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 the Assessment website (assessment.dallasisd.org).

OR

(2) To submit directly: Login to the Assessment website. Under "News" in the left-hand column, click on "Sem 2 Example Items Download." Above the subjects, click on "Example Feedback Form."

Second Semester
2017–2018
Code #: 1111

$\mathcal{ACP}$ Formulas
Algebra II/Algebra II PAP
2017–2018

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:			$(a + b)(a - b) = a^2 - b^2$

$\mathcal{ACP}$ Formulas
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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: $\begin{bmatrix} a & b \\ c & d \end{bmatrix} \cdot \begin{bmatrix} e & f \\ g & h \end{bmatrix} = \begin{bmatrix} ae+bg & af+bh \\ ce+dg & cf+dh \end{bmatrix}$	

EXAMPLE ITEMS Algebra II, Sem 2

1 The table shows the number of times a new website was visited during its first week.

Day	Number of Visits
1	17
2	31
3	49
4	74
5	110
6	165
7	228

Which function best represents the data in the table?

A $f(x) = 13.84x^{1.33}$

B $f(x) = 12.64(1.53)^x$

C $f(x) = 34.36x - 41.14$

D $f(x) = 5.38x^2 - 8.69x + 23.43$

2 If $f(x) = \log x$ is changed to $g(x) = f(x + 5) - 4,$ how is the graph transformed?

A The graph of $f(x)$ is translated 5 units left and 4 units down to create the graph of $g(x)$.

B The graph of $f(x)$ is translated 5 units left and 4 units up to create the graph of $g(x)$.

C The graph of $f(x)$ is translated 5 units right and 4 units down to create the graph of $g(x)$.

D The graph of $f(x)$ is translated 5 units right and 4 units up to create the graph of $g(x)$.

3 The amount of current, c, flowing through a wire varies inversely as the amount of resistance, r. If a resistance of 50 ohms allows a current of 5 Amps, which equation represents this situation?

A $c = 250r$

B $c = 10r$

C $c = \frac{250}{r}$

D $c = \frac{10}{r}$

Dallas ISD - Example Items

EXAMPLE ITEMS Algebra II, Sem 2

4 Mr. Williams wants to show his students the correlation between study time and test grades. He randomly selects eight students and asks them how many minutes they spent studying for the most recent test. He compares the students' study times with their test grades. His data are organized in the table.

Study Time (minutes)	Test Grade
5	61
10	65
10	72
15	76
20	81
20	85
25	84
30	91

If the data is best represented by a quadratic function, what is the approximate test grade for a student who studies for 23 minutes?

A 84

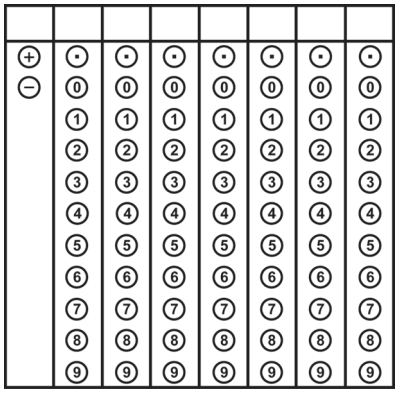
B 85

C 87

D 92

5 What value of x makes the equation $3 = \sqrt[3]{3x + 6}$ true?

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



Dallas ISD - Example Items

EXAMPLE ITEMS Algebra II, Sem 2

6 Which expression is equivalent to $\frac{x^2 + 5x + 6}{x^3 - x} \div \frac{x^2 - x - 6}{x^2 + x}$?

A $\frac{x + 3}{(x - 1)(x - 3)}$

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

C $\frac{5x + 6}{-2(x + 3)}$

D $\frac{(x + 3)x}{x(x - 1)(x - 3)}$

7 What are the domain and range for the function $f(x) = \sqrt[3]{x + 4} - 2$.

A Domain : $\{x \mid x > -4\}$
Range : $\{y \mid y > -2\}$

B Domain : $\{x \mid x > 4\}$
Range : $\{y \mid y > -2\}$

C Domain : $\{x \mid x > -4\}$
Range : {All Real Numbers}

D Domain : {All Real Numbers}
Range : {All Real Numbers}

8 What value of x makes the equation $\frac{3}{17} + \frac{7}{8 - x} = \frac{30}{51}$ true?

A -9

B $-1\frac{2}{13}$

C $17\frac{2}{13}$

D 25

Dallas ISD - Example Items

EXAMPLE ITEMS Algebra II, Sem 2

9 What value of x makes the equation $7^{2x} = 117{,}649$ true?

A 2

B 3

C 4

D 6

10 What is the domain of the function $\frac{5}{x^2 - 4x - 96}$?

A $(-\infty, -8) \cup (-8, \infty)$

B $(-\infty, -8] \cup [-8, \infty)$

C $(-\infty, -8] \cup [-8, 12] \cup [12, \infty)$

D $(-\infty, -8) \cup (-8, 12) \cup (12, \infty)$

11 Which expression is equivalent to $\frac{x+5}{x+2} + \frac{x-5}{x-3}$?

A $\frac{2x^2 - x - 25}{2x^2 - 2x - 12}$

B $\frac{2x^2 - x - 25}{x^2 - x - 6}$

C $\frac{2x}{2x - 5}$

D $\frac{4x - 1}{2x - 1}$

12 If $f(x) = x^3$ is changed to $g(x) = -f(x + 3)^3 + 2$, how is the graph transformed?

A The graph of $f(x)$ is reflected across the y-axis, then translated 3 units right and 2 units up to create the graph of $g(x)$.

B The graph of $f(x)$ is reflected across the x-axis, then translated 3 units right and 2 units up to create the graph of $g(x)$.

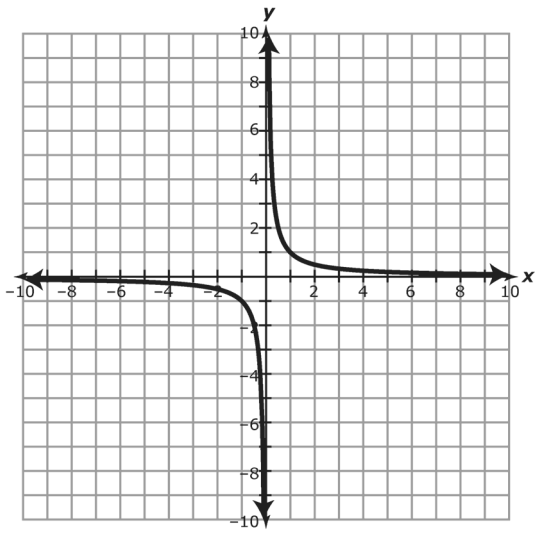
C The graph of $f(x)$ is reflected across the y-axis, then translated 3 units left and 2 units up to create the graph of $g(x)$.

D The graph of $f(x)$ is reflected across the x-axis, then translated 3 units left and 2 units up to create the graph of $g(x)$.

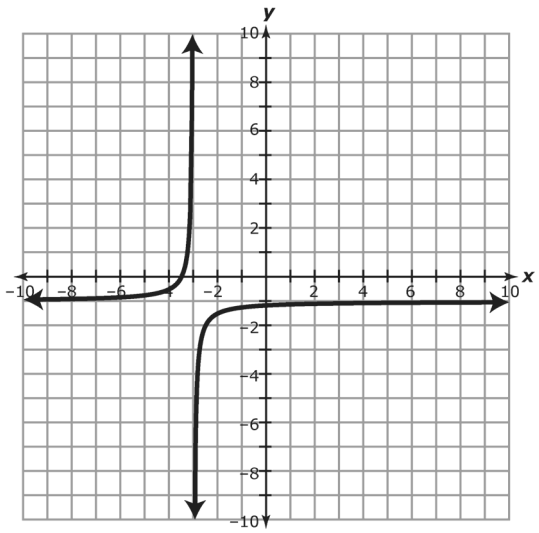
EXAMPLE ITEMS Algebra II, Sem 2

13 If the function $f(x) = \frac{1}{x}$ is changed to $g(x) = -\frac{1}{2}f(x + 3) - 1$, which graph represents $g(x)$?

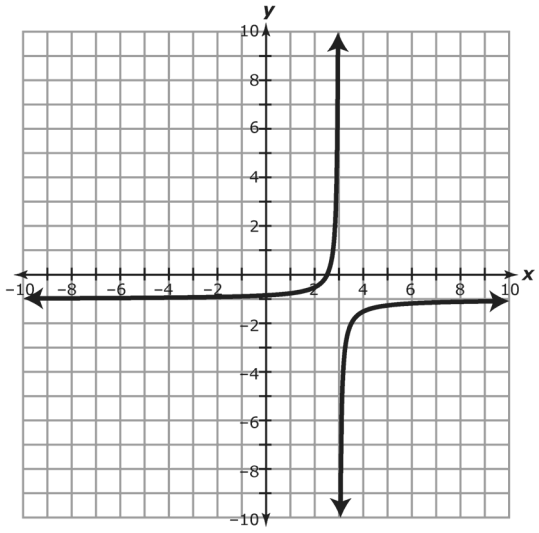
A



C



B



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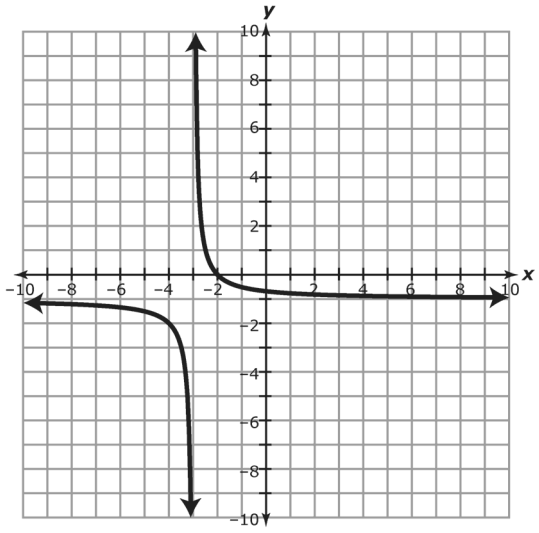


14 If $f(x) = 3^{x-1}$, which equation represents $f^{-1}(x)$?

A $f^{-1}(x) = \log_3 x + 1$

B $f^{-1}(x) = \log_3 x - 1$

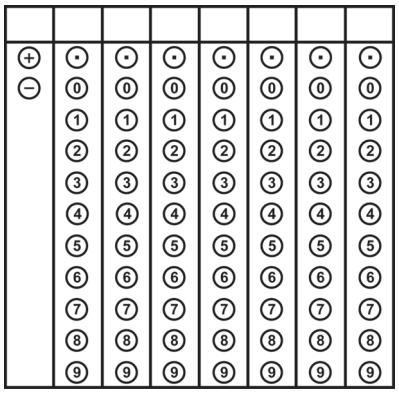
C $f^{-1}(x) = \log_3(x + 1)$

D $f^{-1}(x) = \log_3(x - 1)$

EXAMPLE ITEMS Algebra II, Sem 2

15 What value of x makes the equation $5^{\frac{4}{3}} = (4x + 7)^{\frac{2}{3}}$ true ?

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



16 Which statement about the graph of the function $f(x) = \dfrac{x^2 + 2x - 3}{x^2 + 4x + 3}$ is true?

A The graph of $f(x)$ has a vertical asymptote at $x = -1$.

B The graph of $f(x)$ has a vertical asymptote at $x = -1$ and a hole at $x = -3$.

C The graph of $f(x)$ has a vertical asymptote at $x = -1$ and a hole at $x = 3$.

D The graph of $f(x)$ has a hole at $x = -3$ and at $x = -1$.

17 If $f(x) = 2^x$ is changed to $g(x) = 3f(x + 4)$, how is the graph transformed?

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

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

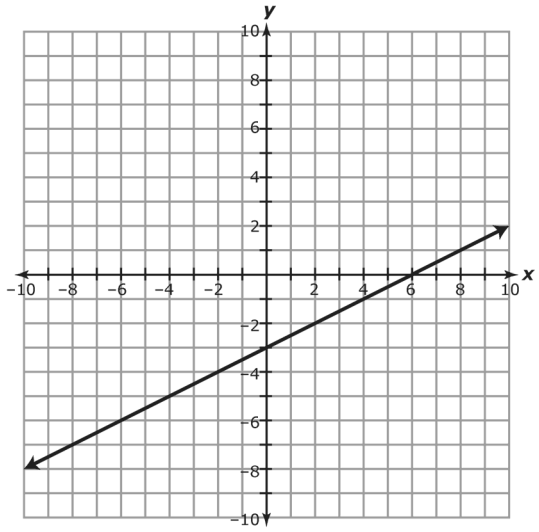
C The of $f(x)$ is vertically stretched by a factor of 3 and translated 4 units left to create the graph of $g(x)$.

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

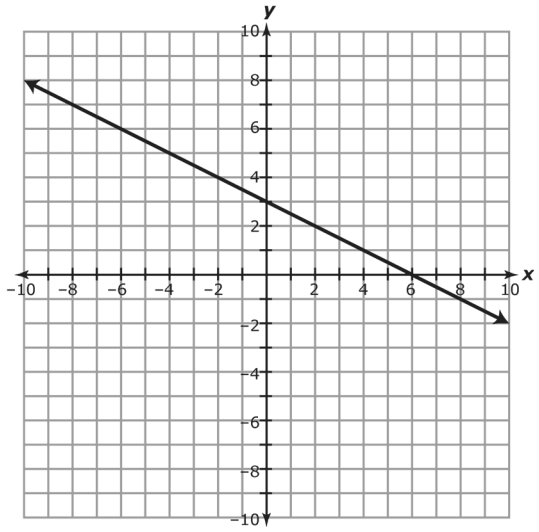
EXAMPLE ITEMS Algebra II, Sem 2

18 If $f(x) = \frac{x - 6}{2}$, which graph represents $f^{-1}(x)$?

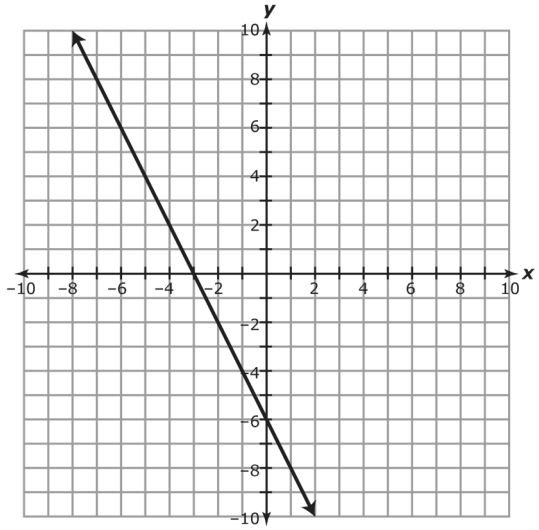
A



C



B



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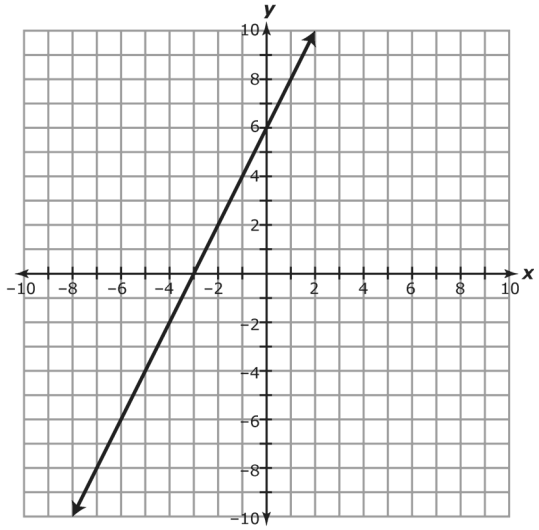

19 What is the logarithmic form of the equation $8^x = 4096$?

A $\log_x 4096 = 8$

B $\log_{4096} x = 8$

C $\log_8 4096 = x$

D $\log_{4096} 8 = x$

EXAMPLE ITEMS Algebra II Key, Sem 2

Item#	Key	SE	SE Justification
1	D	2A.8A	Analyze data to select the appropriate model from among quadratic models.
2	A	2A.5A	Determine the effects on the key attributes on the graphs of $f(x) = \log_b(x)$ where b is 10 when $f(x)$ is replaced by $f(x) + d$, and $f(x - c)$ for specific positive and negative real values of c and d.
3	C	2A.6L	Formulate equations involving inverse variation.
4	B	2A.8C	Predict and make decisions and critical judgments from a given set of data using quadratic models.
5	7	2A.6B	Solve cube root equations that have real roots.
6	A	2A.7F	Determine the quotient of rational expressions with integral exponents of degree one and of degree two.
7	D	2A.2A	Analyze the key attributes such as domain and range of the function $f(x) = \sqrt[3]{x}$.
8	A	2A.6I	Solve rational equations that have real solutions.
9	B	2A.5D	Solve exponential equations of the form $y = ab^x$ where a is a nonzero real number and b is greater than zero and not equal to one.
10	D	2A.6K	Determine the asymptotic restrictions on the domain of a rational function and represent domain using set notation.
11	B	2A.7F	Determine the sum of rational expressions with integral exponents of degree one.
12	D	2A.6A	Analyze the effect on the graphs of $f(x) = x^3$ when $f(x)$ is replaced by $af(x)$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a, c, and d.
13	C	2A.6G	Analyze the effect on the graph of $f(x) = 1/x$ when $f(x)$ is replaced by $af(x)$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a, c, and d.
14	A	2A.2C	Analyze the relationship between a function and its inverse (logarithmic and exponential).
15	4.5	2A.7H	Solve equations involving rational exponents.
16	B	2A.2A	Graph the functions $f(x) = 1/x$, and analyze the key attributes such as asymptotic behavior.
17	C	2A.5A	Determine the effects on the key attributes on the graphs of $f(x) = b^x$ when $f(x)$ is replaced by $af(x)$, [and] $f(x) + d$ for specific positive real values of a and d.
18	D	2A.2B	Graph the inverse of a function using notation such as $f^{-1}(x)$.
19	C	2A.5C	Rewrite exponential equations as their corresponding logarithmic equations.