

Nebraska State Accountability

**Grade 11
Mathematics
Practice Test**

Name:

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)*.

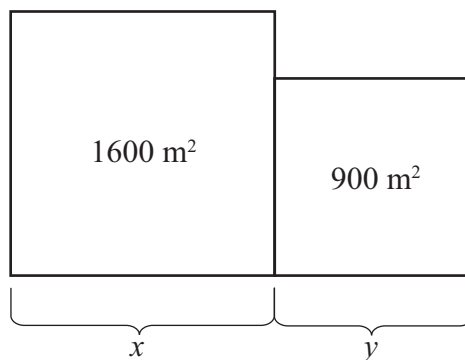
Each question will ask you to select an answer from among four choices.

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.

Remember only one of the answers provided is the correct response.

1. Use the diagram below to answer the question.

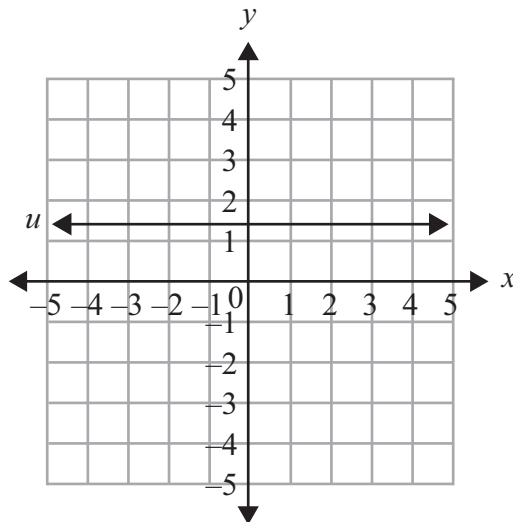
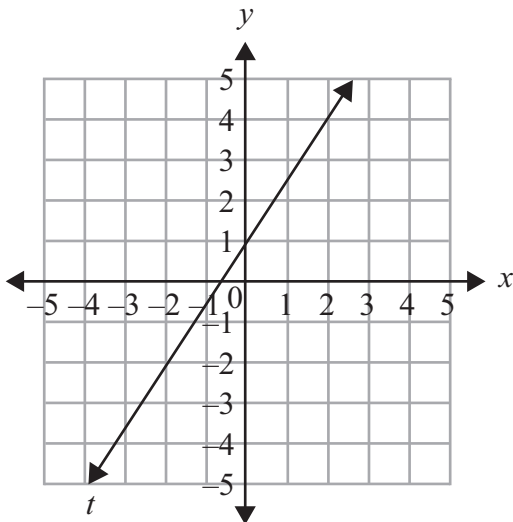
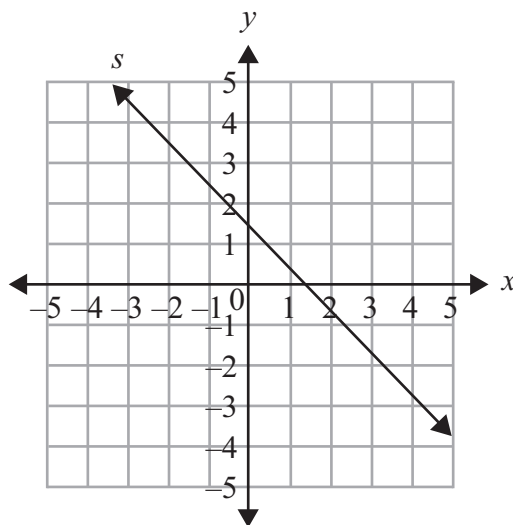
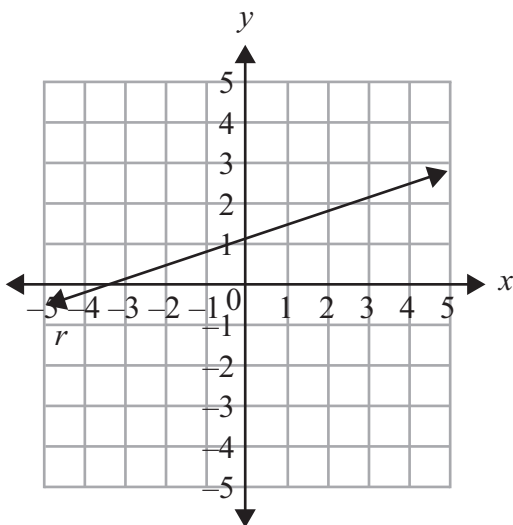


The area of each square is given in the diagram. What is the value of $x + y$?

- A. 30 meters
 B. 40 meters
 C. 70 meters
 D. 120 meters
2. What is the value of the expression $-4\sqrt{25} + 4^3$?
- A. 32
 B. 44
 C. 84
 D. 112
3. What is the simplified form of the expression $(6x^4 + 4x^3 - 2x^2 + 5) - (3x^4 - 2x^3 + x + 4)$?
- A. $3x^4 + 2x^3 - 2x^2 + x + 1$
 B. $3x^4 + 2x^3 - 2x^2 - x + 9$
 C. $3x^4 + 6x^3 - 2x^2 + x + 1$
 D. $3x^4 + 6x^3 - 2x^2 - x + 1$

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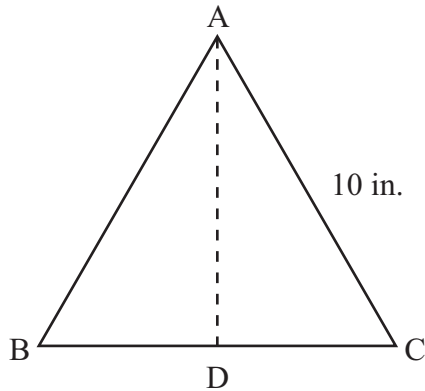
4. Use the graphs below to answer the question.



Which line shows a negative slope?

- A. r
- B. s
- C. t
- D. u

5. Use the figure below to answer the question.



$\triangle ABC$ is equilateral and each side measures 10 inches (in.). Segment DC is equal to 5 in. What is the length of \overline{AD} ?

- A. $5\sqrt{2}$ in.
- B. $5\sqrt{3}$ in.
- C. $10\sqrt{2}$ in.
- D. $10\sqrt{3}$ in.

6. What is the simplest form of the expression $\frac{2x^2 + 16x + 14}{x^2 - 1}$?

- A. $\frac{2(x+7)}{(x-1)}$
- B. $\frac{(2x+2)(x+7)}{(x+1)(x-1)}$
- C. $\frac{2(x+7)}{(x+1)}$
- D. $\frac{2(x+1)(x+7)}{(x-1)(x-1)}$

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7. What is the value of $\left(\frac{1}{2}\right)^{-2}$?

A. -4

B. $-\frac{1}{4}$

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

D. 4

8. A line has a slope of $\frac{3}{4}$ and passes through the point $(-4, 2)$. Which represents the equation of the line written in standard form?

A. $4x - 3y = -22$

B. $-3x + 4y = 20$

C. $4x - 3y = -18$

D. $3x - 4y = -24$

9. Use the table below to answer the question.

School Population By Gender

	Males	Females	Total
Freshman	8	17	25
Sophomores	15	10	25
Juniors	12	13	25
Seniors	15	10	25
Total	50	50	100

In a school of 100 students, what is the probability of randomly selecting a student that is either a female or a senior?

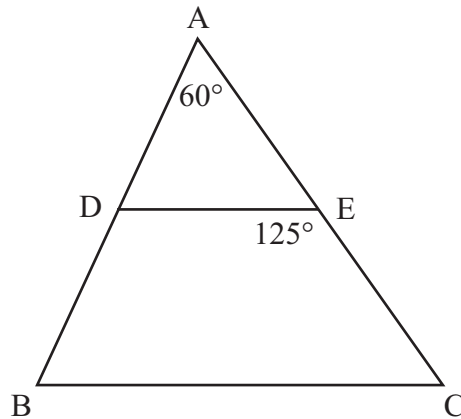
- A. $\frac{10}{100}$
- B. $\frac{25}{100}$
- C. $\frac{60}{100}$
- D. $\frac{65}{100}$
10. The vertices of $\triangle ABC$ are A (0, 0), B (6, 0), and C (3, 7). What type of triangle is $\triangle ABC$?
- A. acute isosceles triangle
- B. acute scalene triangle
- C. right isosceles triangle
- D. right scalene triangle

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11. Which statement is true for a line that passes through points $(-2, 4)$ and $(3, 4)$?

- A. The line has a negative slope.
- B. The line has a positive slope.
- C. The line has an undefined slope.
- D. The line has a zero slope.

12. Use the figure below to answer the question.



In $\triangle ABC$, \overline{DE} is parallel to \overline{BC} . The measure of $\angle A$ is 60° and the measure of $\angle DEC$ is 125° . What is the measure of $\angle B$?

- A. 55°
- B. 60°
- C. 65°
- D. 70°

13. What is the value of the expression $\frac{3 + \frac{1}{4}}{3}$?

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

B. $\frac{13}{12}$

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

D. $\frac{13}{3}$

14. Using positive exponents, what is the simplest form of the expression $\left(\frac{x^4}{3y^2}\right)^3$?

A. $\frac{x^7}{3y^2}$

B. $\frac{x^7}{27y^5}$

C. $\frac{x^{12}}{9y^6}$

D. $\frac{x^{12}}{27y^6}$

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15. Given the linear equation $y = \frac{2}{3}x + 2$, which table of values represents this equation?

A.

x	y
-3	0
0	2
3	4

B.

x	y
0	2
2	5
3	4

C.

x	y
-3	0
2	0
6	6

D.

x	y
-9	-6
-6	-2
0	2

16. What is the y -intercept of the line that contains the points $(3, 3)$ and $(6, -1)$?

- A. 5
- B. 6
- C. 7
- D. 8

17. The coordinates of the vertices for rectangle ABCD are A (2, 4), B (6, 10), C (9, 8) and D (5, 2). What is the length of a diagonal (\overline{AC} or \overline{BD}) of the rectangle?

- A. $\sqrt{13}$
- B. $\sqrt{52}$
- C. $\sqrt{60}$
- D. $\sqrt{65}$

18. Use the frequency table below to answer the question.

Frequency Table

Interval	Frequency
70-74	
75-79	
80-84	
85-89	
90-94	
95-99	

The frequency table shows the test scores for each interval. What effect would dropping the two scores in the 70-74 interval have on the mean and standard deviation?

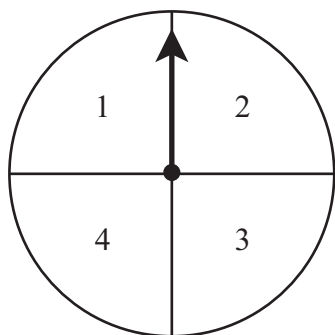
- A. both the mean and standard deviation increase
- B. both the mean and standard deviation decrease
- C. the mean increases, but the standard deviation decreases
- D. the mean decreases, but the standard deviation increases

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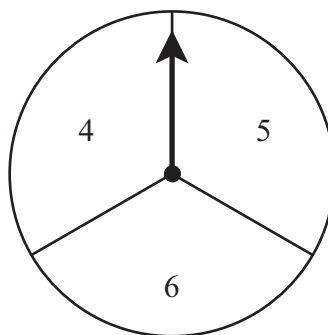
19. A car used 12 gallons of gasoline and traveled a total distance of 290 miles. The car's fuel efficiency is 25 miles per gallon on the highway and 20 miles per gallon in the city. The variable h will represent the number of gallons used on the highway. Which equation could be used to find h ?

- A. $25h + 20(12 - h) = 290$
- B. $25(12 - h) + 20h = 290$
- C. $25(12 + h) + 20h = 290$
- D. $25h + 20(12 + h) = 290$

20. Use the spinners below to answer the question.



Spinner A



Spinner B

All four sections on spinner A are the same size, and all three sections on spinner B are the same size. Charlie spins Spinner A and Spinner B one time each and adds his results. What is the probability of getting a sum of 6?

- A. $\frac{1}{12}$
- B. $\frac{2}{12}$
- C. $\frac{3}{12}$
- D. $\frac{4}{12}$

21. An item sells for \$20 per kilogram. What is the cost in cents per gram for this item?
- A. 0.02 cents per gram
 - B. 0.2 cents per gram
 - C. 2 cents per gram
 - D. 20 cents per gram
22. Nine tiles numbered 1 through 9 are placed in a bag. A tile is randomly drawn and replaced. Then a second tile is randomly drawn. What is the probability the first tile drawn and the second tile drawn are both even numbers?
- A. $\frac{8}{81}$
 - B. $\frac{16}{81}$
 - C. $\frac{20}{81}$
 - D. $\frac{25}{81}$
23. John found the length of one side of a square to be $\sqrt{40}$ inches. Which is closest to the length of the side of the square?
- A. about 6 inches
 - B. about 7 inches
 - C. about 10 inches
 - D. about 20 inches

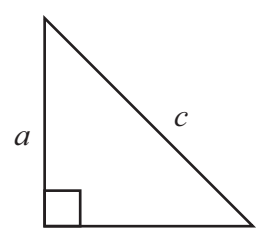
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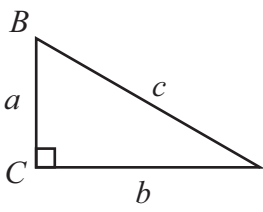
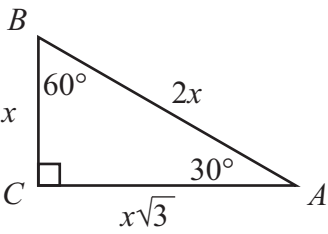
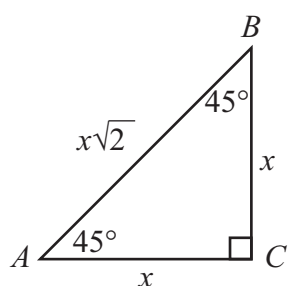
24. Line l and line k are perpendicular. Line l has a slope of 3. Line k contains the points $(5, 8)$ and $(2, y)$. What is the value of y ?
- A. -1
 - B. 7
 - C. 9
 - D. 17

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	$V = \frac{1}{3}\pi r^2h$	$T = \frac{1}{2}(2\pi r)\ell + \pi r^2 + \pi r\ell + \pi r^2$
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	$V = \pi r^2h$	$T = 2\pi rh + 2\pi r^2$
Right Prism	$V = Bh$	$T = 2B + Ph$

Formulas	
<p>Distance, rate, and time formula, where d = distance, r = rate, t = time:</p> $d = rt$	<p style="text-align: center;">Pythagorean Theorem</p>  $c^2 = a^2 + b^2$

Right-Triangle Relationships		
Trigonometric Ratios	30°-60°-90° Triangle Relationships	45°-45°-90° Triangle Relationships
 $\sin A = \frac{a}{c}$ $\cos A = \frac{b}{c}$ $\tan A = \frac{a}{b}$		

NeSA-M High School Reference Sheet

Linear Equation Forms
<p><u>Point-Slope Form:</u></p> $y - y_1 = m(x - x_1)$
<p><u>Standard of General Form:</u></p> $Ax + By = C$
<p><u>Slope-Intercept Form:</u></p> $y = mx + b$

Coordinate Geometry
<p>Given: Points $A(x_1, y_1)$, $B(x_2, y_2)$</p>
<p><u>Distance between two points:</u></p> $AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
<p><u>Midpoint between two points:</u></p> $\text{Midpoint of } \overline{AB} = \left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2} \right)$
<p><u>Slope of line through two points:</u> $m = \frac{y_2 - y_1}{x_2 - x_1}$</p>

Equation of a Circle
$(x - h)^2 + (y - k)^2 = r^2$
<p>(h, k) = center r = radius</p>

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

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Grade 11 Practice Test
Answer Key

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