Name: ______________________________

EOC FSA

Practice Test Key

DEPARTMENT OF
MATHEMATICS, SCIENCE, & GIFTED

BROWARD COUNTY PUBLIC SCHOOLS

Algebra 2

No Calculator Portion

Compiled by the Broward County Public Schools
Office of Instruction and Intervention
Mathematics, Science, & Gifted Department

Algebra 2 EOC FSA Practice Test (No Calculator Portion)
Answer Section

1. ANS:

The quotient can be found using polynomial long division as shown.

$$
\begin{array}{r}
x^3 - x^2 + x - 1 \\
x+1\overline{\big)\, x^4 + 0x^3 + 0x^2 + 0x - 1} \\
\underline{-(x^4 + x^3)} \\
-x^3 + 0x^2 \\
\underline{-(-x^3 - x^2)} \\
x^2 + 0x \\
\underline{-(x^2 + x)} \\
-x - 1 \\
\underline{-(-x - 1)} \\
0
\end{array}
$$

Since there is no remainder, the quotient written in $q(x) + \frac{r(x)}{b(x)}$ form is $x^3 - x^2 + x - 1$.

PTS: 1 STA: MAFS.912.A-APR.4.6

2. ANS:

The steps to write the expression in $a + bi$ form are shown.

$$
\begin{aligned}
\sqrt{-25} &= \sqrt{25}\,\sqrt{-1} \\
&= \sqrt{5^2}\,\sqrt{-1} \\
&= 5i \\
&= 0 + 5i
\end{aligned}
$$

PTS: 1 STA: MAFS.912.N-CN.1.1

3. ANS: B PTS: 1 NAT: MAFS.912.S-IC.1.1
MSC: DOK 2

4 ANS:

	8 − 2i	3	i
8 + 2i	☑	☐	☐
5i	☐	☐	☑
−4	☐	☑	☐

PTS: 1 STA: MAFS.912.N-CN.1.2

5 ANS:
3

PTS: 1 STA: MAFS.912.A-APR.2.2

6 ANS:

In the next step, to find B, we divide both sides of the equation by 4 as shown.

$$4B = 8x^2 - 12x + 20$$
$$\frac{4B}{4} = \frac{8x^2 - 12x + 20}{4}$$
$$B = 2x^2 - 3x + 5$$

PTS: 1 STA: MAFS.912.A-REI.1.1

7 ANS: D PTS: 1 STA: MAFS.912.N-RN.1.2

8 ANS:

The steps to simplify the expression are shown.

$$\left(\frac{64y^9}{x^{-3}}\right)^{\frac{1}{3}} == (64y^9x^3)^{\frac{1}{3}}$$
$$= (64)^{\frac{1}{3}}(y^9)^{\frac{1}{3}}(x^3)^{\frac{1}{3}}$$
$$= 4y^3x$$
$$= 4xy^3$$

PTS: 1 STA: MAFS.912.N-RN.1.2

9 ANS:

The difference of the two polynomials can be simplified as shown.

$$\begin{aligned}&(4x^2+7x-9)-(-2x^2-4x+6)\\&=4x^2+7x-9-(-2x^2)-(-4x)-6\\&=4x^2+7x-9+2x^2+4x-6\\&=4x^2+2x^2+7x+4x-9-6\\&=6x^2+11x-15\end{aligned}$$

PTS: 1	STA: MAFS.912.A-APR.1.1	
10 ANS: D	PTS: 1	NAT: MAFS.912.S-IC.1.1
MSC: DOK 1		
11 ANS: B	PTS: 1	STA: MAFS.912.S-CP.1.1

12 ANS:

First, note that the given function is equivalent to $h(x)=\sqrt{x}$. The square root of x is a real number for all nonnegative real numbers. Thus, the domain of the function $h(x)=\sqrt{x}$ is all real numbers greater than or equal to 0. The graph of this domain is a ray that begins at $x = 0$ and extends to include all real numbers greater than 0.

PTS: 1	STA: MAFS.912.F-IF.2.5	
13 ANS: B	PTS: 1	STA: MAFS.912.F-IF.3.7e

14 ANS:

First, note that the function is a parabola of the form $y=ax^2+bx+c$. A parabola is symmetric about its vertex, which for the given function occurs at $x=-\frac{b}{2a}=-\frac{48}{2(8)}=-3$.

Thus, the function has a minimum or maximum at $x=-3$. Then note that the coefficient of the x^2 term is positive, so the parabola opens upward. This means that the vertex must be a minimum. Therefore, the function decreases to the left of the vertex at $x=-3$ and then increases to the right of $x=-3$.

PTS: 1	STA: MAFS.912.F-IF.2.4	
15 ANS: C	PTS: 1	STA: MAFS.912.A-CED.1.4

16 ANS:

In this case, the amount of money, A, is dependent on the time, t, so the unit dollars should be placed on the dependent, or vertical, axis. Then, the information in the problem states that the time is given in years, so the best label for the independent, or horizontal, axis is years.

PTS: 1 STA: MAFS.912.N-Q.1.2

17 ANS: D PTS: 1 STA: MAFS.912.A-REI.1.2

18 ANS:

A function indicates exponential decay when its base is between 0 and 1. A function with a base greater than 1 will grow larger as x, the exponent, increases. But a function with a base between 0 and 1 will grow smaller as x increases. For example, the following is true for $y = (0.99)^x$

.

When $x = 1$, $y = 0.99$.
When $x = 2$, $y = 0.9801$.
When $x = 3$, $y = 0.970299$.

Out of the set of seven functions, the three functions $y = (0.99)^x$, $y = 0.99(0.12)^x$, and $y = (0.86)^{\frac{x}{0.3}}$ model exponential decay.

PTS: 1 STA: MAFS.912.F-IF.3.8b

19 ANS:

To write the exponential form of the equation, first subtract 2 from both sides of the equation to obtain $x-2=\log(20)$. Then, recall that an equation of the form $\log_b x = y$ is equivalent to $b^y = x$. Thus, since the base in the equation $x-2=\log(20)$ is 10, the equation is equivalent to $10^{(x-2)} = 20$.

PTS: 1 STA: MAFS.912.F-LE.1.4

20 ANS: C PTS: 1 NAT: MAFS.912.S-IC.2.3

MSC: DOK 3

21 ANS:

To find the inverse of $g(x)$, replace $g(x)$ with x and x with y in the statement of $g(x)$ and solve for y as shown.

$$g(x) = 3x^2 - 2$$
$$x = 3y^2 - 2$$
$$x + 2 = 3y^2$$
$$\frac{x+2}{3} = y^2$$
$$\pm\sqrt{\frac{x+2}{3}} = y$$

Then, since the value of x must be nonnegative in the original function $g(x)$, the value of y in the new function must be nonnegative. Thus, the inverse of g(x) is $f(x) = \sqrt{\frac{x+2}{3}}$.

PTS: 1	STA: MAFS.912.F-BF.2.4a	
22 ANS: B	PTS: 1	STA: MAFS.912.F-TF.1.1
23 ANS: D	PTS: 1	STA: MAFS.912.A-CED.1.4

24 ANS:

To solve the equation, divide both sides by 4, take the square root of both sides, and then subtract 7 from both sides as shown.

$$4(x+7)^2 = 11$$

$$(x+7)^2 = \frac{11}{4}$$

$$\sqrt{(x+7)^2} = \pm\sqrt{\frac{11}{4}}$$

$$x+7 = \pm\frac{\sqrt{11}}{2}$$

$$x = -7 \pm \frac{\sqrt{11}}{2}$$

Thus, one solution to the equation is $x = -7 + \frac{\sqrt{11}}{2}$, and the other is $x = -7 - \frac{\sqrt{11}}{2}$. Other equivalent expressions are also acceptable.

PTS: 1 STA: MAFS.912.A-REI.2.4b

25 ANS:

The radical form $\sqrt[3]{x}$ is equivalent to $x^{\frac{1}{3}}$. The multiplication rule for exponents is consistent in radical and exponential form, allowing equations such as $(\sqrt[3]{x})^3 = \left(x^{\frac{1}{3}}\right)^3 = x$ to be true.

PTS: 1 STA: MAFS.912.N-RN.1.1

26 ANS: A PTS: 1 STA: MAFS.912.S-IC.2.4

27 ANS: B PTS: 1 STA: MAFS.912.G-GPE.1.2

28 ANS: B PTS: 1 NAT: MAFS.912.S-IC.2.3

MSC: DOK 1

29 ANS: A

	Feedback
A	
B	
C	
D	

PTS: 1 STA: MAFS.912.G-GPE.1.2

30 ANS: C PTS: 1 NAT: MAFS.912.S-IC.1.1

MSC: DOK 2

31 ANS:

Since the original square has side length x and the new square is created by subtracting y from each side, the new square has side length $x-y$. Then the area of the new square is given by $(x-y)^2$. Thus, in expanded form, the area is

$(x-y)^2 = (x-y)(x-y) = x^2 - 2xy + y^2$.

PTS: 1 STA: MAFS.912.A-SSE.1.2

32 ANS:

To find the value of x where $f(x) = g(x)$, set the functions equal to each other and solve as shown.

$$f(x) = g(x)$$

$$3x + 1 = -\frac{3}{2}x - 7$$

$$3x + \frac{3}{2}x = -1 - 7$$

$$\frac{9}{2}x = -8$$

$$x = -\frac{16}{9}$$

PTS: 1 STA: MAFS.912.A-REI.4.11

33 ANS: B PTS: 1 STA: MAFS.912.S-IC.1.2

34 ANS:

The expression can be factored by removing the common factor and using the perfect-square trinomial formula as shown.

$$2x^2+16x+32=2(x^2+8x+16)$$
$$=2(x^2+(4+4)x+4^2)$$
$$=2(x+4)(x+4)$$
$$=2(x+4)^2$$

PTS: 1 STA: MAFS.912.A-SSE.1.2

35 ANS: C PTS: 1 STA: MAFS.912.S-CP.2.6

36 ANS: A PTS: 1 STA: MAFS.912.S-IC.2.6

37 ANS: D PTS: 1 STA: MAFS.912.S-CP.1.2

MSC: 2

38 ANS:

The calculations used to find $a_1 - a_2 + \frac{3}{7}$ are shown below.

$$a_1 - a_2 + \frac{3}{7} = \left(\frac{3}{4}+\frac{1}{2}i\right) - \left(\frac{1}{4}+\frac{1}{6}i\right) + \frac{3}{7}$$
$$= \frac{3}{4} + \frac{1}{2}i - \frac{1}{4} - \frac{1}{6}i + \frac{3}{7}$$
$$= \frac{3}{4} - \frac{1}{4} + \frac{3}{7} + \frac{1}{2}i - \frac{1}{6}i$$
$$= \frac{21}{28} - \frac{7}{28} + \frac{12}{28} + \frac{3}{6}i - \frac{1}{6}i$$
$$= \frac{26}{28} + \frac{2}{6}i$$
$$= \frac{13}{14} + \frac{1}{3}i$$

PTS: 1 STA: MAFS.912.N-CN.1.2

39 ANS:

$x^2 = 16y$; 1 ft

PTS: 1 STA: MAFS.912.G-GPE.1.2

40 ANS:

The vertex of a quadratic function f(x) occurs at the point where $x = -\frac{b}{2a}$. Thus, for $h(t)$, the value of t at the vertex is $t = -\frac{0}{2(-4.9)} = 0$. Then, since $h(0) = 4$, the correct graph is given by placing the vertex of the given parabola at (0, 4).

PTS: 1 STA: MAFS.912.F-IF.3.7a

41 ANS:

The horizontal asymptote is found by dividing the leading coefficient of the numerator by the leading coefficient of the denominator. Thus, the horizontal asymptote is $y = \frac{8}{4}$, or $y = 2$.

PTS: 1 STA: MAFS.912.F-IF.3.7d

42 ANS:

The parabola should open down because the leading coefficient, −2, is less than 0. The equation is in vertex form showing that its vertex is (-1,0). The transformation represented by $f(x) + 3$ shifts $f(x)$ vertically by 3 units. So, the vertex after the transformation should be (−1, 3).

PTS: 1 STA: MAFS.912.F-BF.2.3

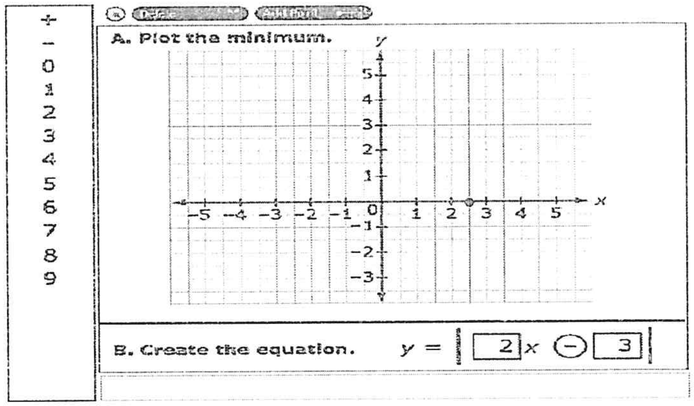
43 ANS:

The table of values represents an absolute value function.

x	y
−1	5
0	3
1	1
2	1
3	3

A. Use the Add Point tool to plot the minimum of this function.

B. Drag numbers into the boxes and an operation symbol into the circle to create the equation of this function.



For part A, an absolute value function that opens up has a minimum at its vertex. From the table, the x-coordinate of the vertex must be halfway between the two points with the same y-coordinate, (1,1) and (2,1). Thus, the x-coordinate is $\frac{3}{2}$. Then since the y-value to the left of $x = \frac{3}{2}$ decreases by 2 each time the x-value increases by 1, the y-value at $x = \frac{3}{2}$ for the function is one less than the y-value at $x = 1$. Thus, the vertex is at $\left(\frac{3}{2}, 0\right)$.

For part B, the equation requires the coefficient of the x term and the constant value to be identified. Since the y-value to the right of $x = \frac{3}{2}$ increases by 2 each time the x-value increases by 1, the function has a slope of 2 to the right of $x = \frac{3}{2}$. Also since the point (1,1) is on the graph to the right of $x = \frac{3}{2}$, the constant term should be 3. Thus, the function is $y = |2x - 3|$

PTS: 1 STA: MAFS.912.F-IF.3.7b

44 ANS: C PTS: 1 STA: MAFS.912.S-CP.1.2

45 ANS: D PTS: 1 STA: MAFS.912.F-IF.3.9

46 ANS: C PTS: 1 STA: MAFS.912.F-IF.2.4

47 ANS: A PTS: 1 STA: MAFS.912.A-CED.1.2

48 ANS: B

B

PTS: 1 STA: MAFS.912.A-REI.2.4a

49 ANS: B PTS: 1 NAT: MAFS.912.S-IC.2.3

MSC: DOK 3

50 ANS: B PTS: 1 STA: MAFS.912.F-IF.2.6

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Practice Test Key

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Algebra 2

Calculator Portion

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Algebra 2 EOC FSA Practice Test (Calculator Portion)
Answer Section

1 ANS:

Use the Graphing Calculator tool. Select Graphing. If not already highlighted in blue, select Expressions (Y=). Enter the equation as $Y1 = -16x^2 + 2$. Select Graph. Click on Zoom Out until the vertex is visible. The initial height of the coconut is 24 feet.

PTS: 1 STA: MAFS.912.F-LE.2.5

2 ANS:

Notice that for Colony 1 and Colony 3, the difference between consecutive numbers of cells is constant. Thus, these data increase linearly and do not represent exponential growth.

For Colony 5, the ratio between consecutive numbers of cells is constant, but the values are decreasing. This means that the data represent exponential decay.

For Colony 2 and Colony 4, the ratio between consecutive numbers of cells is constant, and the values are increasing. Thus, the only tables that represent exponential growth are the tables for Colony 2 and Colony 4.

PTS: 1 STA: MAFS.912.F-IF.3.7e

3 ANS: B PTS: 1 STA: MAFS.912.A-CED.1.3

4 ANS: C, E PTS: 1 STA: MAFS.912.A-REI.1.2

5 ANS:
-0.75 or equivalent

PTS: 1 STA: MAFS.912.A-REI.1.2

6 ANS: C PTS: 1 NAT: MAFS.912.S-ID.1.4
MSC: DOK 1

7 ANS: D PTS: 1 STA: MAFS.912.A-REI.3.6

8 ANS: B PTS: 1 STA: MAFS.912.S-CP.2.7
MSC: 2

9 ANS:

First, the function should convert x British pounds to $B(x)$ U.S. dollars. Then the function should convert $B(x)$ U.S. dollars, to Canadian dollars. Thus, the correct composite function is $C(B(x)) = C(1.59x) = 0.99(1.59x) = 1.5741x$. Therefore, to go from x British pounds to y Canadian dollars, the correct equation is $C(B(x)) = 1.5741x$.

PTS: 1 STA: MAFS.912.F-BF.1.1c

10 ANS: C PTS: 1 STA: MAFS.912.F-TF.1.1

11 ANS: A PTS: 1 STA: MAFS.912.S-CP.1.3
MSC: 1

12 ANS: D PTS: 1 STA: MAFS.912.A-SSE.1.1a

13 ANS:
-7.5 or equivalent

PTS: 1 STA: MAFS.912.A-REI.1.2

14 ANS: D PTS: 1 STA: MAFS.912.S-CP.1.3
MSC: 1

15 ANS: B PTS: 1 STA: MAFS.912.F-IF.3.8

16 ANS: D PTS: 1 NAT: MAFS.912.S-ID.1.4
MSC: DOK 2

17 ANS: B PTS: 1 STA: MAFS.912.A-REI.3.7

18 ANS:

The situation can be modeled as a linear equation in slope-intercept form, where C is the dependent variable and t is the independent variable. Since C increases by $10 for every ticket the class buys, 10 should be the coefficient of t that gives the slope of the linear function. Since C is $20 even when no tickets have been bought, at $t = 0$, 20 is the intercept. So the representative equation can be written as $C = 10t + 20$. Only one other equation in part A is equivalent: $-10t + C = 20$.

In part B, the line should start at (0, 20), the intercept. It should then continue increasing at a rate of $10 per ticket, or with a slope of 10.

PTS: 1 STA: MAFS.912.A-CED.1.2

19 ANS: C PTS: 1 STA: MAFS.912.S-CP.2.7
MSC: 2

20 ANS: D PTS: 1 STA: MAFS.912.F-BF.1.2

21 ANS: D PTS: 1 STA: MAFS.912.F-TF.1.2

22 ANS: B PTS: 1 STA: MAFS.912.A-SSE.2.4

23 ANS: C PTS: 1 STA: MAFS.912.S-CP.1.2
MSC: 2

24 ANS: B PTS: 1 STA: MAFS.912.S-CP.1.5

25 ANS: A PTS: 1 STA: MAFS.912.F-TF.3.8

26 ANS: C PTS: 1 NAT: MAFS.912.S-ID.1.4
MSC: DOK 2

27 ANS:
Part A:h= 4,k= 5
Part B: 7

PTS: 1 STA: MAFS.912.A-REI.1.2

28 ANS: C PTS: 1 STA: MAFS.912.S-CP.1.2
MSC: 2

29 ANS: D
Write a system of equations for the price of each item. Using elimination and substitution, find one of the values and then substitute it in your equations.

	Feedback
A	Did you interchange the prices?
B	You have substituted the values incorrectly.
C	Did you calculate the quantities correctly?
D	Correct!

PTS: 1 STA: MAFS.912.A-CED.1.2

30 ANS: D PTS: 1 STA: MAFS.912.S-CP.1.4

31 ANS: B, E PTS: 1 STA: MAFS.912.A-CED.1.2

32 ANS: D PTS: 1 STA: MAFS.912.S-IC.2.5

33 ANS: C PTS: 1 STA: MAFS.912.F-IF.2.4

34 ANS: B PTS: 1 STA: MAFS.912.S-CP.1.3
MSC: 2

35 ANS:

The equation $5x^2 + 2x + 1 = 0$ can be solved using the quadratic formula as shown.

$$\begin{aligned} x &= \frac{-b \pm \sqrt{b^2-4ac}}{2a} \\ &= \frac{-(2) \pm \sqrt{(2)^2-4(5)(1)}}{2(5)} \\ &= \frac{-2 \pm \sqrt{-16}}{10} \\ &= \frac{-2 \pm \sqrt{16}\sqrt{-1}}{10} \\ &= \frac{-2 \pm 4i}{10} \\ &= -0.2 \pm 0.4i \end{aligned}$$

Therefore, one solution to the equation is $-0.2 + 0.4i$, and the other solution is $-0.2 - 0.4i$.

PTS: 1 STA: MAFS.912.N-CN.3.7

36 ANS: C PTS: 1 STA: MAFS.912.F-TF.1.1

37 ANS: B PTS: 1 STA: MAFS.912.S-CP.2.7
MSC: 2

38 ANS:

The equation is solved using the steps shown.

$$\begin{aligned} (x+13)^{\frac{1}{2}} &= 10 \\ \left[(x+13)^{\frac{1}{2}}\right]^2 &= 10^2 \\ x + 13 &= 100 \\ x &= 87 \end{aligned}$$

Then, since substituting this value into the original equation results in a true statement, the solution for x is 87.

PTS: 1 STA: MAFS.912.A-REI.1.2

39 ANS: D PTS: 1 STA: MAFS.912.S-CP.1.2
MSC: 2

40 ANS: B

Write a system of equations and use substitution and elimination to find the values.

	Feedback
A	The quantities of wheat and cocoa are interchanged.
B	Correct!
C	Did you substitute the values in the system of equations correctly?
D	Did you calculate the quantities correctly?

PTS: 1 STA: MAFS.912.A-CED.1.2

41 ANS: C PTS: 1 STA: MAFS.912.F-LE.1.4

42 ANS:

Evaluate the function where $t = 2$. Calculate the value of $f(2)$ as shown.

$$\begin{aligned} f(2) &= -16(2)2 + 40(2) + 6 \\ &= -64 + 80 + 6 \\ &= 22 \end{aligned}$$

PTS: 1 STA: MAFS.912.A-CED.1.1

43 ANS:

Use the Graphing Calculator tool. Select Regression. Enter the x-values in the x column. Enter the $f(x)$ values in the Y1 column. Select Exponential. The equation displayed is $Y1 = 6 * (2)^{\wedge x}$. Thus, the correct function is $f(x) = 6(2)^x$.

PTS: 1 STA: MAFS.912.A-CED.1.1

44 ANS:

The equation can be factored using the steps shown.

$$3x^2 + 14x = 5$$
$$3x^2 + 14x - 5 = 0$$
$$3x^2 + 15x - x - 5 = 0$$
$$3x^2 + (15 - 1)x - 5 = 0$$
$$(3 \cdot 1)x^2 + [(3 \cdot 5) + (1 \cdot -1)]x + (5 \cdot -1) = 0$$
$$(3x - 1)(x + 5) = 0$$

PTS: 1 STA: MAFS.912.A-SSE.2.3a

45 ANS:

The equation $y = 4x^3 - 12x^2 - 4x + 12$ can be factored as shown.

$$y = 4x^3 - 12x^2 - 4x + 12$$
$$y = 4(x^3 - 3x^2 - x + 3)$$
$$y = 4(x^2(x - 3) - (x - 3))$$
$$y = 4((x^2 - 1)(x - 3))$$
$$y = 4(x + 1)(x - 1)(x - 3)$$
$$0 = 4(x + 1)(x - 1)(x - 3)$$

From these factors, it is apparent that the zeros of the polynomial are $x = -1$, $x = 1$, and $x = 3$.

PTS: 1 STA: MAFS.912.A-APR.2.3

46 ANS: B PTS: 1 STA: MAFS.912.F-TF.2.5