



**Algebra 2 PARCC EOY Sample Assessment Item #2 (non-calculator): Standard A-Int. 1**

What is the solution of the equation  $\frac{2m^2 + 3m - 5}{m^2 + 4m - 5} = 4$ ?

Enter your answer in the space provided. Enter only your answer. You may not need to use all of the answer boxes.

The calculator interface includes a toolbar with the following icons: undo, redo, clear, delete, plus, minus, multiply, divide, fraction, decimal, power, square root, equals, and approximate. Below the toolbar is a grid for input with two rows, each starting with 'm ='. To the right of the grid is a sidebar with the following categories: Numbers, Arithmetic and Units, Exponents, Roots, Logs, Relations, Geometry, and Groups.

1. What do you know about the problem?
2. What questions do you have?
3. Explain your reasoning or thinking in solving the problem.

Algebra 2 PARCC EOY Sample Assessment Item #3 (non-calculator): Standard A-REI.2

What extraneous solution arises when the equation  $\sqrt{x+3} = 2x$  is solved for  $x$  by first squaring both sides of the equation?

The image shows a digital math interface. At the top is a toolbar with various mathematical symbols and functions: a refresh icon, a left arrow, a right arrow, a delete icon, a plus sign, a minus sign, a multiplication sign, a division sign, a fraction template, a square root template, a power function  $y^x$ , a square root symbol, an equals sign, and an approximation symbol  $\approx$ . Below the toolbar is a large input area with the text  $x =$  followed by a cursor. To the right of the input area is a vertical sidebar with several menu items, each with a right-pointing arrow: Numbers, Arithmetic and Units, Exponents, Roots, Logs, Relations, Geometry, and Groups.

1. What do you know about the problem?
2. What questions do you have?
3. Explain your reasoning or thinking in solving the problem.

Consider the equation  $\frac{4x^3}{2^x} = 2$ .

**Part A**

Which equation is equivalent to the equation shown?

Select the correct answer.

- A.  $2x^3 = 2$
- B.  $2x^3 - x = 2$
- C.  $2^{2x} = 2$
- D.  $2^{2x^3 - x} = 2$

**Part B**

Which values are solutions to the equation?

Select **all** that apply.

- A.  $-2$
- B.  $-1$
- C.  $-\frac{1}{2}$
- D.  $\frac{1}{2}$
- E.  $1$
- F.  $2$

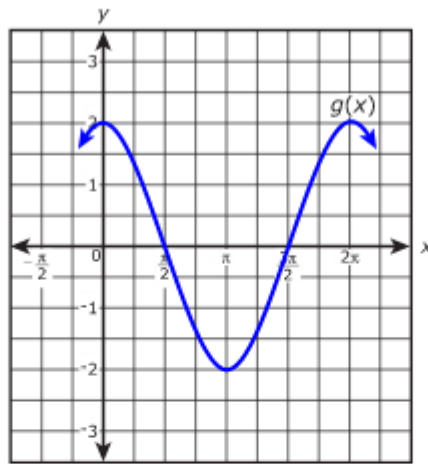
1. What do you know about the problem?
2. What questions do you have?
3. Explain your reasoning or thinking in solving the problem.



The function  $f(x) = \cos(x)$

Part A

Function  $g$  results from a transformation on function  $f$ . A portion of its graph is shown



What is the equation of  $g(x)$ ?

Write your answer in the form  $g(x) = a \cos(bx) + c$ , using real numbers for  $a$ ,  $b$ , and  $c$ .

Enter your answer in the box.

Calculator interface showing a toolbar with symbols for undo, redo, delete, plus, minus, multiply, divide, fraction, decimal, power, square root, equals, and approximate. Below the toolbar is an input field containing  $g(x) =$  and a dropdown menu with categories: Arithmetic and Units, Exponents, Roots, Logs, Relations, Geometry, Groups, and Trigonometry.

1. What do you know about the problem?
  
2. What questions do you have?
  
3. Explain your reasoning or thinking in solving the problem.

**Part A**

An expression is given.

$$x^2 - 8x + 21$$

Determine the values of  $h$  and  $k$  that make the expression  $(x - h)^2 + k$  equivalent to the given expression.

Enter your answers in the space provided. Enter **only** your answer.

Calculator toolbar with icons for: undo, redo, refresh, delete, +, -, ×, ÷, fraction, decimal, power, square root, =, and ≈.

$h =$ <input type="text"/> $k =$ <input type="text"/>	<ul style="list-style-type: none"> <li>▶ Numbers</li> <li>▶ Arithmetic and Units</li> <li>▶ Exponents, Roots, Logs</li> <li>▶ Relations</li> <li>▶ Geometry</li> <li>▶ Groups</li> </ul>
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**Part B**

An equation is given.

$$x^2 - 8x + 21 = (x - 4)^2 + 3x - 16$$

Find one value of  $x$  that is a solution to the given equation.

Use the Equation Editor. Enter **ONLY** your solution.

Calculator toolbar with icons for: undo, redo, refresh, delete, +, -, ×, ÷, fraction, decimal, power, square root, =, and ≈.

$x =$ <input type="text"/>	<ul style="list-style-type: none"> <li>▶ Numbers</li> <li>▶ Arithmetic and Units</li> <li>▶ Exponents, Roots, Logs</li> <li>▶ Relations</li> <li>▶ Geometry</li> <li>▶ Groups</li> </ul>
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Given that  $x > 0$ , which expression is equivalent to  $5\sqrt{xy} + 25\sqrt{x}$  ?

- A.  $5(xy)^{-1} + 25x^{-1}$
- B.  $25x^{\frac{1}{2}}(\sqrt{y} + 5)$
- C.  $\sqrt{x}(25y^{\frac{1}{2}} + 5)$
- D.  $5x^{\frac{1}{2}}(y^{\frac{1}{2}} + 5)$

1. What do you know about the problem?

2. What questions do you have?

3. Explain your reasoning or thinking in solving the problem.



What is the solution of the system of linear equations?

$$\begin{cases} x - 9y + 4z = 1 \\ -2x + 9y - 4z = -3 \\ 2x + y - 4z = -3 \end{cases}$$

Enter your answers in the boxes.

$x =$   ,  $y =$   ,  $z =$

1. What do you know about the problem?
2. What questions do you have?
3. Explain your reasoning or thinking in solving the problem.



**Algebra 2 PARCC EOY Sample Assessment Item #3 (calculator): Standard F-IF.6-2**

An investor deposited \$5,000 in an account that earns 1% annual interest. The amount of money in the account is represented by the function  $f(x) = 5,000(1.01)^x$ , where  $x$  represents the number of years since the account was opened.

What is the average rate of change of the function between  $x = 2$  and  $x = 7$ ?

Select from the drop-down menus to correctly complete the sentence.

The average rate of change is  .

Choose...	Choose...
37.17	dollars
51.53	dollars per year
52.04	years
72.14	years per dollar

1. What do you know about the problem?
2. What questions do you have?
3. Explain your reasoning or thinking in solving the problem.

Algebra 2 PARCC EOY Sample Assessment Item #4 (calculator): Standard F-BF.2

Paul started to train for a marathon. The table shows the number of miles Paul ran during each of the first three weeks after he began training.

Week	1	2	3
Distance (miles)	10	12	14.4

If this pattern continues, which of the listed statements could model the number of miles Paul runs  $a_n$ , in terms of the number of weeks,  $n$ , after he began training?

Select all that apply.

- A.  $a_n = 10 + 2(n - 1)$
- B.  $a_n = 10n^2$
- C.  $a_n = 10(1.2)^{n-1}$
- D.  $a_1 = 10, a_n = 1.2a_{n-1}$
- E.  $a_1 = 10, a_n = 2 + a_{n-1}$

1. What do you know about the problem?

2. What questions do you have?

3. Explain your reasoning or thinking in solving the problem.

Algebra 2 PARCC EOY Sample Assessment Item #5 (calculator): Standard N-RN.2

If  $\sqrt{\sqrt[3]{(x+1)^5}} = (x+1)^a$ , for  $x \geq -1$ , and  $a$  is a constant, what is the value of  $a$ ?

Enter your answer in the space provided. Enter **only** your fraction.

The calculator interface includes a toolbar with the following buttons: a circular arrow for undo, a circular arrow for redo, a left arrow with an 'x' for delete, a plus sign, a minus sign, a multiplication sign, a division sign, a fraction template button, a decimal template button, a power button ( $y^x$ ), a square root button ( $\sqrt{\quad}$ ), an equals sign, and an approximate sign ( $\approx$ ). To the right of the input area is a vertical list of subject categories, each with a right-pointing arrow: Numbers, Arithmetic and Units, Exponents, Roots, Logs, Relations, Geometry, Groups, Trigonometry, Statistics, and Greek.

1. What do you know about the problem?
2. What questions do you have?
3. Explain your reasoning or thinking in solving the problem.

**Algebra 2 PARCC EOY Sample Assessment Item #6 (calculator): Standard F-TF.8-2**

Angle  $\theta$  is in Quadrant II, and  $\sin \theta = \frac{4}{5}$ . What is the value of  $\cos \theta$ ?

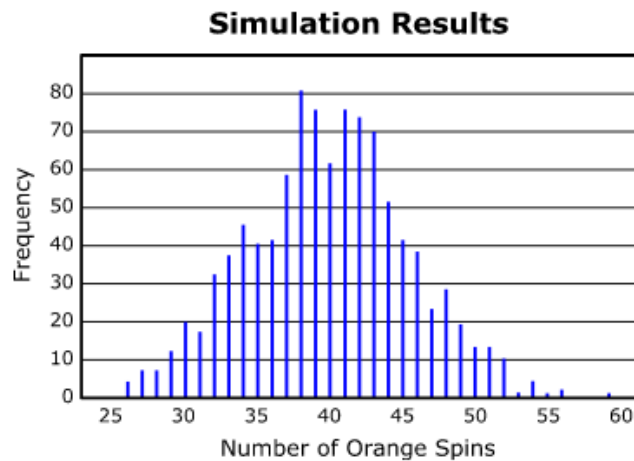
Enter your answer in the space provided. Enter **only** your fraction.

The calculator interface includes a toolbar with the following buttons: undo, redo, clear, delete, plus, minus, multiply, divide, fraction, square root, power, square root, equals, and approximate. To the right of the input area is a vertical list of subject categories: Numbers, Arithmetic and Units, Exponents, Roots, Logs, Relations, Geometry, Groups, Trigonometry, Statistics, and Greek.

1. What do you know about the problem?
2. What questions do you have?
3. Explain your reasoning or thinking in solving the problem.

**Algebra 2 PARCC EOY Sample Assessment Item #7 (calculator): Standard S-IC.2**

A circular spinner is divided into five sectors of different colors. A student spun the arrow on the spinner 200 times and recorded that the arrow stopped on the orange sector 38 times out of the 200 spins. To test whether the spinner was fair, the student used a computer to simulate the number of times the arrow stops on orange in 200 spins of a fair spinner equally divided into five sectors of different colors. The results of 1,000 trials of the simulation are shown.



Based on the results of the simulation, is there statistical evidence that the spinner is not fair?

- A. Yes, because 38 was the most frequent outcome.
- B. Yes, because about 8% of the outcomes were 38.
- C. No, because the distribution is approximately normal.
- D. No, because an outcome of 38 or less is not unusual.

1. What do you know about the problem?

2. What questions do you have?

3. Explain your reasoning or thinking in solving the problem.

Algebra 2 PARCC EOY Sample Assessment Item #8 (calculator): Standard F-BF.1b-1

The functions  $f$  and  $g$  are defined by  $f(x) = x^2$  and  $g(x) = 2x$ , respectively. Rewrite the function  $h(x) = \frac{f(2x)g(-2x)}{2}$  in terms of  $x$ .

Enter your answer in the space provided.



$h(x) = \square$

- ▶ Numbers
- ▶ Arithmetic and Units
- ▶ Exponents, Roots, Logs
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics

1. What do you know about the problem?
2. What questions do you have?
3. Explain your reasoning or thinking in solving the problem.



**Algebra 2 PARCC EOY Sample Assessment Item #9 (calculator): Standard A-REI.11-2**

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Given the functions  $h(x) = |x - 4| + 1$  and  $k(x) = x^2 + 3$ , which intervals contain a value of  $x$  for which  $h(x) = k(x)$ ?

Select all that apply.

- A.  $-4.5 < x < -3$
- B.  $-3 < x < -1.5$
- C.  $-1.5 < x < 1.5$
- D.  $1.5 < x < 3$
- E.  $3 < x < 4.5$

1. What do you know about the problem?

2. What questions do you have?

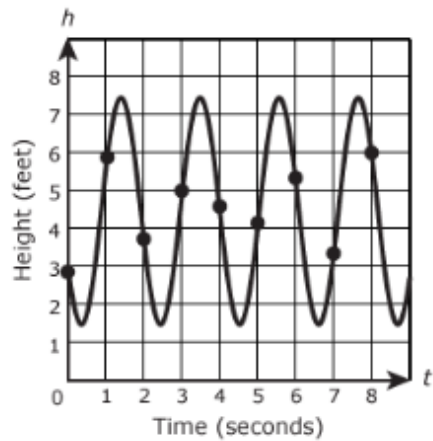
3. Explain your reasoning or thinking in solving the problem.





Algebra 2 PARCC EOY Sample Assessment Item #12 (calculator): StandardF-IF.6-7

The graph models the height  $h$  above the ground, in feet, at time  $t$  seconds of a person swinging on a swing. Each point indicated on the graph represents the height of the person above the ground at the end of each one-second interval.



Over each interval, the average rate of change in the height, in feet per second, of the person on the swing can be calculated. Order the intervals from least to greatest, based on the corresponding rate of change.

Drag and drop each interval to the correct position.

From 0 seconds to 1 second

From 2 seconds to 3 seconds

From 7 seconds to 8 seconds

Least

Greatest

1. What do you know about the problem?
2. What questions do you have?
3. Explain your reasoning or thinking in solving the problem.

**Algebra 2 PARCC EOY Sample Assessment Item #13 (calculator): Standard A-SSE.3c-2**

A scientist places 7.35 grams of a radioactive element in a dish. The half-life of the element is 2 days. After  $d$  days, the number of grams of the element remaining in the dish is given by the function

$R(d) = 7.35\left(\frac{1}{2}\right)^{\frac{d}{2}}$ . Which statement is true about the equation when it is rewritten without a fractional exponent?

Select **all** that apply.

- A. An approximately equivalent equation is  $R(d) = 7.35(0.250)^d$ .
- B. An approximately equivalent equation is  $R(d) = 7.35(0.707)^d$ .
- C. The base of the exponent in this form of the equation can be interpreted to mean that the element decays by 0.250 grams per day.
- D. The base of the exponent in this form of the equation can be interpreted to mean that the element decays by 0.707 grams per day.
- E. The base of the exponent in this form of the equation can be interpreted to mean that about 25% of the element remains from one day to the next day.
- F. The base of the exponent in this form of the equation can be interpreted to mean that about 70.7% of the element remains from one day to the next day.

1. What do you know about the problem?

2. What questions do you have?

3. Explain your reasoning or thinking in solving the problem.

## Algebra 2 PARCC EOY Sample Assessment Item #15 (calculator): Standard A-SSE.2-6

Write the expression  $x - xy^2$  as the product of the greatest common factor and a binomial.  
Then, determine the complete factorization of  $x - xy^2$ .

Enter your answers in the boxes.



Product of greatest common factor and binomial :

Complete factorization :

▶ Numbers

▶ Arithmetic and Units

▶ Exponents, Roots, Logs

▶ Relations

▶ Geometry

▶ Groups

▶ Trigonometry

▶ Statistics

▶ Greek

1. What do you know about the problem?
2. What questions do you have?
3. Explain your reasoning or thinking in solving the problem.

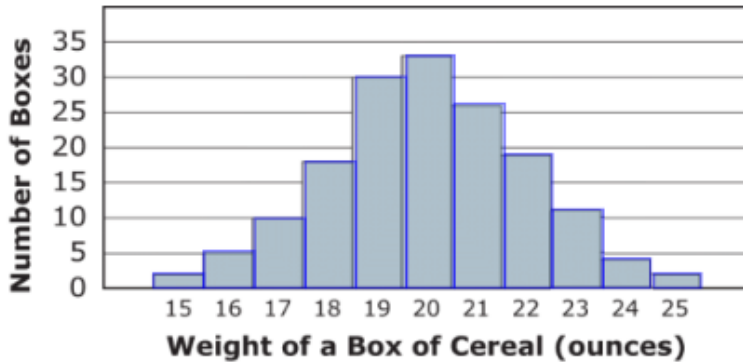
**Algebra 2 PARCC EOY Sample Assessment Item #16 (calculator): Standard S-ID.4**

The distribution of weights (rounded to the nearest whole number) of all boxes of a certain cereal is approximately normal with mean 20 ounces and standard deviation 2 ounces.

**Part A**

A sample of boxes of the cereal was selected and the weights of the selected boxes are represented in the histogram. Click on all bars of the histogram that represent the rounded weights of boxes in the sample that are within 1.5 standard deviations of the mean weight of all boxes of the cereal.

Select all that apply.



**Part B**

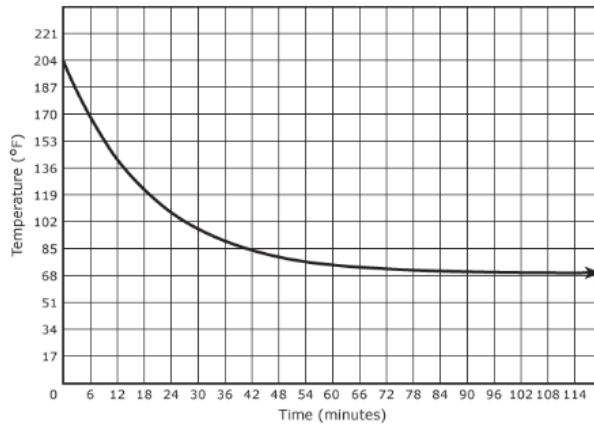
Use the histogram to estimate the number of boxes in the sample with a weight that is more than 1.5 standard deviations above the mean.

- A. 2
- B. 6
- C. 17
- D. 36

1. What do you know about the problem?
2. What questions do you have?
3. Explain your reasoning or thinking in solving the problem.

**Algebra 2 PARCC EOY Sample Assessment Item #18 (calculator): Standard F-IF.4-2**

The graph represents the temperature, in degrees Fahrenheit ( $^{\circ}\text{F}$ ), of tea for the first 120 minutes after it was poured into a cup.



**Part A**

Based on the graph, what was the temperature of the tea when it was first poured into the cup?

- A.  $68^{\circ}$
- B.  $114^{\circ}$
- C.  $136^{\circ}$
- D.  $204^{\circ}$

**Part B**

Based on the graph, as the number of minutes increased, what temperature did the tea approach?

- A.  $68^{\circ}$
- B.  $114^{\circ}$
- C.  $136^{\circ}$
- D.  $204^{\circ}$

1. What do you know about the problem?

2. What questions do you have?

3. Explain your reasoning or thinking in solving the problem.





## Algebra 2 PARCC EOY Sample Assessment Item #20 (calculator): Standard s-CP.Int.1

The two-way table shows the classification of students in a mathematics class by gender and dominant hand. A student who is ambidextrous uses both hands equally well.

	Right-handed	Left-handed	Ambidextrous	Total
Male	11	4	1	16
Female	12	2	0	14
Total	23	6	1	30

### Part A

What is the probability that a randomly selected student in the class is female given that the student is right-handed?

Enter your answer in the space provided. Enter only your fraction.



- ▶ Numbers
- ▶ Arithmetic and Units
- ▶ Exponents, Roots, Logs
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics

### Part B

One student will be selected at random from the class.

Consider the events:

$X$  the selected student is female

$Y$  the selected student is right-handed

Which statement about events  $X$  and  $Y$  is true?

- A. The events are independent because the number of right-handed students in the class is larger than the number of female students.
- B. The events are independent because the number of categories for dominant hand is different from the number of categories for gender.
- C. The events are not independent because for one of the dominant hand categories the number of female students is 0.
- D. The events are not independent because the probability of  $X$  is not equal to the probability of  $X$  given  $Y$ .

1. What do you know about the problem?

2. What questions do you have?

3. Explain your reasoning or thinking in solving the problem.

## Algebra 2 PARCC EOY Sample Assessment Item #21 (calculator): Standard F-Int.1-2

The London Eye, a Ferris wheel in England, has a diameter of 120 meters. The wheel completes a full rotation in 30 minutes at a speed which allows passengers to enter a capsule at the base of the Ferris wheel without stopping the wheel. At the highest point, a capsule reaches a height of 135 meters above the ground.

The height above the ground, in meters, of a capsule  $x$  minutes after it starts at the base of the Ferris wheel can be modeled by

$$f(x) = A \cdot \cos\left(\frac{\pi}{15}x\right) + B, \text{ where } A \text{ and } B \text{ are constants.}$$

### Part A

What values of  $A$  and  $B$  define the model?

Enter your answers in the boxes.

$A =$   and  $B =$

### Part B

Consider a capsule that begins its rotation at the base of the London Eye. At which of the times listed will the capsule be 45 meters above the ground?

Select **all** that apply.

- A. 15 minutes
- B. 25 minutes
- C. 35 minutes
- D. 45 minutes
- E. 55 minutes
- F. 65 minutes

1. What do you know about the problem?

2. What questions do you have?

3. Explain your reasoning or thinking in solving the problem.

Consider the expression  $6x^3 - 5x^2y - 24xy^2 + 20y^3$ .

**Part A**

Which expression is equivalent to  $6x^3 - 5x^2y - 24xy^2 + 20y^3$  ?

- A.  $x^2(6x - 5y) + 4y^2(6x + 5y)$
- B.  $x^2(6x - 5y) + 4y^2(6x - 5y)$
- C.  $x^2(6x - 5y) - 4y^2(6x + 5y)$
- D.  $x^2(6x - 5y) - 4y^2(6x - 5y)$

**Part B**

Which expressions are factors of  $6x^3 - 5x^2y - 24xy^2 + 20y^3$  ?

Select all that apply.

- A.  $x^2 + 4y^2$
- B.  $6x - 5y$
- C.  $x + 2y$
- D.  $6x + 5y$
- E.  $x - 2y$

1. What do you know about the problem?

2. What questions do you have?

3. Explain your reasoning or thinking in solving the problem.

Algebra 2 PARCC EOY Sample Assessment Item #24 (calculator): Standard F-IF.4-2

**Part A**

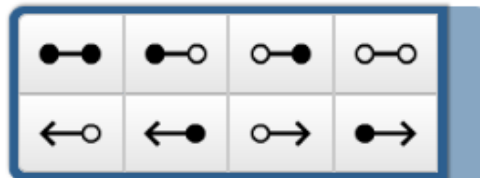
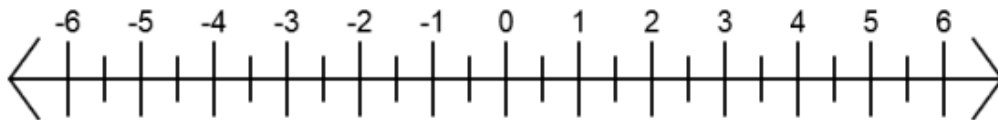
What is the  $y$ -intercept of the graph of the function in the coordinate plane?

Enter your answer in the box.

**Part B**

For what values of  $x$  is  $f(x) > 0$ ? Show your answer on the number line.

Select a solution set indicator. Drag the points on the indicator to the appropriate locations on the number line.



**Part C**

What is the end behavior of the graph of the function?

- A. As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \infty$ , and as  $x \rightarrow \infty$ ,  $f(x) \rightarrow \infty$ .
- B. As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \infty$ , and as  $x \rightarrow \infty$ ,  $f(x) \rightarrow -\infty$ .
- C. As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow -\infty$ , and as  $x \rightarrow \infty$ ,  $f(x) \rightarrow \infty$ .
- D. As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow -\infty$ , and as  $x \rightarrow \infty$ ,  $f(x) \rightarrow -\infty$ .

**Part D**

How many relative maximums does the function have?

- A. none
- B. one
- C. two
- D. three

## Algebra 2 PARCC EOY Sample Assessment Item #26 (calculator): Standard F-Int.1-2

When approximating the age of an artifact that is less than 40,000 years old, the radioisotope carbon-14 can be used. Carbon-14 is an element with the property that every 5,730 years the mass of the element in a sample is reduced by half.

The mass of the carbon-14 in an artifact can be modeled by an exponential function,  $m$ , of its age  $x$ .

### Part A

Let  $A$  represent the original mass of carbon-14. Which function is an appropriate model?

- A.  $m(x) = A \cdot 2^{-5,730x}$
- B.  $m(x) = A \cdot 2^{\frac{-x}{5,730}}$
- C.  $m(x) = A \cdot 2^{\frac{-5,730x}{40,000}}$
- D.  $m(x) = A \cdot 2^{\frac{-40,000x}{5,730}}$

### Part B

Based on the situation, which interval represents the domain of the function  $m$ ?

- A.  $0 \leq x < \infty$
- B.  $-\infty < x < \infty$
- C.  $0 \leq x \leq 5,730$
- D.  $0 \leq x \leq 40,000$

### Part C

Which statements describe the graph of  $m$  in the coordinate plane?

Select **all** that apply.

- A. The function  $m$  is a linear function.
- B. The function  $m$  is a nonlinear function.
- C. The function  $m$  is an increasing function.
- D. The function  $m$  is a decreasing function.
- E. The function  $m$  is a periodic function.