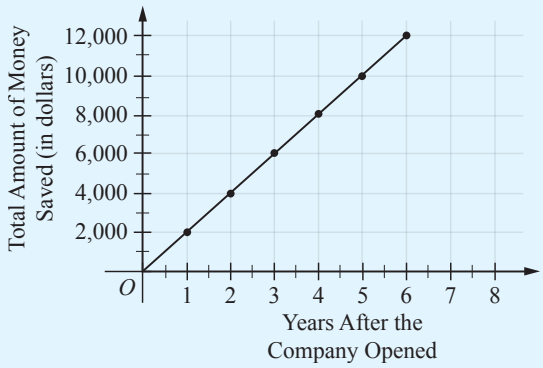
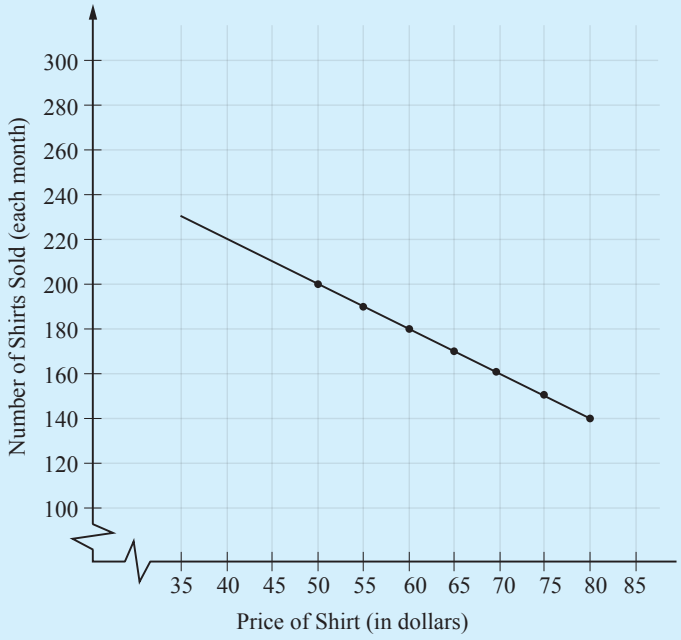
Operations with Integers		
Question Number	**Correct Answer**	**Rationale**
1	**C**	Choice (C) is correct. The low temperature of $75°\text{F}$ was reached at 6 in the morning, and the high temperature was $16°\text{F}$ higher. So the high temperature in Benton that day was $75°\text{F} + 16°\text{F} = 91°\text{F}$.
2	**A**	 Choice (A) is correct. The absolute value of point A is $\lvert -4 \rvert = 4$. The absolute values of points C and D, respectively, are $\lvert -2 \rvert = 2$, $\lvert 2 \rvert = 2$ and $\lvert 3 \rvert = 3$. Therefore, of the four labeled points, point A has the greatest absolute value.
3	**A**	Choice (A) is correct. The value of $-2 - 4$ is $-2 + (-4) = -6$. Therefore, $(-2 - 4) \times 8 = -6 \times 8 = -48$.
4	**C**	Choice (C) is correct. Cheryl's average score for the five quizzes will be the sum of the scores divided by 5, the number of quizzes. She scored a total of 364 points on the first four quizzes, and if she scores 96 points on her next quiz, the sum of the scores will be $364 + 96 = 460$ points. Therefore, her average score for the five quizzes will be $460 \div 5 = 92$ points.
5	**B**	Choice (B) is correct. The square root of 529, denoted $\sqrt{529}$, is 23, because $23^2 = 23 \times 23 = 529$.

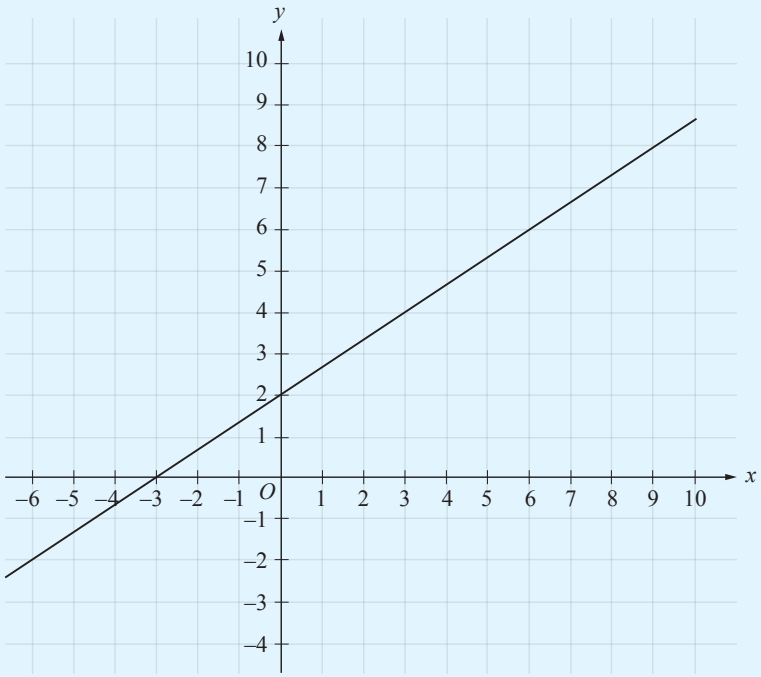
Fractions and Decimals		
Question Number	**Correct Answer**	**Rationale**
1	**B**	Choice (B) is correct. Since the table is a semicircle of diameter 12 feet, the radius of the semicircle is 6 feet. The area of the table is $\frac{1}{2}\times\pi\times 6^2$ square feet, or approximately $18\times 3.14 = 56.52$ square feet. Therefore, of the choices given, the closest to the area of the table is choice (B), 57 square feet.
2	**D**	Choice (D) is correct. Since the large square has area 9, each of its sides is of length 3. Hence each of the 9 smaller squares has sides of length 1. Since the path drawn in bold is made up of six of the sides of smaller squares, its length is $6\times 1 = 6$.
3	**A**	Choice (A) is correct. The division $0.6\div 10^{-2}$ is equivalent to the multiplication $0.6\times\frac{1}{10^{-2}} = 0.6\times 10^2 = 0.6\times 100 = 60$.
4	**C**	Choice (C) is correct. The number $3{,}590$ is equal to the product $3.59\times 1{,}000$, which can be rewritten as 3.59×10^3.
5	**D**	Choice (D) is correct. Since a circle has 360 degrees of arc, the shaded 75-degree sector of the circle represents $\frac{75}{360} = \frac{5}{24}$ of the circle, which is equal to the decimal $0.208\overline{3}$. This value lies between $\frac{5}{25} = 0.20$ and $\frac{6}{25} = 0.24$ on the number line.

Proportions, Ratios, Rates and Percentages		
Question Number	**Correct Answer**	**Rationale**
1	**A**	Choice (A) is cworrect. Since 40% of 25 is $\frac{40}{100}\times 25=10$, and 52% of 25 is $\frac{52}{100}\times 25=13$, Jeron made 3 more free-throws attempts than Sidell did.
2	**D**	Choice (D) is correct. Since there 60 minutes in an hour, the 10-minute interval is equivalent to $\frac{1}{6}$ of an hour. The boy's average speed can be calculated as $\frac{\text{number of miles skied}}{\text{time}}$, which is $\frac{4}{\frac{1}{6}}=4\times\frac{6}{1}=24$ miles per hour.
3	**C**	Choice (C) is correct. Since every 4th child in line, starting with the fourth in line, gets a toy, it follows that the children who get a toy are in line in positions 4, 8, 12, 16 and 20. Hence, of the 23 children in the line, 5 get a toy, and $23-5=18$ do not get a toy. Therefore, the ratio of the number of children in line who get a toy to the number of children in line who do not get a toy is $5:18$.
4	**B**	Choice (B) is correct. Since $\frac{52}{160}=\frac{13}{40}=0.325$, it follows that 52 is 32.5 percent of 160.
5	**B**	Choice (B) is correct. Since there are about 1.6 kilometers in 1 mile, it follows that Jenna's speed in kilometers per hour is $65\times 1.6=104$ kilometers per hour.

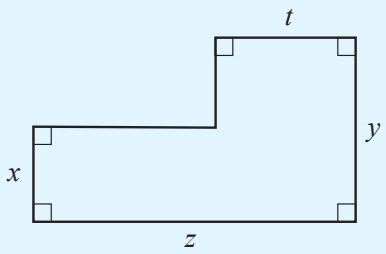
Expressions, Linear Equations and Linear Inequalities		
Question Number	**Correct Answer**	**Rationale**
1	**C**	 Choice (C) is correct. The value of x on the number line is $-\frac{2}{3}$, and the value of y on the number line is 2. Substituting these values into the expression y^2+2x gives $2^2+2\left(-\frac{2}{3}\right)=4-\frac{4}{3}=\frac{8}{3}$.
2	**B**	Choice (B) is correct. The rental fee for the costume consists of the initial charge of $\$20$ and a daily charge of $\$8$. Thus if the costume is rented for n days, the total cost, in dollars, is $20+8n$.
3	**D**	Choice (D) is correct. If the original cost of the treadmill is t dollars, an 8% discount on that price is $0.08t$ dollars. Therefore, the discounted price is the original price, in dollars, minus the discount, which is $t-0.08t$.
4	**C**	Choice (C) is correct. The cost, in dollars, of n minutes of use is $0.4n$. Therefore, the total cost of this service, in dollars, for a month in which n minutes were used is $20+0.4n$.
5	**B**	Choice (B) is correct. The equation $\frac{x}{3}-2=5x-2$ is equivalent to $\frac{x}{3}=5x$. Multiplying both sides of this equation by 3 gives $15x=x$. It follows that $14x=0$, so $x=0$.

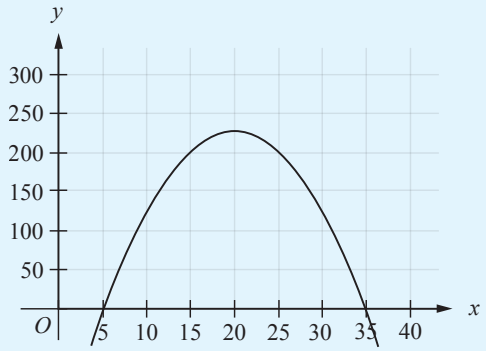
Graphs and Equations of Lines

Question Number	Correct Answer	Rationale
1	C	 Choice (C) is correct. The y-value represents the total amount of money that the company saved. From the graph, after 5 years the company was opened, they saved $10,000.
2	A	 Choice (A) is correct. The graph in (A) is a line with a slope of –10 that contains the point (50, 200).
3	A	Choice (A) is correct. The expression $\frac{\$220-\$140}{4-2}$ represents the difference of dollars charged for two different help sessions divided by the difference in the number of hours of help-service used, giving the amount, in dollars, the company charges for each hour of help-service a customer uses.

4	**A**	Choice (A) is correct. Since y represents the amount of points Jen scored, and the x-intercept is the value of x that satisfies equation $2x+4y=16$ when $y=0$, Jen must have scored only 2 points each round. Since she scored a total of 16 points, she must have scored 2 points in 8 rounds.
5	**B**	 Choice (B) is correct. The y-value of the line increases 2 units for every 3 units of increase in the x-value. Therefore, the slope of the line is $\frac{2}{3}$. The line also intersects the y-axis at 2, and therefore the y-intercept is 2.

Polynomials and Quadratic Applications

Question Number	Correct Answer	Rationale
1	C	 Choice (C) is correct. The figure can be divided into three nonoverlapping rectangles. One has area $x(z-t)$, one has area $t(y-x)$ and one has area xt. The sum of the areas is then $(xz-xt)+(ty-tx)+tx=xz-xt+ty$.
2	B	Choice (B) is correct. By the law of exponents, $(xy^3z^4)(x^{-4}y^{-3}z^{-1})=x^{(1-4)}y^{(3-3)}z^{(4-1)}$. Therefore, $(xy^3z^4)(x^{-4}y^{-3}z^{-1})=x^{-3}y^0z^3$. This is equivalent to $\frac{z^3}{x^3}=\left(\frac{z}{x}\right)^3$.
3	C	Choice (C) is correct. By definition, the expression $\left(\frac{a}{2}-b\right)^2$ is $\left(\frac{a}{2}-b\right)\left(\frac{a}{2}-b\right)$. This expression is equivalent to $\left(\frac{a}{2}\right)^2-b\left(\frac{a}{2}\right)-\left(\frac{a}{2}\right)b+b^2$. It follows that $\left(\frac{a}{2}-b\right)^2$ is equivalent to $\left(\frac{a}{2}\right)^2-\frac{ab}{2}-\frac{ab}{2}+b^2$, which simplifies to $\frac{a^2}{4}-ab+b^2$.
4	C	Choice (C) is correct. The expression $x^2-3x-18$ factors as $(x-6)(x+3)$. Since $x^2-3x-18=0$, either $x-6=0$ or $x+3=0$. It follows that $x=6$ or $x=-3$. Of the options given, only 6 is a possible value for x.

5	**B**	 Choice (B) is correct. The quadratic expression $-x^2+40x-175$ factors as $(x-5)(35-x)$. It follows that the graph of $f(x)=-x^2+40x-175$ intersects the x-axis at $x=5$ and at $x=35$. The greatest value of $f(x)$ occurs at the vertex, and the x-coordinate of the vertex of the parabola is the point halfway between 5 and 35 on the x-axis. This is $5+\frac{35-5}{2}=20$. So the value of x for which $f(x)$ is greatest is $x=20$.

Rational Expressions and Equations		
Question Number	**Correct Answer**	**Rationale**
1	**D**	Choice (D) is correct. Since Kayla's average speed while biking is s miles per hour, it will take her $\frac{90}{s}$ hours of biking to ride the entire 90-mile bike path. In addition to this time, Kayla's break will add 1 hour to the time it takes her to reach the end of the bike path. Therefore, it will take Kayla $\frac{90}{s}+1$ hours from the time she leaves the start of the bike path until she reaches the end of the bike path.
2	**B**	Choice (B) is correct. The graph could be of a rational function that is not defined at $x=0$ and has a horizontal asymptote at $y=1$. Of the given choices, (A) $y=\frac{1}{x}$ and (B) $y=\frac{1}{x}+1$ are not defined at $x=0$, and of these, only (B) $y=\frac{1}{x}+1$ has a horizontal asymptote at $y=1$. Therefore, of the given choices, only (B) $y=\frac{1}{x}+1$ could be an equation of the graph shown.
3	**C**	Choice (C) is correct. The quadratic expression $x^2+2x-63$ factors as $x^2+2x-63=(x+9)(x-7)$, and so $(x+9)\left(\frac{1}{x^2+2x-63}\right)$ can be rewritten as $(x+9)\left(\frac{1}{(x+9)(x-7)}\right)=\frac{1}{x-7}$.
4	**C**	Choice (C) is correct. The expression $\frac{1}{y}$ can be rewritten as $\frac{y}{y^2}$, and so $\frac{1}{y}+\frac{1}{y^2}$ can be rewritten as $\frac{y}{y^2}+\frac{1}{y^2}=\frac{y+1}{y^2}$.
5	**D**	Choice (D) is correct. Since $x^2-2x-3=(x+1)(x-3)$, the equation $\frac{1}{x+1}+\frac{3}{x-3}=\frac{8}{x^2-2x-3}$ can be rewritten as $\frac{x-3}{x^2-2x-3}+\frac{3(x+1)}{x^2-2x-3}=\frac{8}{x^2-2x-3}$, or $\frac{4x}{x^2-2x-3}=\frac{8}{x^2-2x-3}$. It follows that $4x=8$, or $x=2$.

Radical Expressions and Equations		
Question Number	**Correct Answer**	**Rationale**
1	**A**	Choice (A) is correct. Substituting 55 for d and 0.9 for f in the formula $v = \sqrt{30fd}$ gives $v = \sqrt{(30)(0.9)(55)} \approx 38.54$ miles per hour, which, to the nearest tenth, rounds to 38.5 miles per hour.
2	**C**	Choice (C) is correct. For any nonzero number a and rational number $\frac{m}{n}$, where m and n are integers and $n > 0$, the expression $a^{-\frac{m}{n}}$ is defined as $\frac{1}{\sqrt[n]{a^m}}$. Therefore, $(49x)^{-\frac{1}{2}} = \frac{1}{\sqrt{49x}} = \frac{1}{7\sqrt{x}}$.
3	**D**	Choice (D) is correct. Since $\sqrt{27} = \sqrt{9 \times 3} = 3\sqrt{3}$ and $\sqrt{300} = \sqrt{100 \times 3} = 10\sqrt{3}$, it follows that $\sqrt{27} + \sqrt{300} = 13\sqrt{3}$.
4	**A**	Choice (A) is correct. If x and y are positive numbers, then $\left(\sqrt{x^5 y}\right)\left(\sqrt{x^{-3} y^{-1}}\right) = \sqrt{\left(x^5 y\right)\left(x^{-3} y^{-1}\right)} = \sqrt{x^2} = x.$
5	**B**	Choice (B) is correct. Squaring both sides of the equation $\sqrt{x^2 - 3x - 10} = x - 2$ gives $x^2 - 3x - 10 = x^2 - 4x + 4$, which simplifies to $x = 14$. Substituting 14 for x in the original equation, one can see that 14 is a solution of the equation. Therefore, the value of x is 14.