Example Items

Algebra II

Algebra II Example Items are a **representative set** of items for the ACP. Teachers may use this set of items along with the test blueprint as guides to prepare students for the ACP. On the last page, the correct answer, content SE and SE justification are listed for each item.

The specific part of an SE that an Example Item measures is NOT necessarily the only part of the SE that is assessed on the ACP. None of these Example Items will appear on the ACP.

Teachers may provide feedback regarding Example Items.

(1) Download the Example Feedback Form and email it. The form is located on the homepage of Assessment.dallasisd.org.

OR

(2) To submit directly, click "Example Feedback" **after** you login to the Assessment website.

First Semester
2018–2019
Code #: 1111

$\mathcal{ACP}$ Formulas
Algebra II/Algebra II PAP
2018–2019

Coordinate Geometry			
Midpoint:	$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$	Slope:	$m = \frac{y_2 - y_1}{x_2 - x_1}$
Distance:	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$		
Logarithms			
Product Property:	$\log_x ab = \log_x a + \log_x b$	Power Property:	$\log_b m^p = p \log_b m$
Quotient Property:	$\log_x \frac{a}{b} = \log_x a - \log_x b,\ b \neq 0$	Change of Base:	$\log_a n = \frac{\log_b n}{\log_b a}$
Properties of Exponents			
Product of Powers:	$a^m a^n = a^{(m+n)}$	Power of a Power:	$(a^m)^n = a^{mn}$
Quotient of Powers:	$\frac{a^m}{a^n} = a^{(m-n)}$	Rational Exponent:	$a^{\frac{m}{n}} = \sqrt[n]{a^m}$
Negative Exponents:	$a^{-n} = \frac{1}{a^n}$		
Quadratic Equations			
Standard Form:	$f(x) = ax^2 + bx + c$	Vertex Form:	$f(x) = a(x - h)^2 + k$
Quadratic Formula:	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	Parabolas:	$(x - h)^2 = 4py(y - k)$ $(y - k)^2 = 4py(x - h)$
Axis of Symmetry:	$x = \frac{-b}{2a}$		

Polynomials		
Perfect Square Trinomials:	$a^2 + 2ab + b^2 = (a + b)^2$	$a^2 - 2ab + b^2 = (a - b)^2$
Difference of Squares:	$a^2 - b^2 = (a - b)(a + b)$	
Sum of Cubes:	$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$	
Difference of Cubes:	$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$	
Square of a Sum:	$(a + b)^2 = (a + b)(a + b) = a^2 + 2ab + b^2$	
Square of a Difference:	$(a - b)^2 = (a - b)(a - b) = a^2 - 2ab + b^2$	
Product of a Sum and a Difference:	$(a + b)(a - b) = a^2 - b^2$	

ACP Formulas
Algebra II/Algebra II PAP
2018–2019

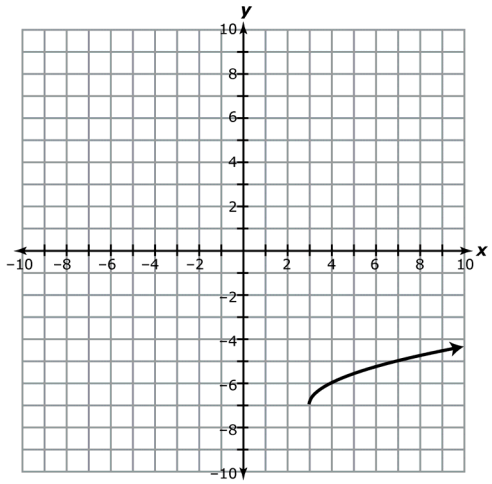
Matrices	
Adding: $\begin{bmatrix} a & b \\ c & d \end{bmatrix} + \begin{bmatrix} e & f \\ g & h \end{bmatrix} = \begin{bmatrix} a+e & b+f \\ c+g & d+h \end{bmatrix}$	Subtracting: $\begin{bmatrix} a & b \\ c & d \end{bmatrix} - \begin{bmatrix} e & f \\ g & h \end{bmatrix} = \begin{bmatrix} a-e & b-f \\ c-g & d-h \end{bmatrix}$
Multiplying by a Scalar: $k\begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} ka & kb \\ kc & kd \end{bmatrix}$	
Multiplying: $\begin{bmatrix} a & b \\ c & d \end{bmatrix} \bullet \begin{bmatrix} e & f \\ g & h \end{bmatrix} = \begin{bmatrix} ae+bg & af+bh \\ ce+dg & cf+dh \end{bmatrix}$	

EXAMPLE ITEMS Algebra II, Sem 1

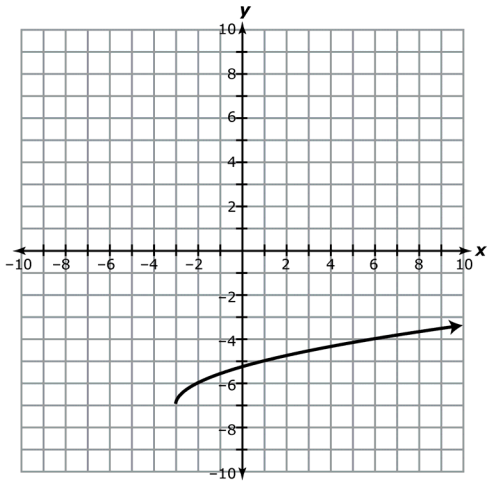
1 The graph of $f(x)$ is given.

If the domain of $f(x)$ is restricted to $[3, \infty)$, which graph represents $f^{-1}(x)$?

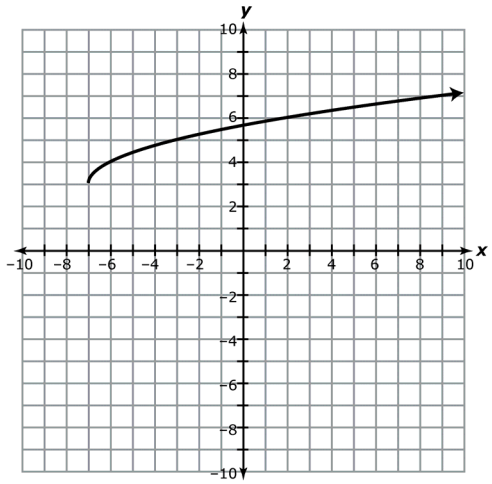
A



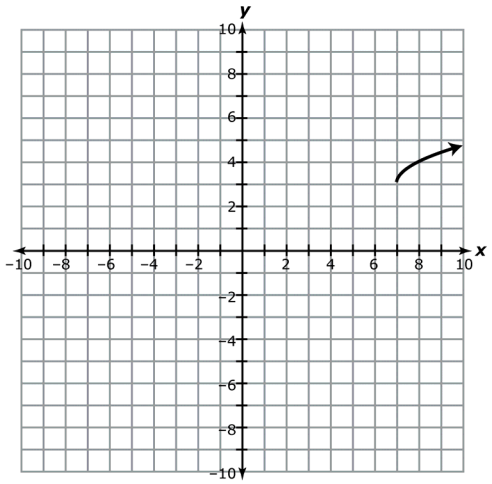
C



B



D



2 The graph of a parabola is shown.

Which equation represents this parabola?

A $f(x) = -3(x + 3)^2 - 1$

B $f(x) = -3(x - 3)^2 - 1$

C $f(x) = -2(x + 3)^2 - 1$

D $f(x) = -2(x - 3)^2 - 1$

3 If the domain of $f(x) = (x - 1)^2$ is restricted to $(-\infty, 1]$, what are the domain and range of $f^{-1}(x)$?

A Domain: $(-\infty, \infty)$
Range: $[0, \infty)$

B Domain: $(-\infty, \infty)$
Range: $(-\infty, 0]$

C Domain: $[0, \infty)$
Range: $(-\infty, 1]$

D Domain: $[0, \infty)$
Range: $[1, \infty)$

EXAMPLE ITEMS Algebra II, Sem 1

4 What value of m makes the equation $|2m + 12| = 7m - 3$ true?

Record the answer and fill in the bubbles on the grid provided. Be sure to use the correct place value.

5 What is the domain of the function $f(x) = 5\sqrt{2x - 7} + 10$?

A $x \geq \frac{7}{2}$

B $x \geq \frac{13}{2}$

C $x \geq 7$

D $x \geq 10$

6 What value of x makes the equation $|7 - x| + 4 = 2x + 5$ true?

A –12

B –8

C –4

D 2

7 If $f(x) = \sqrt{x}$ is changed to $g(x) = -\frac{1}{3}f(x)$, which statement is true?

A The graph of $f(x)$ is compressed vertically to create the graph of $g(x)$.

B The graph of $f(x)$ is reflected over the x-axis and compressed vertically to create the graph of $g(x)$.

C The graph of $f(x)$ is stretched vertically to create the graph of $g(x)$.

D The graph of $f(x)$ is reflected over the x-axis and stretched vertically to create the graph of $g(x)$.

8 The graph of the quadratic parent function, $f(x) = x^2$, is transformed to create $g(x)$ using the steps shown.

(1) vertically stretched by a factor of 2
(2) reflected over the x-axis
(3) translated four units left and three units up

What is the value of $g(1)$?

Record the answer and fill in the bubbles on the grid provided. Be sure to use the correct place value.

9 The graph of the square root parent function, $f(x) = \sqrt{x}$, is shown.

Which graph represents $f^{-1}(x)$ over the same domain?

A

C

B

D

10 The graph of a quadratic inequality is shown.

Which inequality represents this graph?

A $f(x) \geq 2x^2 - 16x + 29$

B $f(x) \leq 2x^2 - 16x + 29$

C $f(x) > 2x^2 - 16x + 29$

D $f(x) < 2x^2 - 16x + 29$

11 If $f(x) = |x + 2|$ is changed to $g(x) = 3f(x) + 4$, how is the graph of the function transformed?

A The graph of $f(x)$ is vertically stretched by a factor of 3 and translated 4 units up to create the graph of $g(x)$.

B The graph of $f(x)$ is vertically compressed by a factor of 3 and translated 4 units up to create the graph of $g(x)$.

C The graph of $f(x)$ is vertically stretched by a factor of 3 and translated 4 units down to create the graph of $g(x)$.

D The graph of $f(x)$ is vertically compressed by a factor of 3 and translated 4 units down to create the graph of $g(x)$.

EXAMPLE ITEMS Algebra II, Sem 1

12 A car collides with a truck that suddenly broke down on the highway. A police officer investigating the skid marks made by the car after the breaks were applied measures the length of the skid marks of the car to be 225 feet. The officer determines the speed of the car using the formula $s = \sqrt{21d}$, where s is the speed of the car, in miles per hour, when it begins to skid and d is the length of the skid marks measured in feet. What was the speed of the car when the breaks were applied? Round the answer to the nearest tenth.

Record the answer and fill in the bubbles on the grid provided. Be sure to use the correct place value.

13 The steps Lillian used to solve the equation $3x^{\frac{2}{3}} + 8 = 155$ are shown.

Step 1: $3x^{\frac{2}{3}} + 8 = 155$

Step 2: $3x^{\frac{2}{3}} = 147$

Step 3: $x^{\frac{2}{3}} = 49$

Step 4: $x =$ ____

Which expression completes Step 4 of Lillian's solution?

A $49^{\frac{2}{3}}$

B $49^{\frac{3}{2}}$

C $(\sqrt[3]{49})^2$

D $(\sqrt{49})^2$

14 A system of inequalities is shown on the coordinate grid.

Which system is represented by this graph?

A

$$y > -\frac{3}{4}x + 3$$
$$y \leq \frac{2}{3}x - 2$$

B

$$y > \frac{3}{4}x + 3$$
$$y \leq -\frac{2}{3}x - 2$$

C

$$y < -\frac{3}{4}x + 3$$
$$y \geq \frac{2}{3}x - 2$$

D

$$y < \frac{3}{4}x + 3$$
$$y \geq -\frac{2}{3}x - 2$$

EXAMPLE ITEMS Algebra II, Sem 1

15 Horatio has 57 coins consisting of nickels, dimes, and quarters. He has twice as many dimes as nickels. If the coins are worth a total of \$7.25, which system of equations is used to determine how many of each coin Horatio has?

A
$n + d + q = 57$
$n = 2d$
$5n + 10d + 25q = 7.25$

B
$n + d + q = 57$
$n = 2d$
$0.05n + 0.10d + 0.25q = 7.25$

C
$n + d + q = 57$
$d = 2n$
$5n + 10d + 25q = 7.25$

D
$n + d + q = 57$
$d = 2n$
$0.05n + 0.10d + 0.25q = 7.25$

16 The graph of a quadratic function has roots at −3 and −7 and a vertex at (−5, 4). What is the equation of the function in vertex form?

A $y = -(x + 5)^2 - 4$

B $y = -(x + 5)^2 + 4$

C $y = (x + 5)^2 - 4$

D $y = (x + 5)^2 + 4$

17 Which expression represents the complete factorization of $2x^3 - x^2 - 2x + 1$?

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

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

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

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

18 The graph of a system of equations is shown.

Which system of equations is represented by this graph?

A $y = -\frac{5}{4}x - 3$

$y = -\frac{3}{2}(x + 6)^2 + 8$

B $y = -\frac{5}{4}x - 3$

$y = -\frac{3}{2}(x - 6)^2 + 8$

C $y = -\frac{4}{5}x - 3$

$y = -\frac{3}{2}(x + 6)^2 + 8$

D $y = -\frac{4}{5}x - 3$

$y = -\frac{3}{2}(x - 6)^2 + 8$

19 The graph of a function is shown.

What are the domain and range of this function?

A Domain: (– , 5]
Range: (– ,)

B Domain: (– ,)
Range: (– , 5]

C Domain: (– , 3]
Range: (– ,)

D Domain: (– ,)
Range: (– , 3]

20 A system of equations is shown.

$$x - 2y + 3z = 3$$
$$2x + y + 5z = 8$$
$$3x - y - 3z = -22$$

What is the solution to this system of equations?

A (3, –4, 1)

B (4, –1, –3)

C (–3, 4, –1)

D (–4, 1, 3)

21 Given the function $f(x) = \frac{1}{4}(x + 4)^2 - 1$, which graph represents $f^{-1}(x)$ when the domain of $f(x)$ is restricted to $(-\infty, -4]$?

A

C

B

D

22 Elaine purchased juice boxes, bags of chips, and candy bars for her friends and spent a total of $25.25. The price of each item is shown in the table.

Item	Price
Candy Bar, x	$1.00
Bag of Chips, y	$0.50
Juice Box, z	$0.75

Elaine bought 6 fewer bags of chips than twice the number of candy bars. She bought 1 more juice box than candy bars. Which system of equations models this situation if x is the number of candy bars, y is the number of bags of chips, and z is the number of juice boxes purchased?

A
$$y = 6 - 2x$$
$$z = x + 1$$
$$x + 0.5y + 0.75z = 25.25$$

B
$$x = 2y - 6$$
$$x = z + 1$$
$$x + 0.5y + 0.75z = 25.25$$

C
$$x = 6 - 2y$$
$$x = z + 1$$
$$x + 0.5y + 0.75z = 25.25$$

D
$$y = 2x - 6$$
$$z = x + 1$$
$$x + 0.5y + 0.75z = 25.25$$

23 Which expression represents the complete factorization of $8x^3 + 27y^3$?

A $(2x + 3y)(4x^2 - 6xy + 9y^2)$

B $(8x + 27y)(x^2 - xy + y^2)$

C $(2x + 3y)^3$

D $(2x + 3y)(4x^2 + 9y^2)$

24 Which value of x makes the equation $\frac{1}{2}x^{\frac{4}{3}} = 52$ true?

A $104^{\frac{4}{3}}$

B $\left(\sqrt[3]{104}\right)^4$

C $104^{\frac{3}{4}}$

D $\left(\sqrt{104^4}\right)^3$

EXAMPLE ITEMS Algebra II Key, Sem 1

Item#	Key	SE	SE Justification
1	B	2A.2B	Graph the inverse of a function using notation such as $f^{-1}(x)$.
2	D	2A.4B	Write the equation of a parabola using given attributes, including vertex, axis of symmetry, and direction of opening.
3	C	2A.2C	Describe and analyze the relationship between a function and its inverse, including the restriction(s) on domain, which will restrict its range.
4	3	2A.6E	Solve absolute value linear equations.
5	A	2A.2A	Analyze the key attributes of $f(x) = \sqrt{x}$ such as domain.
6	D	2A.6E	Solve absolute value linear equations.
7	B	2A.4C	Determine the effect on a graph of $f(x) = \sqrt{x}$ when $f(x)$ is replaced by $af(x)$ for specific negative values of a.
8	–47	2A.4D	Transform a quadratic function.
9	B	2A.2C	Describe the relationship between a function and its inverse (quadratic and square root).
10	A	2A.4H	Solve quadratic inequalities.
11	A	2A.6C	Analyze the effect on the graphs of $f(x) = \|x\|$ when f(x) is replaced by $af(x)$, and $f(x) + d$ for specific real values of a and d.
12	68.7	2A.4F	Solve square root equations.
13	B	2A.7H	Solve equations involving rational exponents.
14	C	2A.3F	Solve systems of two linear inequalities in two variables.
15	D	2A.3A	Formulate systems of equations, including systems consisting of three linear equations in three variables.
16	B	2A.4B	Write the equation of a parabola using given attributes, including vertex, and direction of opening.
17	C	2A.7E	Determine linear and quadratic factors of a polynomial expression of degree three, including factoring by grouping.
18	A	2A.3A	Formulate systems of equations, including systems consisting of two equations, the first linear and the second quadratic.
19	B	2A.7I	Write the domain and range of a function in interval notation.
20	D	2A.3B	Solve systems of three linear equations in three variables.
21	B	2A.2C	Describe and analyze the relationship between a function and its inverse (quadratic and square root), including the restriction(s) on domain, which will restrict its range.
22	D	2A.3A	Formulate systems of equations, including systems consisting of three linear equations in three variables.
23	A	2A.7E	Determine linear and quadratic factors of a polynomial expression of degree three including factoring the sum of two cubes.
24	C	2A.7H	Solve equations involving rational exponents.