Florida Standards Assessments

Algebra 1

FSA Mathematics

Practice Test Answer Key
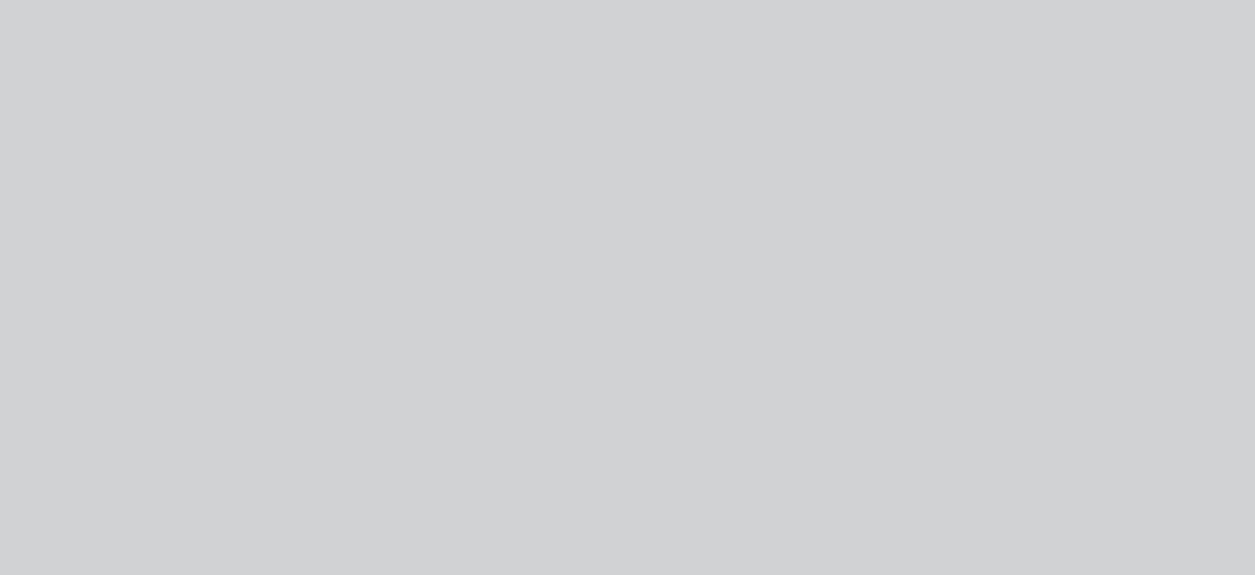
The purpose of these practice test materials is to orient teachers and students to the types of questions on computer-based FSA tests. By using these materials, students will become familiar with the types of items and response formats they may see on a computer-based test. The practice questions and answers are not intended to demonstrate the length of the actual test, nor should student responses be used as an indicator of student performance on the actual test. The practice test is not intended to guide classroom instruction.

Session 1

1.

Jeremy determines that $\sqrt{9} = 9^{\frac{1}{2}}$. Part of his work is shown.

$\sqrt{9} = 3 = 3^1 = 3^{\frac{1}{2} + \frac{1}{2}} = $ _____ $= 9^{\frac{1}{2}}$

Which expression or equation should be placed in the blank to correctly complete Jeremy's work?

(A) $(3^2)^1$

(B) $3^{\frac{1}{2}} + 3^{\frac{1}{2}}$

● $3^{\frac{1}{2}} \cdot 3^{\frac{1}{2}} = (3 \cdot 3)^{\frac{1}{2}}$

(D) $3^{\frac{1}{2}} \cdot 3^{\frac{1}{2}} = (3 \cdot 3)^{\frac{1}{2} + \frac{1}{2}}$

2.

The table below shows the values for the function $y = f(x)$.
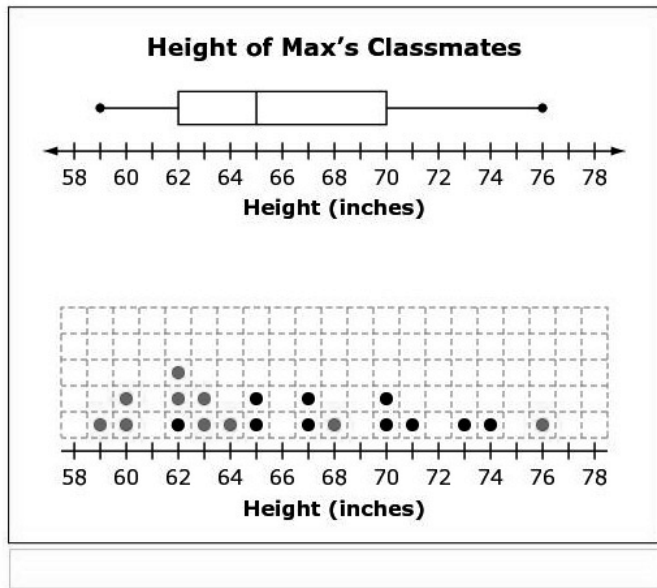
x	y
−4	7
−1	−2
0	3
3	−4
6	5

Complete the table for the function $y = f\left(\frac{1}{5}x\right)$.

x	y
-20	7
-5	-2
0	3
15	-4
30	5

Go On

3.

Max collected data on the height of each of his 20 classmates. The box plot shown represents his data.

Click above the number line to complete the dot plot that could also represent these data.

Height of Max's Classmates

Height (inches)

Height (inches)

Other correct responses: *any dot plot containing 20 dots such that the range is 59 to 76, with Q1 = 62, median = 65, and Q3 = 70*

Go On

4.

A bird drops a stick from the top of Miami Tower. The height of the stick after x seconds is given by $f(x) = 625 - 16x^2$.

Select all the correct interpretations of the coordinates of the point at the maximum of the function $f(x)$.

☐ the time it takes the stick to hit the ground

☑ the time when the stick is at its highest point

☑ the height of the stick when it is dropped from Miami Tower

☑ the time when the stick is dropped from the top of Miami Tower

☐ the distance of the stick from Miami Tower when it hits the ground

Go On

5.

Some of the steps in Raya's solution to $2.5(6.25x + 0.5) = 11$ are shown.

Statement	Reason
1. $2.5(6.25x + 0.5) = 11$	1. Given
2.	2.
3.	3. Subtraction property of equality
4. $x = 0.624$	4. ?

Select the correct reason for line 4 of Raya's solution.

- Closure property
- Distributive property
- Addition property of equality
- Division property of equality
- Symmetric property of equality

6.

Cora is using successive approximations to estimate a positive solution to $f(x) = g(x)$, where $f(x) = x^2 + 13$ and $g(x) = 3x + 14$. The table shows her results for different input values of x.

x	$f(x)$	$g(x)$
0	13	14
1	14	17
2	17	20
3	22	23
4	29	26
3.5	25.25	24.5

Use Cora's process to find the positive solution, to the nearest tenth, of $f(x) = g(x)$.

3.3

1	2	3
4	5	6
7	8	9
0	.	-

Go On

7. Roxanne wants to test the idea that polynomials are closed under addition. Her work and explanation are shown.

Drag an expression and phrases to the boxes to complete the statement.

Add $3x^4 - 7x^3 + 12x - 9$

to $\boxed{(2x)^3 + 2.1x^2 - 11}$.

The sum is closed because $\boxed{\text{the exponents}}$

are $\boxed{\text{whole numbers}}$ and by definition

the sum is a polynomial.

$\boxed{5x^2 - (2x)^3 + (4x)^{-1}}$

$\boxed{-8x^{-2} - (3x)^3 - 12x^6 + 7}$

$\boxed{\text{the variables}}$ $\boxed{\text{the coefficients}}$

$\boxed{\text{integers}}$ $\boxed{\text{real numbers}}$

Go On

8.

The function $f(x)$ models the value of goods that are imported into the United States, where x is the number of years since 1990. The function $g(x)$ models the value of goods that are exported from the United States.

x	f(x)	g(x)
40	$ 8,859,296.92	$ 6,295,111.00
45	$10,308,975.90	$ 8,476,064.00
50	$11,833,485.40	$11,412,611.00
51	$12,147,367.00	$12,112,204.00
52	$12,464,241.80	$12,854,683.00
55	$13,432,825.40	$15,366,531.00
60	$15,106,996.00	$20,690,294.00

If $f(x)$ and $g(x)$ continue to model the importing and exporting of goods, then sometime in 2041, which is 51 years after 1990, $f(x) = g(x)$.

Determine which function is exponential. Use the table of values to justify your choice.

Type your answer in the space provided. Be sure to include your function choice.

The amount of exports will exceed the amount of imports because exponential functions grow faster than polynomial functions.

Other correct responses include:

- *The exponential function is the amount of exports because the values for the amount of imports are approximately linear.*

- *When x is less than 51, the values of exports are less than the values of imports. When x is greater than 51, the values of exports are greater than the values of imports. Therefore, the function that represents exports is the exponential function, because an exponential function will eventually exceed a polynomial function.*

Go On

9. Matthew solved the quadratic equation shown.

$$4x^2 - 24x + 7 = 3$$

One of the steps that Matthew used to solve the equation is shown.

Drag values into the boxes to complete the step and the solution.

2
3
5
6
24
32
36
148
154

Delete

Step: $4(x - \boxed{3})^2 = \boxed{32}$

Solution: $x = \boxed{3} \pm \boxed{2}\sqrt{\boxed{2}}$

Go On

10.

The system $\begin{array}{c} Px + Qy = R \\ Fx + Gy = H \end{array}$ has the solution $(3, -1)$, where F, G, H, P, Q, and R are nonzero real numbers.

Select all the systems that are also guaranteed to have the solution $(3, -1)$.

☑ $(P + F)x + (Q + G)y = R + H$
   $Fx + Gy = H$

☐ $(P + F)x + Qy = R + H$
   $Fx + (G + Q)y = H$

☐ $Px + Qy = R$
   $(3P + F)x + (3Q + G)y = 3H + R$

☑ $Px + Qy = R$
   $(F - 2P)x + (G - 2Q)y = H - 2R$

☑ $Px + Qy = R$
   $5Fx + 5Gy = 5H$

11. The graph shows *T*, the temperature of water, in degrees Celsius, in a test tube after *m* minutes of an experiment.

Drag a label to each box to correctly identify the type of rate of change between temperature and time on each part of the graph.
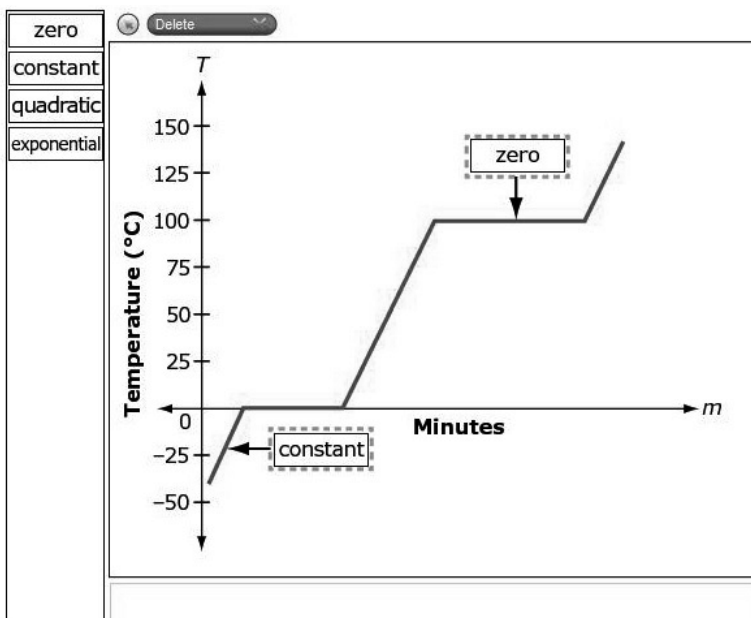
Other correct responses: "constant" in both boxes

Go On

12.

The production cost, C, in thousands of dollars, for a toy company to manufacture a ball is given by the model $C(x) = 75 + 21x - 0.72x^2$, where x is the number of balls produced in one day, in thousands. The company wants to keep its production cost at or below \$125,000. The graph shown models the situation.
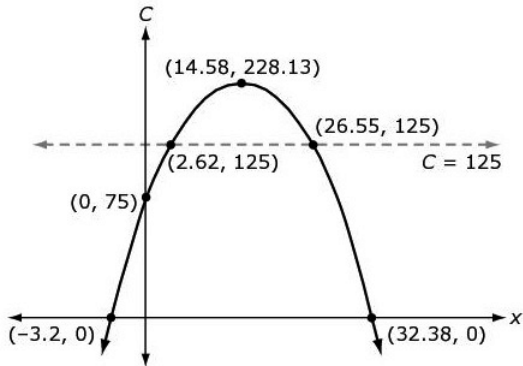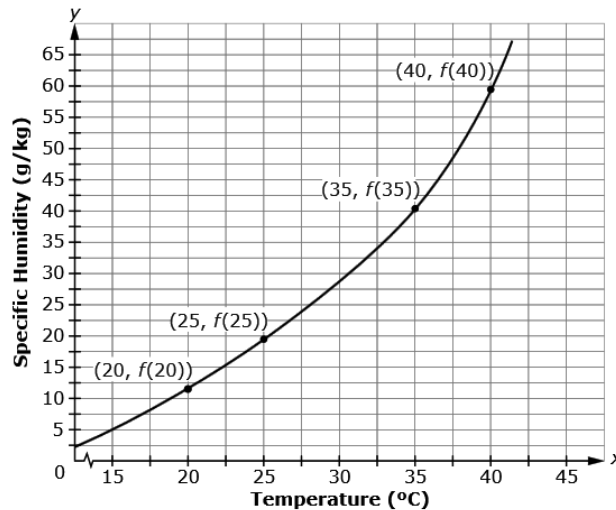

What is a reasonable constraint for the model?

Ⓐ $-3.2 \leq x \leq 32.38$

Ⓑ $2.62 \leq x \leq 26.55$

Ⓒ $-3.2 \leq x \leq 2.62$ and $26.55 \leq x \leq 32.38$

● $0 \leq x \leq 2.62$ and $26.55 \leq x \leq 32.38$

13.

The graph of function f models the specific humidity in the atmosphere, in grams of water vapor per kilogram of atmospheric gas $\left(\frac{g}{kg}\right)$, versus temperature, in degrees Celsius (°C), as shown. Four of its points are labeled.

This question has **two** parts.

Part A. Felicia wants to model the relationship between temperature, in °C, and specific humidity, in $\frac{g}{kg}$.

Select words to complete the statement about the type of model Felicia should use.

The relationship is | exponential ▾ | because the specific humidity increases by equal | factors ▾ | over equal intervals of temperature.

Part B. Which relationship must be true to justify the function type that models the relationship?
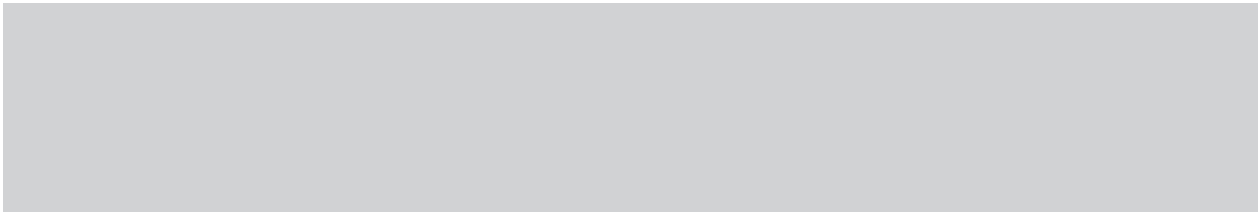
Ⓐ $\dfrac{f(20)-f(35)}{20-35} = \dfrac{f(25)-f(40)}{25-40}$

● $\dfrac{f(25)}{f(20)} = \dfrac{f(40)}{f(35)}$

Ⓒ $\dfrac{f(40)-f(35)}{40-35} = \dfrac{f(25)-f(20)}{25-20}$

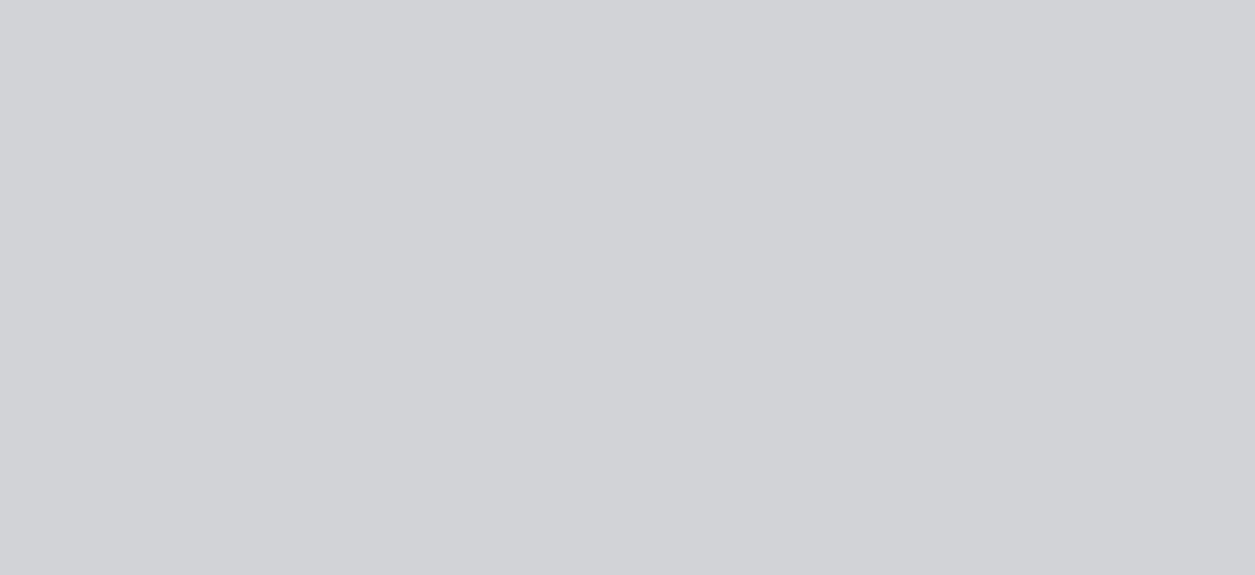Ⓓ $\dfrac{f(40)}{f(20)} = \dfrac{f(35)}{f(20)}$

Go On

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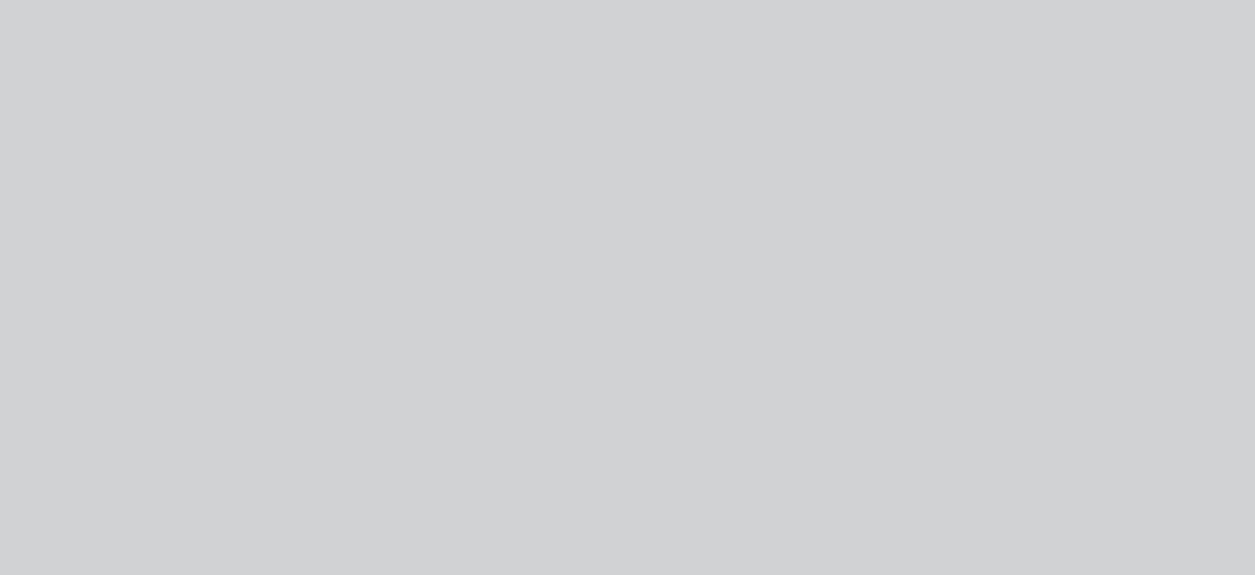# TO THE
NEXT PAGE.
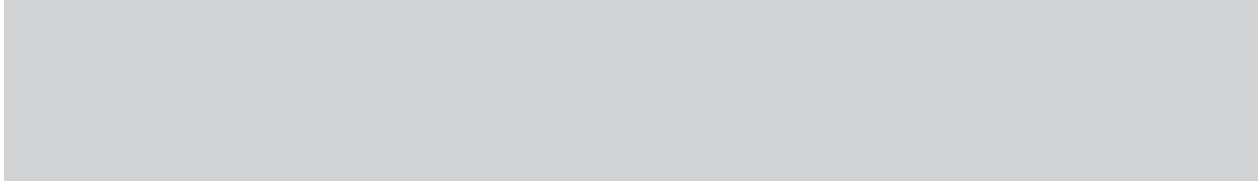
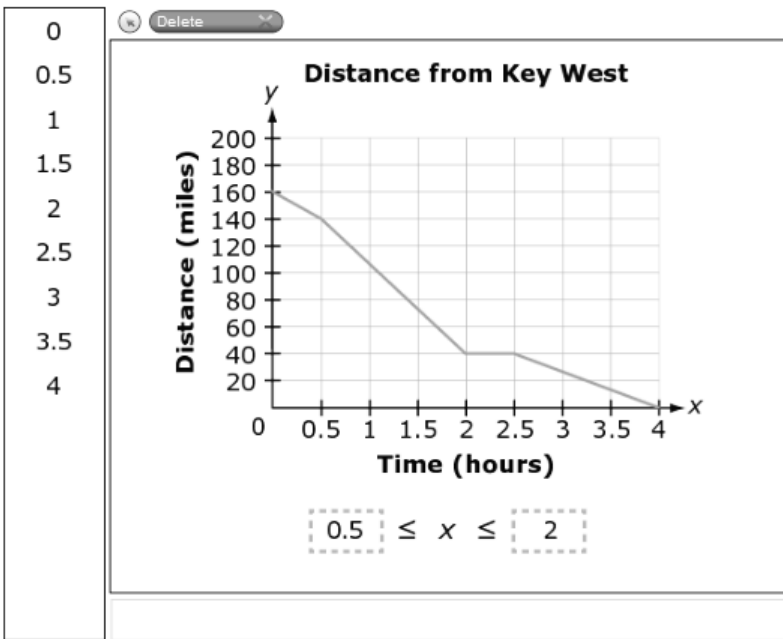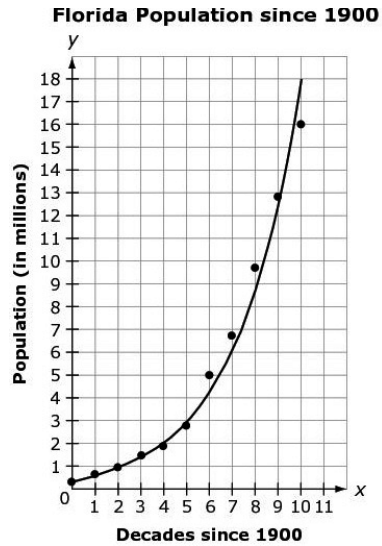# This is the end of Session 1.

Session 2

14.

Kim is driving from Miami to Key West. The graph shows her distance from Key West.

During what interval is Kim driving the fastest? Drag numbers to the boxes to complete the inequality.

| 0 |
| 0.5 |
| 1 |
| 1.5 |
| 2 |
| 2.5 |
| 3 |
| 3.5 |
| 4 |

Delete

Distance from Key West

$$0.5 \le x \le 2$$

Go On

15.

Florida Population since 1900

The points on the graph show the population data, in millions, of the state of Florida for each decade from 1900 to 2000. The data are modeled by the function $P(x) = 506975(1.43)^x$, shown on the graph.

What is the domain of the graph of $P(x)$ that is shown?

Ⓐ $x \geq 0$

Ⓑ $1900 \leq x \leq 2000$

Ⓒ   all whole numbers

● $0 \leq x \leq 10$

16.

The table shows a company's income and expenses over the last 7 days.

Day of Week	Income	Expenses
Sun.	$ 169.56	$ 256.25
Mon.	$ 217.61	$ 195.79
Tues.	$ 150.89	$1208.55
Wed.	$ 409.73	$ 709.11
Thurs.	$ 687.45	$ 190.98
Fri.	$1563.09	$ 325.78
Sat.	$1267.92	$ 315.64

The company found that its weekly income and expenses were approximately the same from week to week.

A. Select the correct definition of the variable x.

B. Drag terms to the boxes and symbols to the circles to create an equation that can be solved to approximate the number of weeks it will take for the company's income to be $10,000 more than its expenses.

1,000
3,200
4,500
10,000
1,000x
3,200x
4,500x
10,000x
+
−
•
÷
=

Delete

Part A: Variable Choices

x = day of the week	x = weekly expenses
x = weekly income	**x = number of weeks**

Part B: Equation

$$3,200x + 10,000 = 4,500x$$

Other correct responses: *for Part B, any equivalent equation*

17.

Florida	
County	**Population**
Smallest	8,349
First quartile	27,013
Median	107,056
Third quartile	337,362
Largest	2,617,176

Texas	
County	**Population**
Smallest	95
First quartile	7,057
Median	18,293
Third quartile	49,426
Largest	4,336,853

Florida has 67 counties, and Texas has 254 counties.

- The mean population for the state of Florida by county is 291,834 with a standard deviation of 467,012.03, and the median is 107,056.
- The mean population for the state of Texas by county is 104,127 with a standard deviation of 374,012.2261, and the median is 18,293.

Some of the data for both states are shown.

A business moves its corporate location from Texas to Florida. As a result of the move, 8,193 people move from the largest Texas county to the smallest Florida county, in terms of population.

Select all the population statistics that will be affected by this population change.

	Increases	Decreases	Stays the Same
Interquartile Range of Florida	☐	☐	☑
Mean of Texas	☐	☑	☐
Median of Florida	☐	☐	☑
Standard Deviation of Texas	☐	☑	☐

Go On

18. The graph shows the number of acres, in millions, of farmland in the United States from 1975 to 2008.

U.S. Farmland Area
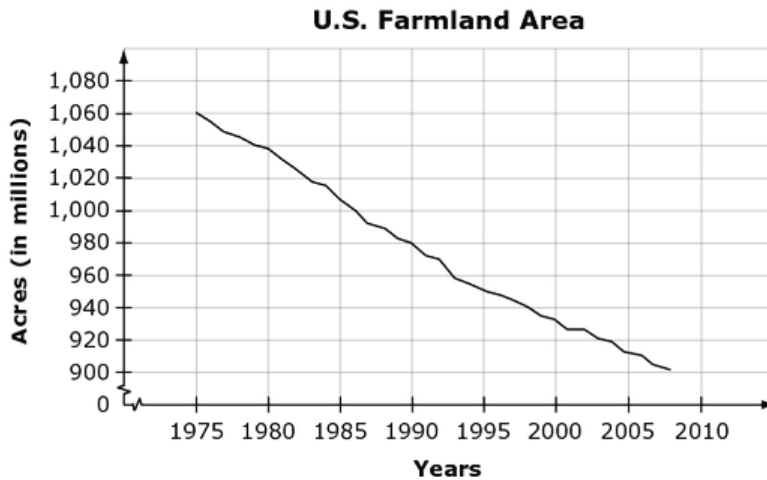
Which statement describes the average rate of change of the graph?

Ⓐ The number of acres of farmland in the United States decreases by 0.21 million each year.

⬤ The amount of farmland in the United States decreases by 4.8 million acres each year.

Ⓒ The time it takes the farmland in the United States to decrease by 160 acres is 33 years.

Ⓓ Every 5 years, the amount of farmland in the United States decreases by 20 acres.

Go On

19.

A high school drama teacher organizes a musical production. He wants to record the number of students involved in each part of the production. He uses a two-way table to display the data.

The drama teacher knows that approximately 55% more girls participate in the production as actors than as stage crew members.

Complete the two-way table to show a possible breakdown of students.

	Actors	Musicians	Stage Crew	Total
Boys	17	13	23	53
Girls	31	22	20	73
Total	48	35	43	126

Go On

20.

Chantel drew a picture of her dog on a piece of paper that is 12 centimeters long. She used a copy machine to enlarge her drawing. She used the 115% setting to make each new copy. She then used each new copy to generate the next copy, using the same copier setting.

Enter a recursive formula that will give the length of each new copy.

$a_1 = \boxed{12}$

$a_n = \boxed{1.15a_{n-1}}$

←	→	↶	↷	⌫							
1	2	3	n	a							
4	5	6	+	-	•	÷					
7	8	9	<	≤	=	≥	>				
0	.	-	$\frac{\square}{\square}$	$\square^\square$	$\square_\square$	( )	| |	$\sqrt{\square}$	$\sqrt[\square]{\square}$	π	

Other correct responses:

- *$a_1 = 13.8$*

- *any equivalent recursive equation for a_n*

Go On

21.

Sue removes the plug from a trough to drain the water inside. The volume, in gallons, in the trough after it has been unplugged can be modeled by $4t^2 - 32t + 63$, where t is time, in minutes.

A. Click on the correct property that will give Sue the amount of time it takes the trough to drain.
- minimum
- maximum
- y-intercept
- **zero**

B. Click on the expression that will reveal the property.
- $4(0)^2 - 32(0) + 63$
- **$(2t - 7)(2t - 9)$**
- $4(t - 4)^2 - 1$
- $4(t - 8)^2 + 47$

Go On

22. A company creates the equation $y = 11.26x - 76.1$ to model the relationship between the number of pages in its catalog and the number of orders, in thousands, that were received.

To determine how well the equation models the relationship, the company plots the residuals as shown.

Residual Plot

Residual Value (y-axis)

Number of Pages (x-axis)
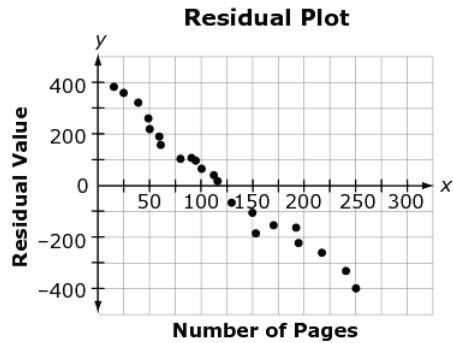
Why is the equation not a good model for the relationship?

Type your answer in the space provided.

Because the points on the residual plot have a linear pattern.

Other correct responses include:

- *Because the points on the residual plot are not randomly distributed.*

- *The residual values should be randomly distributed and have values close to 0.*

Go On

23.

A bird drops a stick from the top of Miami Tower. The height of the stick after x seconds is given by $f(x) = 625 - 16x^2$.

What is the maximum value of $f(x)$?

625

1	2	3
4	5	6
7	8	9
0	.	–

Go On

24.

A librarian in a large city collects data about his summer reading program. He collects data for two years, 2011 and 2012, on how many books are read each week. His ordered data sets are shown.

2011	2012
44,126	35,001
44,901	41,534
55,080	68,550
58,546	75,534
79,984	76,617
99,860	84,834

The librarian writes a summary about his data, as shown.

Click on each blank and select the appropriate word or phrase to complete the librarian's summary.

If you compare the means, it appears that in 2011 ⊢—⊣ approximately 71 more books were read on average than in 2012. When the medians for the two years are compared, the data show that in 2011 ⊢—⊣ approximately 15,229 fewer books were read than in 2012. As far as the spread of the data, both data sets have the same ⊢—⊣ interquartile range .
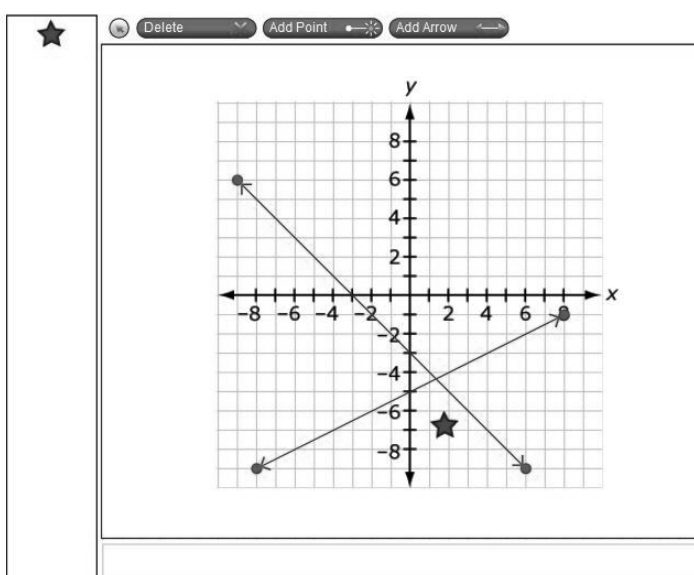
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25. A system of inequalities is shown.

$2y \leq x - 10$
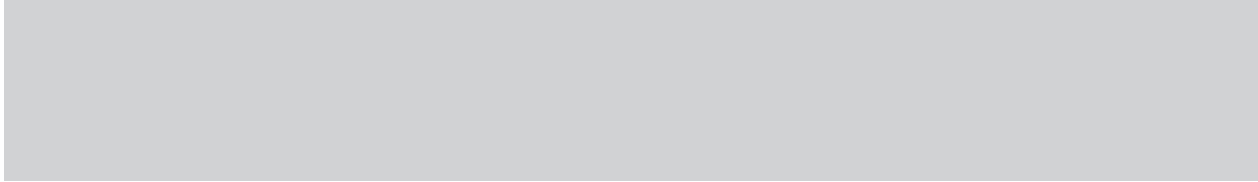$x + y \leq -3$

A. Use the Add Arrow tool to graph the boundary lines of the system.

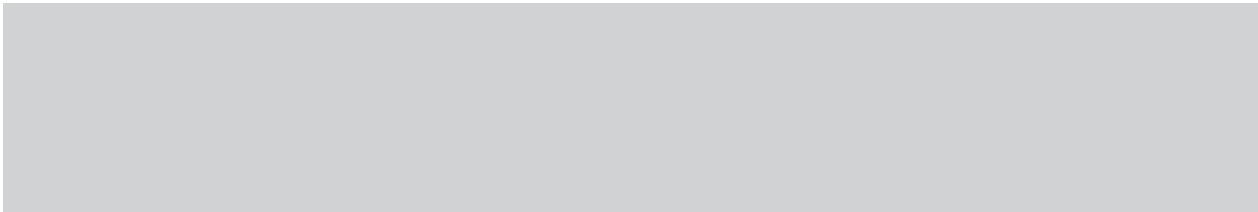B. Drag a star to each region that is in the solution set of the system.

Other correct responses:

• *The star can be placed anywhere in the correct region.*

• *Several stars can be placed on the graph as long as they are all in the correct region.*

Go On

This is the end of Session 2.

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