Tennessee Comprehensive Assessment Program

TCAP

TNReady—Math
EOC Item Release

TN Department of Education

Table of Contents

Metadata Interpretation Guide – Math

SAMPLE METADATA TABLE

Label	TN0045532	**Max Points**	1
Item Grade	8	**Rationale1**	
Item Content	Math	**Rationale2**	
Item Type	Choice	**Rationale3**	
Key	3	**Rationale4**	
DOK	2	**Rationale5**	
Difficulty	M	**Rationale6**	
Calculator	No	**Sample Answer**	
Ruler	None		
Standard 1 Code	8.NS.A.2	**Standard 1**	
Standard 2 Code	8.NS.A.2	**Standard 2**	

METADATA DEFINITIONS

Label: Unique letter/number code used to identify the item.	**Max Points**: Maximum score points possible for this item.
Item Grade (if listed): Grade level in 3-8 or EOC	**Rationale1** (if listed): Reason why this answer choice is correct or incorrect.
Item Content (if listed): Subject being tested. (e.g., ELA, Algebra I, etc.).	**Rationale2** (if listed): Reason why this answer choice is correct or incorrect.
Item Type: For example, "Choice" for multiple choice questions, "Match" for matching tables, "Composite" for two-part items.	**Rationale3** (if listed): Reason why this answer choice is correct or incorrect.
Key: Correct answer. 1=A, 2=B, etc. This may be blank for constructed response items where students write or type their responses.	**Rationale4** (if listed): Reason why this answer choice is correct or incorrect.
DOK (if listed): Depth of Knowledge (cognitive complexity) is measured on a four-point scale. 1=recall; 2=skill/concept; 3=strategic thinking; 4=extended thinking.	**Rationale5** (if listed): Reason why this answer choice is correct or incorrect.
Difficulty (if listed): Level of difficulty.	**Rationale6** (if listed): Reason why this answer choice is correct or incorrect.
Calculator (if listed): Yes for items that permit calculator use.	**Protractor** (if listed): Yes for items that permit protractor use.
Ruler (if listed): Yes for items that permit a ruler.	**Sample Answer** (if listed): An example of an answer a student could provide.
Standard 1 Code (if listed): Content standard assessed.	**Standard 1** (if listed): Text of the content standard assessed.
Standard 2 Code (if listed): Content standard assessed. This is the primary code used for the Integrated Math courses.	**Standard 2** (if listed): Text of the content standard assessed.

TN142548

Label	TN142548	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	4	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	No	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.SSE.A.2	**Standard 1 Text**	N/A

Select the expression that is equivalent to $g^2 - 144$.

A $(g - 12)^2$

B $(g - 72)^2$

C $(g - 8)(g + 18)$

D $(g - 12)(g + 12)$

TN539815

Label	TN539815	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	2,3,7	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	No	**Sample Answer**	N/A
Ruler	N/A		
Standard 1 Code	N.Q.A.1	**Standard 1 Text**	N/A

A horse holds the all-time record for running a 2-kilometer race in 1 minute and 59.4 seconds. Which conversions are necessary to find the horse's average speed for the race in miles per hour? Select all that apply.

- ☐ $\frac{1 \text{ minute}}{60 \text{ seconds}}$
- ☐ $\frac{60\text{seconds}}{1\text{minute}}$
- ☐ $\frac{60\text{minutes}}{1\text{hour}}$
- ☐ $\frac{1\text{hour}}{60\text{minutes}}$
- ☐ $\frac{1\text{kilometer}}{0.621371\text{miles}}$
- ☐ $\frac{5280\text{feet}}{1\text{mile}}$
- ☐ $\frac{0.621371\text{miles}}{1\text{kilometer}}$

TN440121

Label	TN440121	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	2	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	F.IF.B.4	**Standard 1 Text**	N/A

Consider the function $f(x) = -x^2 - 2x + 8$.

Select the interval of values for which $f(x)$ is positive and increasing.

A $x < -4$

B $-4 < x < -1$

C $-1 < x < 2$

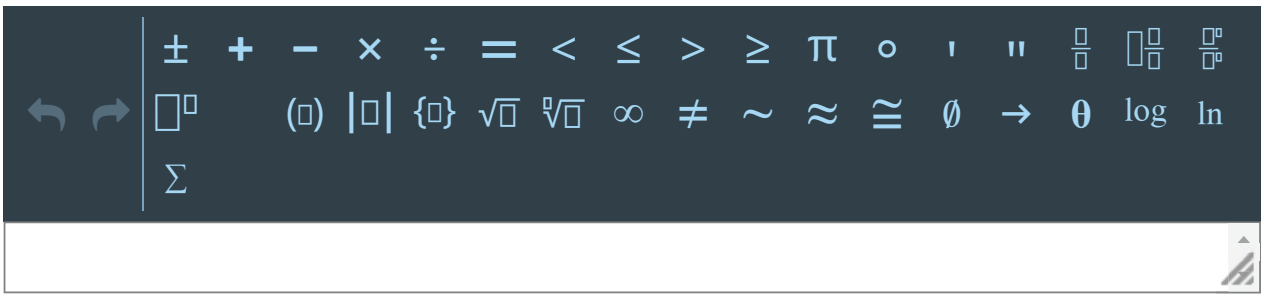
D $x > 2$

TN940088

Label	TN940088	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	textEntry	**Rationale3**	N/A
Key	(2P)/(5a)	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.CED.A.4	**Standard 1 Text**	N/A

The formula for the area of a pentagon is defined as $P = \frac{5}{2}sa$.

What is the formula in terms of s?



TN142523

Label	TN142523	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	2	**Rationale4**	N/A
DOK	N/A	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	N/A	**Sample Answer**	N/A
Ruler	N/A		
Standard 1 Code	A.REI.C.6	**Standard 1 Text**	N/A

Two fitness clubs are adding new members. Fitness Club A currently has 450 members and adds 15 new members each month. Fitness Club B currently has 400 members and adds 25 new members each month.

After how many months will Fitness Club A and Fitness Club B have the same number of members?

M 2

P 5

R 450

S 525

TN240323

Label	TN240323	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	2,5	**Rationale4**	N/A
DOK	N/A	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	N/A	**Sample Answer**	N/A
Ruler	N/A		
Standard 1 Code	A.REI.C.7	**Standard 1 Text**	N/A

A system of functions is given.

$g(x) = x^2 + 2x - 8$

$f(x) = \frac{3}{2}x + \frac{5}{2}$

Select **all** values of x for which $f(x) = g(x)$.

- ☐ -8
- ☐ -3.5
- ☐ -2.75
- ☐ 0
- ☐ 3
- ☐ 7

TN139868

Label	TN139868	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	3,4,7	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.APR.B.3	**Standard 1 Text**	N/A

Consider the expression $(x^2 - 16)(x + 2)$.

Select all values of x for which $(x^2 - 16)(x + 2) = 0$.

- ☐ -32
- ☐ -16
- ☐ -4
- ☐ -2
- ☐ 0
- ☐ 2
- ☐ 4
- ☐ 8

TN539764

Label	TN539764	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	4	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.SSE.A.2	**Standard 1 Text**	N/A

Which is the correct factorization of the expression $x^4 - 1$?

A $(x-1)^4$

B $(x^2-1)^2$

C $(x-1)^2(x+1)^2$

D $(x-1)(x+1)(x^2+1)$

TN240081

Label	TN240081	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	1,3,4	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.REI.D.12	**Standard 1 Text**	N/A

Consider the system of inequalities.

$3x + 2y < 8$

$-5x - 9y > -2$

Select **all** ordered pairs that are solutions to the system of inequalities.

☐ $(-10, -3)$

☐ $(-1, 5)$

☐ $(0, 0)$

☐ $(1, -1)$

☐ $(4, -2)$

☐ $(8, 9)$

TN545856

Label	TN545856	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	4	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.CED.A.1	**Standard 1 Text**	N/A

A fence is being built around a rectangular garden. The length of the garden is 35 feet, and the total fencing used to enclose the garden measures 160 feet.

Which equation can be used to find the width, w, of the garden, in feet?

A $35w = 160$

B $70w = 160$

C $35 + 2w = 160$

D $70 + 2w = 160$

TN442698

Label	TN442698	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	4	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	No	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.REI.A.1	**Standard 1 Text**	N/A

Consider the equation $x - 2 = \sqrt{4x + 13}$.

Which statement is the first step for solving this equation?

M subtract 2 from both sides to get $x = \sqrt{4x + 13} - 2$

P add 2 to both sides to get $x = \sqrt{4x + 13} + 2$

R square both sides to get $x^2 - 4 = 4x + 13$

S square both sides to get $x^2 - 4x + 4 = 4x + 13$

TN641424

Label	TN641424	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	2	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	No	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	F.IF.C.8	**Standard 1 Text**	N/A

The population of deer on an island is given by $P(x) = 100(0.85)^x$, where x represents the number of years. Determine the percent rate of change for the population of deer per year.

A 85% decrease

B 15% decrease

C 85% increase

D 15% increase

TN841486

Label	TN841486	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	1	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	No	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.APR.B.3	**Standard 1 Text**	N/A

The graph of $y = x^3 + 5x^2 - 2x - 24$ has a zero at $x = -4$.

Which of the following is also a zero of the graph?

M -3

P -2

R 4

S 6

TN641604

Label	TN641604	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	1	**Rationale4**	N/A
DOK	1	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	No	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	S.IC.B.3	**Standard 1 Text**	N/A

A supermarket owner wants to know where in the supermarket he should locate the bread to maximize sales. He puts the bread in one location for two weeks, counts the loaves of bread sold, changes the location for two more weeks, and counts again. Which of these methods is the owner using?

A experiment

B observational study

C sample survey

D two-stage sampling

TN741458

Label	TN741458	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	3	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.SSE.B.4	**Standard 1 Text**	Recognize a finite geometric series (when the common ratio is not 1), and use the sum formula to solve problems in context.

A post is being driven into the ground. The first strike drives the post 25 inches into the ground. Each additional strike drives the stake $\frac{4}{5}$ the distance farther into the ground than the previous strike (20 inches, 16 inches, . . .).

What is the total distance (to the nearest inch) that the post is driven into the ground after 7 strikes?

M 79

P 92

R 99

S 104

TN339997

Label	TN339997	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	3	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.REI.C.6	**Standard 1 Text**	N/A

What is the value of y that satisfies the system of equations?

$x + 2y + 3z = 13$
$2x - 3y - 2z = -11$
$3x + 4y - 5z = 5$

A 1

B 2

C 3

D 4

TN441491

Label	TN441491	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	1	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.APR.B.2	**Standard 1 Text**	N/A

A polynomial, $f(x)$, is divided by four different linear expressions, as listed in the table. The resulting remainders after the division by each linear expression are as shown in the table.

Linear Expression	Remainder
$x - 1$	0
$x + 1$	-4
$x - 3$	2
$x + 3$	0

Which must be a root of the polynomial equation?

M -3

P -1

R 2

S 3

TN342790

Label	TN342790	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	1,3	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	G.GPE.A.2	**Standard 1 Text**	N/A

Consider the parabola with the equation $(x + 5)^2 = 8(y - 6)$.

Which two statements about the parabola are true?

- ☐ The vertex is $(-5, 6)$.
- ☐ The vertex is $(5, -6)$.
- ☐ The directrix is $y = 4$.
- ☐ The directrix is $y = -13$.
- ☐ The directrix is $x = 4$.
- ☐ The directrix is $x = -2$.

TN941494

Label	TN941494	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	1	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.REI.A.2	**Standard 1 Text**	N/A

Consider the equation $5x = \sqrt{8 + 10x}$.

Which is the extraneous solution for the equation?

M $-\frac{2}{5}$

P $\frac{2}{5}$

R $-\frac{4}{5}$

S $\frac{4}{5}$

TN241516

Label	TN241516	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	1	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	N.CN.C.7	**Standard 1 Text**	N/A

What is the solution to the quadratic equation $3x^2 - 6x + 5 = 0$?

A $1 \pm \frac{\sqrt{6}}{3}i$

B $1 \pm 2i$

C $1 \pm 2\sqrt{6}i$

D $1 \pm \frac{2\sqrt{6}}{3}i$

TN942730

Label	TN942730	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	1,6	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.REI.D.11	**Standard 1 Text**	N/A

A system of functions is given.

$f(x) = x^2 + 2x - 8$
$g(x) = -x^2 - 3x + 5$

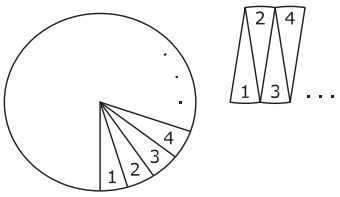
Select all values of x, rounded to the nearest tenth, for which $f(x) = g(x)$.

- ☐ -4.1
- ☐ -2.3
- ☐ -2
- ☐ -1
- ☐ 0.5
- ☐ 1.6

TN142794

Label	TN142794	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	3	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	No	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	G.GMD.A.1	**Standard 1 Text**	N/A

To find the formula for the area of a circle, the circle can be cut into "slices," as indicated below.



Which statement **best** describes the process being used?

A. To find the area of a circle, rearrange the pieces to form a "parallelogram" with a base of $\frac{1}{2}\pi r$ and a height of r.

B. To find the area of a circle, rearrange the pieces to form a "parallelogram" with a base of $2\pi r$ and a height of r.

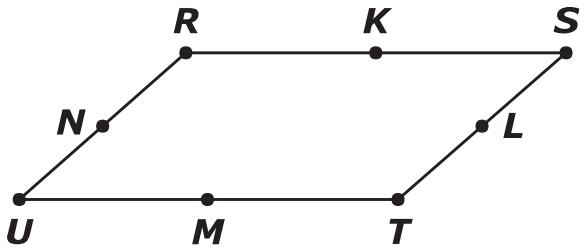
C. To find the area of a circle, rearrange the pieces to form a "parallelogram" with a base of πr and a height of r.

D. To find the area of a circle, rearrange the pieces to form a "parallelogram" with a base of $\frac{1}{2}\pi r$ and a height of $2r$.

TN941553

Label	TN941553	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	4	**Rationale4**	N/A
DOK	1	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	No	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	G.CO.B.6	**Standard 1 Text**	N/A

Parallelogram $RSTU$ has midpoints K, L, M, N marked on the sides as shown.



Which rigid motion could be applied to $\triangle RSU$ to show that $\triangle RSU \cong \triangle TUS$?

M reflection over $\overline{SU}$

P reflection over $\overline{LN}$

R rotation 90° clockwise about the intersection point of $\overline{KM}$ and $\overline{LN}$

S rotation 180° clockwise about the intersection point of $\overline{SU}$ and $\overline{RT}$

TN542771

Label	TN542771	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	4	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	G.MG.A.2	**Standard 1 Text**	N/A

In the year 2000, the population of Utah was 2,233,169, and the population of Tennessee was 5,689,283. The area of Utah is 82,168 square miles, and the area of Tennessee is 41,219 square miles.

Which statement **best** compares the population density, in people per square mile, of the two states?

A The density of Tennessee is about 2 times the density of Utah.

B The density of Utah is about 2 times the density of Tennessee.

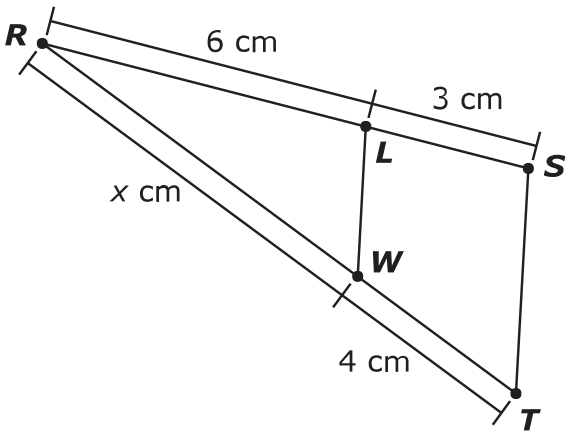
C The density of Tennessee is about $2\frac{1}{2}$ times the density of Utah.

D The density of Tennessee is about 5 times the density of Utah.

TN041732

Label	TN041732	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	3	**Rationale4**	N/A
DOK	1	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	G.SRT.B.4	**Standard 1 Text**	N/A

In the diagram, $\overline{LW}$ is parallel to $\overline{ST}$. $RL = 6$ centimeters, $LS = 3$ centimeters, and $WT = 4$ centimeters.



What is the value of x?

M 5

P 7

R 8

S 12

TN341565

Label	TN341565	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	1,2,3	**Rationale4**	N/A
DOK	3	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	G.CO.B.7	**Standard 1 Text**	N/A

Triangle RST is translated 5 units left and 3 units down and then reflected over the line $y = x$. Triangle JKL is congruent to the final image of triangle RST.

Select all statements that must be true.

- ☐ $\triangle RST \cong \triangle JKL$
- ☐ There is a sequence of transformations that would map $\triangle JKL$ onto $\triangle RST$.
- ☐ $\angle K$ is congruent to an angle of $\triangle RST$.
- ☐ $\triangle JKL$ is similar to $\triangle RST$ with a scale factor of 8.
- ☐ The perimeter, in cm, of $\triangle JKL$ is equal to 2 more than the perimeter, in cm, of $\triangle RST$.

TN842752

Label	TN842752	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	textEntry	**Rationale3**	N/A
Key	400	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	G.MG.A.3	**Standard 1 Text**	N/A

In order to find the density of a rock, Michael needs to find the volume of the rock.

Michael has a container in the shape of a rectangular prism. The base of the container is 20 centimeters long and 10 centimeters wide. The height of the container is 12 centimeters. Michael puts water in the prism until the height of the water is 6 centimeters. He then puts the rock in the water so that it is completely submerged. The water rises to a height of 8 centimeters.

What is the volume, in cubic centimeters, of the rock?

TN341779

Label	TN341779	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	4	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	G.SRT.C.6	**Standard 1 Text**	N/A

Let θ represent the smaller of the acute angles of a right triangle such that $\tan\theta = 0.75$. The longer leg of the right triangle measures 10 feet.

What is the length of the shorter leg?

M 0.25 ft

P 0.75 ft

R 2.5 ft

S 7.5 ft

TN242693

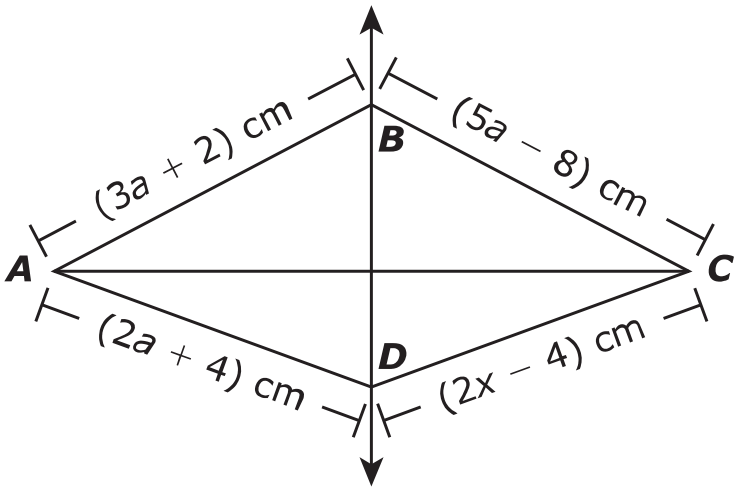
Label	TN242693	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	textEntry	**Rationale3**	N/A
Key	8	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	G.GPE.A.1	**Standard 1 Text**	N/A

What is the radius of the circle with equation $x^2 + y^2 + 6x = 54 + 2y$?

TN841613

Label	TN841613	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	2	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	G.CO.C.9	**Standard 1 Text**	N/A

Quadrilateral $ABCD$ is shown.



For what value of x will line BD be the perpendicular bisector of segment AC?

A 5

B 9

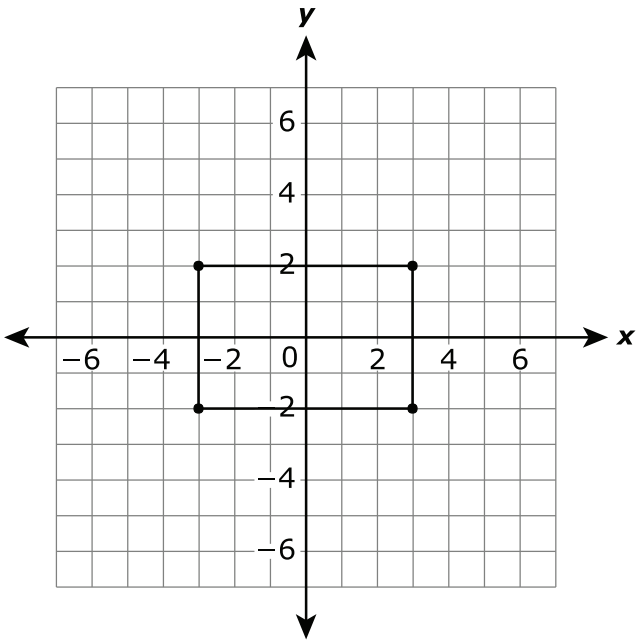
C 14

D 17

TN642540

Label	TN642540	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	1	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	No	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	G.CO.A.3	**Standard 1 Text**	N/A

The rectangle shown is reflected over the *x*-axis, and then, after a second transformation, the final image is mapped back onto the original figure.



Which could **not** have been the second transformation?

M rotation 90° clockwise

P rotation 180° clockwise

R reflection over the *x*-axis

S reflection over the *y*-axis

TN042515

Label	TN042515	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	3,5	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.SSE.B.3c	**Standard 1 Text**	N/A

Select **all** expressions equivalent to $27(3)^{n-1}$.

- ☐ $(3)^{3n-3}$
- ☐ $(3)^{3n-1}$
- ☐ $(3)^{n+2}$
- ☐ $9(3)^{n+1}$
- ☐ $9(3)^{n}$

TN842519

Label	TN842519	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	textEntry	**Rationale3**	N/A
Key	14.25	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.REI.C.6	**Standard 1 Text**	N/A

John and his friends bought 4 bags of popcorn and 3 sodas at a movie for a total of $13.50. At the next movie, John and his friends bought 2 bags of popcorn and 5 sodas for a total of $12.00. How much will John and his friends pay, in dollars, for 5 bags of popcorn and 2 sodas?

TN942535

Label	TN942535	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	textEntry	**Rationale3**	N/A
Key	9	**Rationale4**	N/A
DOK	N/A	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	N/A	**Sample Answer**	N/A
Ruler	N/A		
Standard 1 Code	F.LE.B.5	**Standard 1 Text**	N/A

Kim purchases a car for $27,000. She is given a table showing the data representing the expected depreciation of the car.

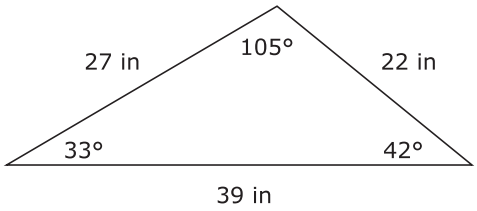
Car Depreciation	
Year after Purchase	**Predicted Value of Car**
0	$27,000
1	$24,570
2	$22,359
3	$20,346
4	$18,515

What percent of depreciation was used?

TN941698

Label	TN941698	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	2	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	M	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	G.CO.B.8	**Standard 1 Text**	N/A

Aniyah has repeatedly stenciled the triangle shape shown on her bedroom wall.



Her best friend, Daniela, wants to copy the exact same shape on her bedroom wall. Which statement has sufficient information about the triangle for Aniyah to give to Daniela to guarantee Daniela will have the exact same triangle?

M Construct a triangle with angles whose measures are 33°, 42°, and 105°.

P Construct a triangle with sides of measure 22 inches and 27 inches where the included angle is 105°.

R Construct a triangle with sides of measure 39 inches and 22 inches and a non-included angle of measure 33°.

S Construct a triangle with a 105° angle opposite from a side of length 39 inches where the remaining two sides differ in length by 5 inches.

TN442563

Label	TN442563	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	textEntry	**Rationale3**	N/A
Key	na	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.REI.B.4b	**Standard 1 Text**	N/A

Solve the equation.

$2(x + 4)^2 - 113 = 49$

TN242600

Label	TN242600	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	1	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	N.CN.C.7	**Standard 1 Text**	N/A

Solve the equation.

$-3x^2 + 2x = 8$

A $x = \frac{1 \pm i\sqrt{23}}{3}$

B $x = 2,\ x = -\frac{4}{3}$

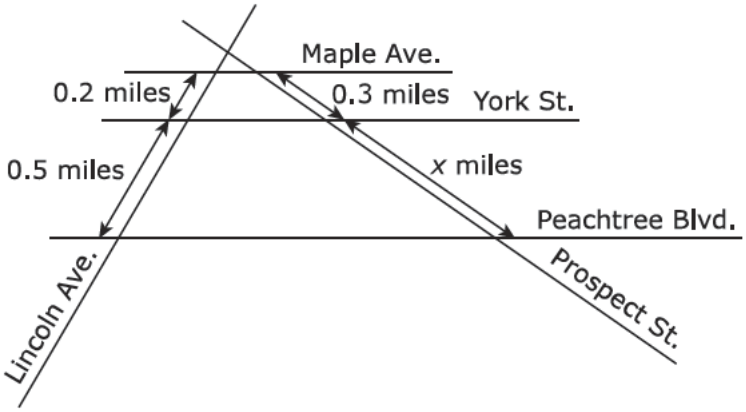
C $x = -1 \pm i\sqrt{23}$

D $x = \frac{2 \pm 23i\sqrt{2}}{6}$

TN342583

Label	TN342583	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	4	**Rationale4**	N/A
DOK	3	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	G.SRT.B.4	**Standard 1 Text**	N/A

A map of part of a city is shown. Maple Avenue, York Street, and Peachtree Boulevard all run directly east-west.



If Walter walks down Prospect Street from Maple Avenue to Peachtree Boulevard, how far, in miles, will he have walked?

M 0.70 mi

P 0.90 mi

R 1.00 mi

S 1.05 mi

TN042573

Label	TN042573	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	textEntry	**Rationale3**	N/A
Key	40	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	F.IF.B.6	**Standard 1 Text**	N/A

A function $h(x)$ is used to represent the number of items sold at a store during business hours x. The table shows some values for the function.

x	0	1	2	3	4
$h(x)$	0	7	21	28	?

The average rate of change of $h(x)$ over the interval $1 \leq x \leq 4$ is 11.

What is the missing value in the table?

TN742558

Label	TN742558	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	textEntry	**Rationale3**	N/A
Key	y=5(2)^x	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.CED.A.1	**Standard 1 Text**	N/A

Kendrick deposits twice as much money into his account as he did the day before. His initial deposit is $5.

Write an equation to model his daily deposit, y, x days after his initial deposit.

TN442591

Label	TN442591	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	textEntry	**Rationale3**	N/A
Key	-14 - 32i	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	N.CN.A.1	**Standard 1 Text**	N/A

A complex number is shown.

$5i^2 - 9 - 8\sqrt{-16}$

What is the complex number in the form of $a + bi$?

TN742613

Label	TN742613	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	textEntry	**Rationale3**	N/A
Key	0.21-0.22	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	S.CP.A.4	**Standard 1 Text**	N/A

Kylie has a collection of bows for her hair. She has two different sizes, small and large. All the bows are either solid or have a pattern.

	Small	Large
Pattern	8	6
Solid	7	7

What is the probability that a randomly selected bow is large and has a pattern?

TN442587

Label	TN442587	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	4	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	N.RN.B.3	**Standard 1 Text**	N/A

Let a represent any non-zero rational number.

Which number, when multiplied by a, will produce an irrational number?

A -13

B $\frac{4}{9}$

C $0.\overline{547}$

D $\sqrt{75}$

TN042749

Label	TN042749	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	1	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	No	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	G.GPE.B.5	**Standard 1 Text**	N/A

What is the equation of the line through $(3, 7)$ that is perpendicular to the line through points $(-1, -2)$ and $(5, 3)$?

M $y = -\frac{6}{5}x + \frac{53}{5}$

P $y = -4x + 19$

R $y = \frac{6}{5}x + \frac{17}{5}$

S $y = -\frac{5}{6}x + \frac{57}{6}$

TN841594

Label	TN841594	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	textEntry	**Rationale3**	N/A
Key	524,286	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.SSE.B.4	**Standard 1 Text**	N/A

Consider the geometric sequence.

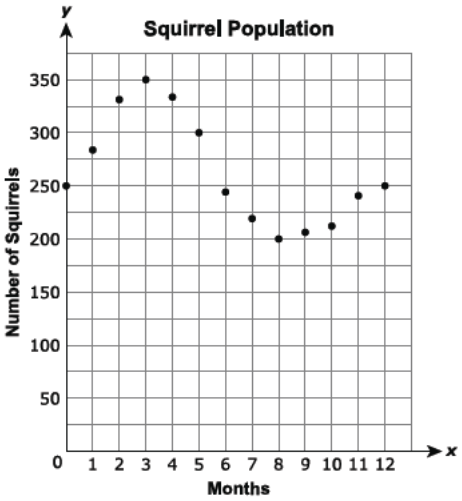
$6, 24, 96, 384, \ldots$

What is the sum of the first nine terms?

TN842812

Label	TN842812	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	choice	**Rationale3**	N/A
Key	2	**Rationale4**	N/A
DOK	3	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	F.TF.B.5	**Standard 1 Text**	N/A

The graph shows the squirrel population in an area for 12 months.



This population pattern is expected to repeat. Which function **best** models the data?

A $f(t) = \cos\left(\frac{\pi}{6}t\right) + 275$

B $f(t) = 75\sin\left(\frac{\pi}{6}t\right) + 275$

C $f(t) = 275\cos\left(\frac{\pi}{6}t\right) + 75$

D $f(t) = 275\sin\left(\frac{\pi}{6}t\right) + 75$

TN642632

Label	TN642632	**Max Points**	1
Item Grade	HS	**Rationale1**	N/A
Item Content	Math	**Rationale2**	N/A
Item Type	textEntry	**Rationale3**	N/A
Key	5	**Rationale4**	N/A
DOK	2	**Rationale5**	N/A
Difficulty	N/A	**Rationale6**	N/A
Calculator	Yes	**Sample Answer**	N/A
Ruler	None		
Standard 1 Code	A.APR.B.2	**Standard 1 Text**	N/A

The polynomial $x^3 - kx^2 + kx + 2$ has a factor of $(x - 2)$.

What is the value of k?

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Fall 2016