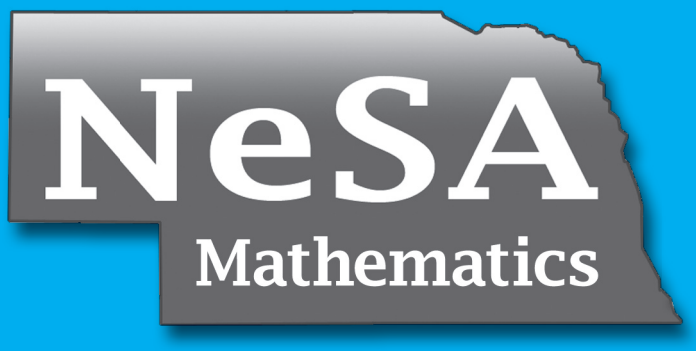


Nebraska State Accountability

Grade 11

Mathematics

Practice Test

Name:

Nebraska Department of Education 2014

Directions:

On the following pages are multiple-choice questions for the Grade 11 Practice Test, a practice opportunity for the *Nebraska State Accountability–Mathematics (NeSA–M).*

Each question will ask you to select an answer from among four choices.

For all questions:

- Read each question carefully and choose the best answer.
- You may use scratch paper to solve the problems.
- The Mathematics Reference Sheet is provided in the back of the test booklet. You may refer to this page any time during the test.
- You may not use a calculator on this test.
- Be sure to answer ALL the questions.

Only one of the answers provided is the correct response.

STOP.

1. **Use the table below to answer the question.**

Trip	Hours	Miles	Average Speed
1	5 hours	300 miles	? mph
2	11 hours	600 miles	? mph
3	15 hours	800 miles	? mph
4	20 hours	1150 miles	? mph

Charlie kept track of the number of miles and the number of hours he drove for four different trips. On which trip was Charlie's average speed the greatest?

A. trip 1

B. trip 2

C. trip 3

D. trip 4

2. A pump sold with a 40 liter fish tank can empty the full tank in 1 hour. What is an equivalent rate, in liters per minute?

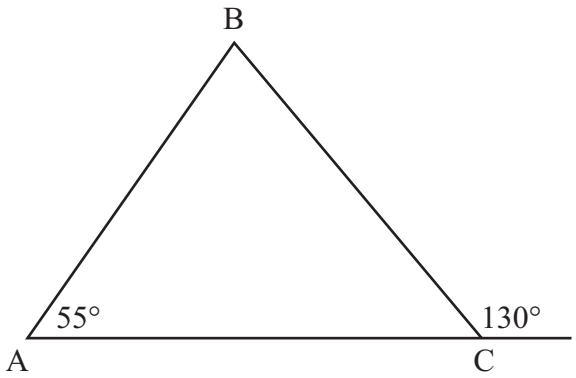
A. $\frac{1}{3}$ liter per minute

B. $\frac{2}{3}$ liter per minute

C. 1 liter per minute

D. $1\frac{1}{2}$ liters per minute

3. **Use the triangle below to answer the question.**



What is the measure of ∠ABC?

A. 50°

B. 55°

C. 70°

D. 75°

4. Justin has 44 coins in a jar. The coins are all pennies, nickels, or dimes. There are 3 times as many pennies as there are dimes. There are 2 fewer nickels than there are dimes. Which equation can be used to model the number of dimes in the jar?

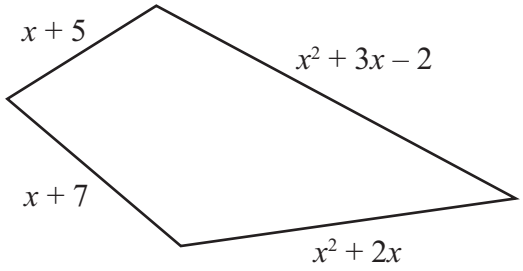
A. $3x + (x + 2) + x = 44$

B. $3x + (x - 2) + x = 44$

C. $3x(x + 2)x = 44$

D. $3x(x - 2)x = 44$

5. **Use the figure below to answer the question.**



The figure shows the lengths of the four sides of a quadrilateral. Which expression represents the perimeter of the quadrilateral?

A. $2x^2 + 7x + 10$

B. $2x^2 + 7x + 14$

C. $2x^4 + 7x^2 + 14$

D. $2x^4 + 7x^2 + 10$

6. The midpoint of $\overline{AB}$ is $(-3, 2)$ and the coordinates of point A are $(1, -2)$. What are the coordinates of point B?

A. $(-1, 0)$

B. $(0, -1)$

C. $(-7, 6)$

D. $(6, -7)$

7. Which equation is equivalent to $y - 3 = 2(x - 7)$?

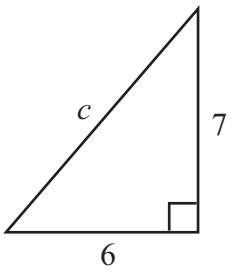
A. $y = 2x - 17$

B. $y = 2x - 11$

C. $y = 2x - 10$

D. $y = 2x - 4$

8. **Use the diagram below to answer the question.**



What is the value of c to the nearest integer?

A. 5

B. 7

C. 9

D. 11

9. Using a spinner to select each digit, a student randomly selects a three-digit number. The spinner is divided into ten equal sections numbered 0 through 9. The digit zero cannot be used in the hundreds place. What is the probability that the student selects 213?

A. $\frac{1}{1,000}$

B. $\frac{1}{900}$

C. $\frac{1}{30}$

D. $\frac{1}{29}$

10. **Use the table below to answer the question.**

x	$f(x)$
–1	1
2	10
5	19

Which linear function represents $f(x)$?

A. $f(x) = \frac{1}{3}x - \frac{4}{3}$

B. $f(x) = \frac{1}{3}x + \frac{16}{3}$

C. $f(x) = 3x + 4$

D. $f(x) = 3x + 12$

11. Which expression is equivalent to $(3x^2y^5)(-4x^4y^3)$?

A. $-1x^6y^8$

B. $-1x^8y^{15}$

C. $-12x^6y^8$

D. $-12x^8y^{15}$

12. The probability of drawing a red card is 0.4. The probability of drawing a card with a star on it is 0.1. Drawing a red card and drawing a card with a star on it are mutually exclusive events. What is the probability of drawing a red card with a star on it?

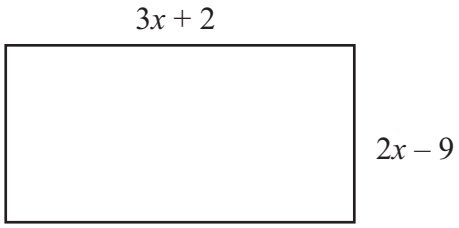
A. 0

B. 0.04

C. 0.5

D. 1

13. **Use the figure below to answer the question.**



The area of the rectangle is represented by the product of its two side lengths, $(3x + 2)(2x - 9)$. Which expression represents the area of the rectangle?

A. $5x - 7$

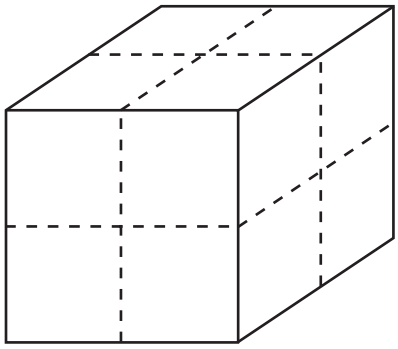
B. $10x - 14$

C. $6x^2 - 18$

D. $6x^2 - 23x - 18$

14. **Use the diagram below to answer the question.**

Sliced Cube



The cube has a surface area of 96 square inches. Each side of the cube is sliced along dashed lines to produce eight smaller cubes. What is the surface area of one of the eight smaller cubes?

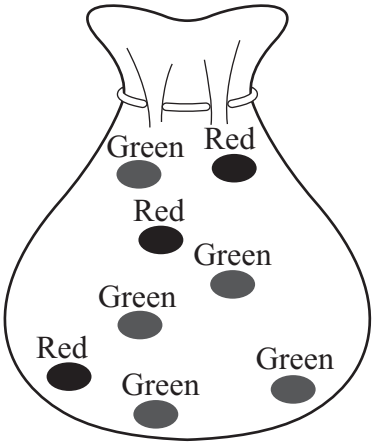
A. 8 square inches

B. 12 square inches

C. 24 square inches

D. 48 square inches

15. **Use the figure below to answer the question.**



Sally is given a bag containing red and green jelly beans. She reaches into the bag and removes a red jelly bean. She does not replace the jelly bean before randomly removing a second jelly bean. What is the probability that the second jelly bean is red?

A. $\frac{2}{8}$

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

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

D. $\frac{3}{7}$

16. What is the value of the expression $\left(\frac{16}{25}\right)^{\frac{1}{2}}$?

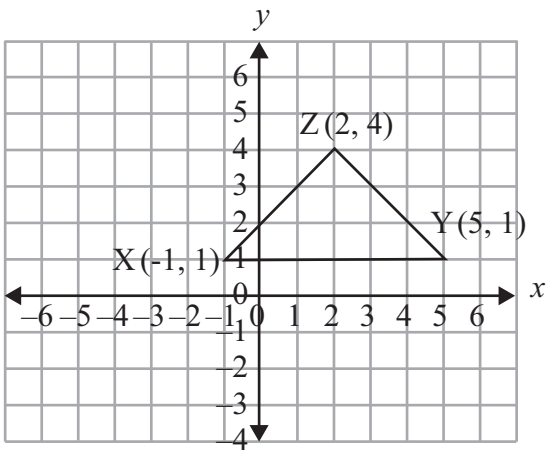
A. $\frac{4}{25}$

B. $\frac{8}{25}$

C. $\frac{4}{5}$

D. $\frac{5}{4}$

17. **Use the coordinate grid below to answer the question.**



Which method proves that $\triangle XYZ$ is an isosceles right triangle?

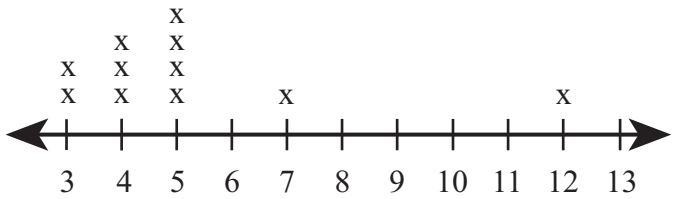
A. use the distance formula to show that three sides are equal in length and use the slope formula to show that two sides are parallel

B. use the distance formula to show that three sides are equal in length and use the slope formula to show that two sides are perpendicular

C. use the distance formula to show that two sides are equal in length and use the slope formula to show that two sides are parallel

D. use the distance formula to show that two sides are equal in length and use the slope formula to show that two sides are perpendicular

18. **Use the line plot below to answer the question.**



The line plot displays a distribution of data. Which comparison of measures of center matches the line plot?

A. the median is less than the mode

B. the median is less than the mean

C. the mode is equal to the mean

D. the mean is equal to the median

19. Which expression is equivalent to $3\sqrt{3} + 5\sqrt{3} - 5$?

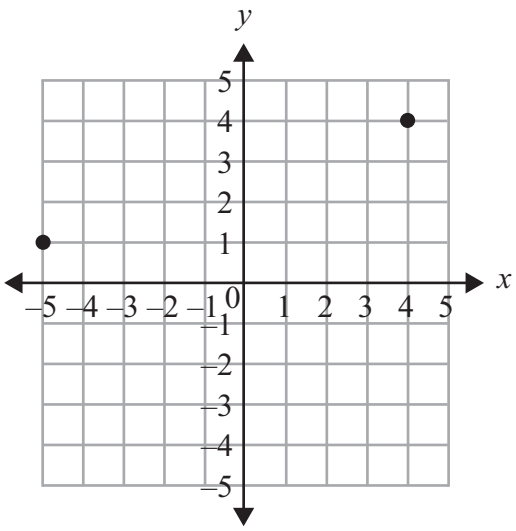
A. $3\sqrt{3}$

B. $3\sqrt{6}$

C. $8\sqrt{3} - 5$

D. $8\sqrt{6} - 5$

20. **Use the coordinate grid below to answer the question.**



The coordinates of the endpoints of a segment are (–5, 1) and (4, 4). What is the length of the segment?

A. 3

B. 9

C. $3\sqrt{10}$

D. $9\sqrt{10}$

21. What is the y-coordinate of the minimum value of $f(x) = \left| x - 5 \right| + 2$?

A. –5

B. –2

C. 0

D. 2

22. What is the slope of the line represented by the equation $2x + 5y = 10$?

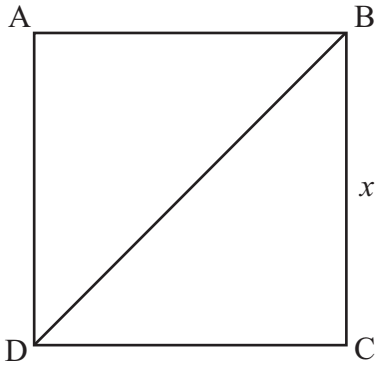
A. -2

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

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

D. 2

23. **Use the figure below to answer the question.**



In square ABCD, what is the length of diagonal $\overline{BD}$?

A. $2x$

B. $x\sqrt{2}$

C. x^2

D. $x\sqrt{3}$

NeSA-M High School Reference Sheet

Shape	Area	Circumference
Circle	$A = \pi r^2$	$C = \pi d = 2\pi r$
Triangle	$A = \frac{1}{2} bh$	**Perimeter**
Rectangle	$A = lw$	$P = 2l + 2w$
Trapezoid	$A = \frac{1}{2} h\,(b_1 + b_2)$	
Parallelogram	$A = bh$	

Key	
b = base	w = width
B = area of base	d = diameter
h = height	r = radius
l = length	ℓ = slant
Use 3.14 for π	

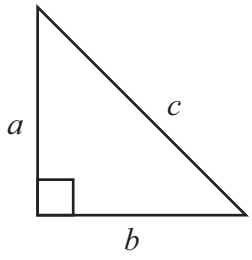
3-Dimensional Shape	Volume	Total Surface Area
Right Circular Cone	$V = \frac{1}{3} \pi r^2 h$	$T = \frac{1}{2}(2\pi r)\ell + \pi r^2 = \pi r\ell + \pi r^2$
Pyramid	$V = \frac{1}{3}$ Bh	$T =$ B $+ \frac{1}{2} P\ell$
Sphere	$V = \frac{4}{3} \pi r^3$	$T = 4\pi r^2$
Right Circular Cylinder	$V = \pi r^2 h$	$T = 2\pi rh + 2\pi r^2$
Right Prism	$V =$ Bh	$T =$ 2B $+ Ph$

Formulas

Distance, rate, and time formula, where d = distance, r = rate, t = time:

$d = rt$

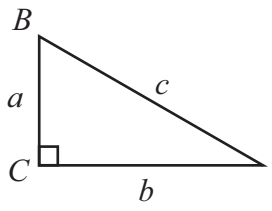
Pythagorean Theorem



$c^2 = a^2 + b^2$

Right-Triangle Relationships

Trigonometric Ratios

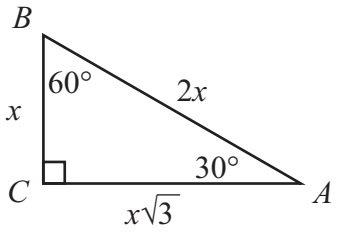


$\sin A = \frac{a}{c}$

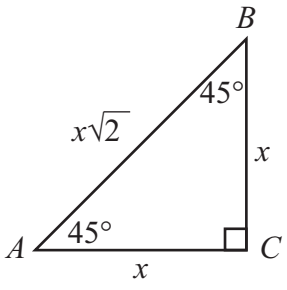
$\cos A = \frac{b}{c}$

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

30°-60°-90° Triangle Relationships



45°-45°-90° Triangle Relationships



NeSA-M High School Reference Sheet

Linear Equation Forms

Point-Slope Form:

$$y - y_1 = m\,(x - x_1)$$

Standard or General Form:

$$Ax + By = C$$

Slope-Intercept Form:

$$y = mx + b$$

Coordinate Geometry

Given: Points $A(x_1, y_1)$, $B(x_2, y_2)$

Distance between two points:

$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Midpoint between two points:

$$\text{Midpoint of } \overline{AB} = \left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2}\right)$$

Slope of line through two points: $m = \dfrac{y_2 - y_1}{x_2 - x_1}$

Equation of a Circle

$$(x - h)^2 + (y - k)^2 = r^2$$

(h, k) = center $\qquad$ r = radius

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$ax^2 + bx + c = 0$$

Standard Units	Metric Units
Conversions – Length	
1 foot (ft) = 12 inches (in.)	1 centimeter (cm) = 10 millimeters (mm)
1 yard (yd) = 3 feet (ft) = 36 inches (in.)	1 meter (m) = 100 centimeters (cm)
1 mile (mi) = 1,760 yards (yd) = 5,280 feet (ft)	1 kilometer (km) = 1,000 meters (m)
Conversions – Area	
1 square foot (sq. ft) = 144 square inches (sq. in.)	
1 square yard (sq. yd) = 9 square feet (sq. ft)	
Conversions – Volume	
1 cubic yard (cu. yd) = 27 cubic feet (cu. ft)	
1 cubic foot (cu. ft) = 1,728 cubic in. (cu. in.)	
Conversions – Capacity	
1 cup = 8 fluid ounces (fl oz)	1 liter (l) = 1,000 milliliters (ml)
1 pint (pt) = 2 cups	1 liter (l) = 1,000 cubic centimeters (cu. cm)
1 quart (qt) = 2 pints (pt)	1 kiloliter (kl) = 1,000 liters (l)
1 gallon (gal.) = 4 quarts (qt)	
Conversions – Weight/Mass	
1 pound (lb) = 16 ounces (oz)	1 gram (g) = 1,000 milligrams (mg)
1 ton = 2,000 pounds (lb)	1 kilogram (kg) = 1,000 grams (g)

Grade 11
Mathematics Practice Test
Answer Key

1	A
2	B
3	D
4	B
5	A
6	C
7	B
8	C
9	B
10	C
11	C
12	A
13	D
14	C
15	B
16	C
17	D
18	B
19	C
20	C
21	D
22	B
23	B

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