EOCT Practice Items

1) What are the solutions to the equation $12x^2 = -300$?

    A. $x = \pm 5$

    B. $x = \pm 5i$

    C. $x = 5 \pm i$

    D. $x = -5 \pm i$

<div align="right">[Key: B]</div>

2) What are the solutions to the equation $2x^2 + 3x + 9 = 0$?

    A. $x = \dfrac{3}{4} \pm \dfrac{21}{4}i$

    B. $x = -\dfrac{3}{4} \pm \dfrac{21}{4}i$

    C. $x = \dfrac{3}{4} \pm \dfrac{3i\sqrt{7}}{4}$

    D. $x = -\dfrac{3}{4} \pm \dfrac{3i\sqrt{7}}{4}$

<div align="right">[Key: D]</div>

EOCT Practice Items

1) **In which expression is the coefficient of the *n* term –1?**

   A. $3n^2 + 4n - 1$

   B. $-n^2 + 5n + 4$

   C. $-2n^2 - n + 5$

   D. $4n^2 + n - 5$

   [Key: C]

2) **Which expression is equivalent to $121x^4 - 64y^6$?**

   A. $(11x^2 - 16y^2)(11x^2 + 16y^2)$

   B. $(11x^2 - 16y^3)(11x^2 - 16y^3)$

   C. $(11x^2 + 8y^2)(11x^2 + 8y^2)$

   D. $(11x^2 + 8y^3)(11x^2 - 8y^3)$

   [Key: D]

3) **The expression s^2 is used to calculate the area of a square, where *s* is the side length of the square. What does the expression $(8x)^2$ represent?**

   A. the area of a square with a side length of 8

   B. the area of a square with a side length of 16

   C. the area of a square with a side length of $4x$

   D. the area of a square with a side length of $8x$

   [Key: D]

EOCT Practice Items

1) **What are the zeros of the function represented by the quadratic expression $2x^2 + x - 3$?**

   A. $x = -\dfrac{3}{2}$ and $x = 1$

   B. $x = -\dfrac{2}{3}$ and $x = 1$

   C. $x = -1$ and $x = \dfrac{2}{3}$

   D. $x = -1$ and $x = -\dfrac{3}{2}$

[Key: A]

2) **What is the vertex of the graph of $f(x) = x^2 + 10x - 9$?**

   A. $(5, 66)$

   B. $(5, -9)$

   C. $(-5, -9)$

   D. $(-5, -34)$

[Key: D]

3) **Which of the following is the result of completing the square for the expression $x^2 + 8x - 30$?**

   A. $(x + 4)^2 - 30$

   B. $(x + 4)^2 - 46$

   C. $(x + 8)^2 - 30$

   D. $(x + 8)^2 - 94$

[Key: B]

4) **The expression $-x^2 + 70x - 600$ represents a company's profit for selling x items. For which number(s) of items sold is the company's profit equal to \$0?**

   A. 0 items

   B. 35 items

   C. 10 items and 60 items

   D. 20 items and 30 items

[Key: C]

EOCT Practice Items

1) **A garden measuring 8 feet by 12 feet will have a walkway around it. The walkway has a uniform width, and the area covered by the garden and the walkway is 192 square feet. What is the width of the walkway?**

   A. 2 feet

   B. 3.5 feet

   C. 4 feet

   D. 6 feet

   [Key: A]

2) **The formula for the surface area of a cone is $SA = \pi r^2 + \pi rs$. Which equation shows the formula in terms of s?**

   A. $s = \dfrac{SA}{\pi r} - \pi r^2$

   B. $s = \dfrac{SA}{\pi r} + \pi r^2$

   C. $s = \dfrac{SA - \pi r^2}{\pi r}$

   D. $s = \dfrac{SA + \pi r^2}{\pi r}$

   [Key: C]

3) Solve the equation $x^2 - 100 = 0$ by using square roots.

Solution:

Solve the equation using square roots.

$$x^2 = 100$$ Add 100 to both sides of the equation.

$$x = \pm\sqrt{100}$$ Take the square root of both sides of the equation.

$$x = \pm 10$$ Evaluate.

EOCT Practice Items

1) What are the solutions to the equation $2x^2 - 2x - 12 = 0$?

A. $x = -4, x = 3$

B. $x = -3, x = 4$

C. $x = -2, x = 3$

D. $x = -6, x = 2$

[Key: C]

2) What are the solutions to the equation $4x^2 + 8x + 20 = 0$?

A. $x = 1 \pm 2i$

B. $x = -1 \pm 2i$

C. $x = 1 \pm i$

D. $x = -1 \pm i$

[Key: B]

3) What are the solutions to the equation $6x^2 - x - 40 = 0$?

A. $x = -\dfrac{8}{3}, x = -\dfrac{5}{2}$

B. $x = -\dfrac{8}{3}, x = \dfrac{5}{2}$

C. $x = \dfrac{5}{2}, x = \dfrac{8}{3}$

D. $x = -\dfrac{5}{2}, x = \dfrac{8}{3}$

[Key: D]

4) **What are the solutions to the equation $x^2 - 5x = 14$?**

    A. $x = -7, x = -2$

    B. $x = -14, x = -1$

    C. $x = -2, x = 7$

    D. $x = -1, x = 14$

[Key: C]

5) **An object is thrown in the air with an initial velocity of 5 m/s from a height of 9 m. The equation $h(t) = -4.9t^2 + 5t + 9$ models the height of the object in meters after t seconds.**

    How many seconds does it take for the object to hit the ground?

    A. 0.94 seconds

    B. 1.77 seconds

    C. 1.96 seconds

    D. 9.0 seconds

[Key: C]

EOCT Practice Items
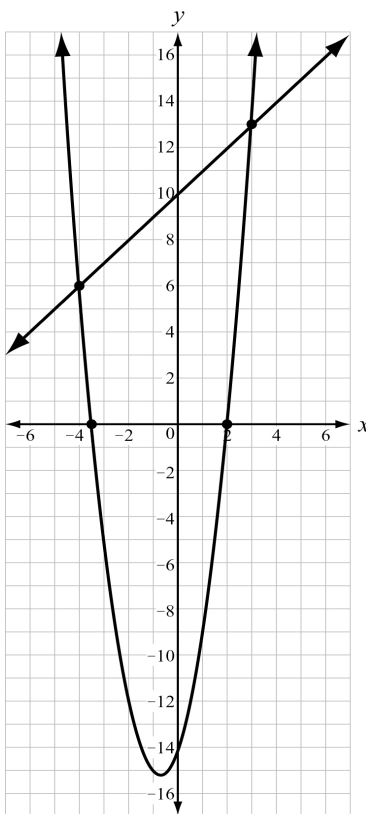
1) What are the solutions of this system of equations?

$$y = 5x^2 + 7x - 6$$
$$y = 12x - 6$$

   A. (0, 6) and (1, –6)

   B. (0, –6) and (1, –6)

   C. (0, –6) and (1, 6)

   D. (–6, 0) and (6, 1)

<div align="right">[Key: C]</div>

2) What appear to be the solutions of the system of equations shown in the graph?

   A. (4, 6) and (3, 13)

   B. (–4, 6) and (3, 13)

   C. (–4, 13) and (3, 6)

   D. (–3, 13) and (4, 6)

<div align="right">[Key: B]</div>

$$\frac{f(b)-f(a)}{b-a} = \frac{627-18}{24-3} = \frac{609}{21} = 29$$

The average rate of change between 3 and 24 months is 29 thousand dollars ($29,000) per month.

EOCT Practice Items

1) **A flying disk is thrown into the air from a height of 25 feet at time $t = 0$. The function that models this situation is $h(t) = -16t^2 + 75t + 25$, where t is measured in seconds and h is the height in feet. What values of t best describe the times when the disk is flying in the air?**

   A. $0 < t < 5$

   B. $0 < t < 25$

   C. all real numbers

   D. all positive integers

   [Key: A]

2) **Use this table to answer the question.**

x	$f(x)$
–2	15
–1	9
0	5
1	3
2	3

   What is the average rate of change of $f(x)$ over the interval $-2 \le f(x) \le 0$?

   A. –10

   B. –5

   C. 5

   D. 10

   [Key: B]

3) What is the end behavior of the graph of $f(x) = -0.25x^2 - 2x + 1$?

    A. As x increases, $f(x)$ increases.
        As x decreases, $f(x)$ decreases.

    B. As x increases, $f(x)$ decreases.
        As x decreases, $f(x)$ decreases.

    C. As x increases, $f(x)$ increases.
        As x decreases, $f(x)$ increases.

    D. As x increases, $f(x)$ decreases.
        As x decreases, $f(x)$ increases.   [Key: B]

Solution:

The minimum value of a quadratic function is the *y*-value of the vertex.
The vertex of the graph of *f*(*x*) appears to be (2, –18). So, the minimum value is –18.

Find the vertex of the function $g(x) = 4x^2 + 6x - 18$.

To find the vertex of *g*(*x*), use $\left(\dfrac{-b}{2a}, g\left(\dfrac{-b}{2a} \right) \right)$ with *a* = 4 and *b* = 6.

$$x = \frac{-b}{2a} = \frac{-(6)}{2(4)} = \frac{-6}{8} = -0.75$$

Substitute –0.75 for *x* in the original function *g*(*x*) to find *g*(–0.75):
$$g(x) = 4x^2 + 6x - 18$$
$$g(-0.75) = 4(-0.75)^2 + 6(-0.75) - 18$$
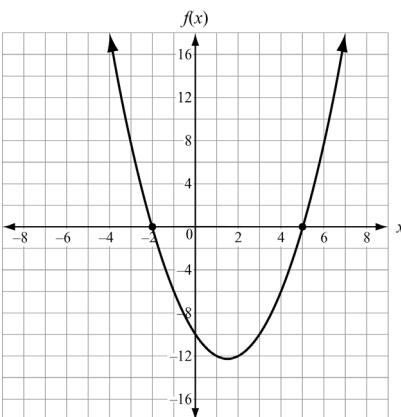$$= 2.25 - 4.5 - 18$$
$$= -20.25$$
The minimum value of *g*(*x*) is –20.25.
$-20.25 < -18$, so the function *g*(*x*) has the lesser minimum value.

EOCT Practice Items

1) **Use this graph to answer the question.**

Which function is shown in the graph?

A. $f(x) = x^2 - 3x - 10$

B. $f(x) = x^2 + 3x - 10$

C. $f(x) = x^2 + x - 12$

D. $f(x) = x^2 - 5x - 8$

[Key: A]

2) **The function $f(t) = -16t^2 + 64t + 5$ models the height of a ball that was hit into the air, where t is measured in seconds and h is the height in feet.**

This table represents the height, $g(t)$, of a second ball that was thrown into the air.

Time, t (in seconds)	Height, $g(t)$ (in feet)
0	4
1	36
2	36
3	4

Which statement BEST compares the length of time each ball is in the air?

A. The ball represented by $f(t)$ is in the air for about 5 seconds, and the ball represented by $g(t)$ is in the air for about 3 seconds.

B. The ball represented by $f(t)$ is in the air for about 3 seconds, and the ball represented by $g(t)$ is in the air for about 5 seconds.

C. The ball represented by $f(t)$ is in the air for about 3 seconds, and the ball represented by $g(t)$ is in the air for about 4 seconds.

D. The ball represented by $f(t)$ is in the air for about 4 seconds, and the ball represented by $g(t)$ is in the air for about 3 seconds.

[Key: D]

EOCT Practice Items

1) **What explicit expression can be used to find the next term in this sequence?**

   2, 8, 18, 32, 50, …

   A. $2n$

   B. $2n + 6$

   C. $2n^2$

   D. $2n^2 + 1$

   [Key: C]

2) **The function $s(t) = vt + h - 0.5at^2$ represents the height of an object, *s*, from the ground after time, *t*, when the object is thrown with an initial velocity of *v*, at an initial height of *h*, and where *a* is the acceleration due to gravity (32 feet per second squared).**

   A baseball player hits a baseball 4 feet above the ground with an initial velocity of 80 feet per second. About how long will it take the baseball to hit the ground?

   A. 2 seconds

   B. 3 seconds

   C. 4 seconds

   D. 5 seconds

   [Key: D]

3) **A café's annual income depends on *x*, the number of customers. The function $I(x) = 4x^2 - 20x$ describes the café's total annual income. The function $C(x) = 2x^2 + 5$ describes the total amount the café spends in a year. The café's annual profit, *P(x)*, is the difference between the annual income and the amount spent in a year.**

   Which function describes *P(x)*?

   A. $P(x) = 2x^2 - 20x - 5$

   B. $P(x) = 4x^3 - 20x^2$

   C. $P(x) = 6x^2 - 20x + 5$

   D. $P(x) = 8x^4 - 40x^3 - 20x^2 - 100x$

   [Key: A]

EOCT Practice Items

1) Which statement BEST describes the graph of $f(x + 6)$?

 A. The graph of $f(x)$ is shifted up 6 units.

 B. The graph of $f(x)$ is shifted left 6 units.

 C. The graph of $f(x)$ is shifted right 6 units.

 D. The graph of $f(x)$ is shifted down 6 units.

[Key: B]

2) Which of these is an even function?

 A. $f(x) = 5x^2 - x$

 B. $f(x) = 3x^3 + x$

 C. $f(x) = 6x^2 - 8$

 D. $f(x) = 4x^3 + 2x^2$

[Key: C]

3) Which statement BEST describes how the graph of $g(x) = -3x^2$ compares to the graph of $f(x) = x^2$?

 A. The graph of $g(x)$ is a vertical stretch of $f(x)$ by a factor of 3.

 B. The graph of $g(x)$ is a reflection of $f(x)$ across the x-axis.

 C. The graph of $g(x)$ is a vertical shrink of $f(x)$ by a factor of $\frac{1}{3}$ and a reflection across the x-axis.

 D. The graph of $g(x)$ is a vertical stretch of $f(x)$ by a factor of 3 and a reflection across the x-axis.

[Key: D]

EOCT Practice Items

1) A table of values is shown for *f*(*x*) and *g*(*x*).

x	*f*(*x*)
0	0
1	1
2	4
3	9
4	16
5	25

x	*g*(*x*)
0	–2
1	–1
2	1
3	5
4	13
5	29

Which statement compares the graphs of *f*(*x*) and *g*(*x*) over the interval [0, 5]?

A. The graph of *f*(*x*) always exceeds the graph of *g*(*x*) over the interval [0, 5].

B. The graph of *g*(*x*) always exceeds the graph of *f*(*x*) over the interval [0, 5].

C. The graph of *g*(*x*) exceeds the graph of *f*(*x*) over the interval [0, 4], the graphs intersect at a point between 4 and 5, and then the graph of *f*(*x*) exceeds the graph of *g*(*x*).

D. The graph of *f*(*x*) exceeds the graph of *g*(*x*) over the interval [0, 4], the graphs intersect at a point between 4 and 5, and then the graph of *g*(*x*) exceeds the graph of *f*(*x*).

[Key: D]

2) Which statement is true about the graphs of exponential functions?

A. The graphs of exponential functions never exceed the graphs of linear and quadratic functions.

B. The graphs of exponential functions always exceed the graphs of linear and quadratic functions.

C. The graphs of exponential functions eventually exceed the graphs of linear and quadratic functions.

D. The graphs of exponential functions eventually exceed the graphs of linear functions, but not quadratic functions.

[Key: C]

3) **Which statement BEST describes the comparison of the function values for *f*(*x*) and**
   ***g*(*x*)?**

x	*f(x)*	*g(x)*
0	0	−10
1	2	−9
2	4	−6
3	6	−1
4	8	6

   A. The values of *f*(*x*) will always exceed the values of *g*(*x*).

   B. The values of *g*(*x*) will always exceed the values of *f*(*x*).

   C. The values of *f*(*x*) exceed the values of *g*(*x*) over the interval [0, 5].

   D. The values of *g*(*x*) begin to exceed the values of *f*(*x*) within the interval [4, 5].

[Key D]

EOCT Practice Items

1) **This scatter plot shows the height, in feet, of a ball launched in the air from an initial height of 3 feet, and the time the ball traveled in seconds.**
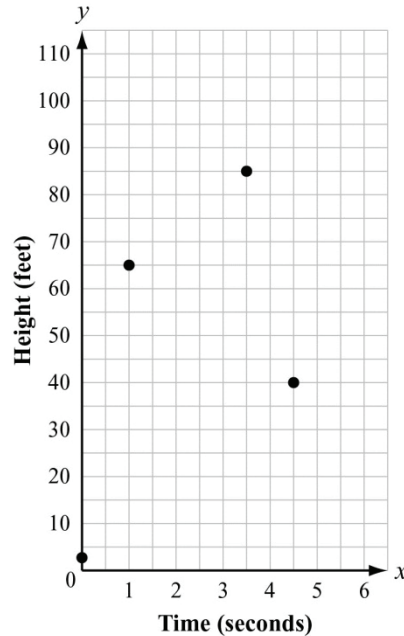
 Based on an estimated quadratic regression curve, which is the BEST estimate for the maximum height of the ball?

 A. 75 feet

 B. 85 feet

 C. 100 feet

 D. 120 feet

<div align="right">[Key: C]</div>

2) **The quadratic function $f(x) = -45x^2 + 350x + 1{,}590$ models the population of a city, where x is the number of years after 2005 and $f(x)$ is the population of the city in thousands of people. What is the estimated population of the city in 2015?**

 A. 45,000

 B. 77,000

 C. 590,000

 D. 670,000

<div align="right">[Key: C]</div>