

1. The equation  $h = 241m^{-\frac{1}{4}}$  predicts a mammal's heart rate,  $h$ , in beats per minute, based on its mass,  $m$ , in kilograms. What is the predicted heart rate, in beats per minute, of a polar bear with a mass of 326 kilograms?
- A 57  
B 67  
C 82  
D 92
2. What is the logarithmic form of the equation  $y = 20^{-\frac{3}{2}}$ ?
- A  $\log_{20} y = -\frac{3}{2}$   
B  $\log_{\frac{3}{2}} 20 = y$   
C  $-\log_{\frac{3}{2}} y = 20$   
D  $\log_{20} \left(-\frac{3}{2}\right) = y$
3. What are the values of  $x$  and  $y$  when  $(3 - 2i) - (x + yi) = (2 - 3i)$ ?
- A  $x = -1, y = -i$   
B  $x = 1, y = i$   
C  $x = 1, y = 5$   
D  $x = 1, y = 1$
4. Simplify:  $\frac{1+2i}{2-3i}$
- A  $\frac{8+i}{7}$   
B  $\frac{-4+7i}{13}$   
C  $\frac{8+7i}{7}$   
D  $-4+7i$

5. Simplify:  $\frac{\frac{1}{x} + 1}{\frac{1}{x} - 1}$

A  $\frac{1+x}{1-x}$

B  $\frac{1-x}{1+x}$

C  $\frac{1}{x}$

D  $-1$

6. Expand:  $(x + y)^4$

A  $x^4 + y^4$

B  $x^4 + 4xy + y^4$

C  $x^4 + 4x^3y + 4x^2y^2 + 4xy^3 + y^4$

D  $x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4$

7. Matrix  $G$  shows the gallons of milk sold at a dairy over a two-week period. Matrix  $D$  shows the dollar amount per gallon.

$$G = \begin{array}{l} \text{Week 1} \\ \text{Week 2} \end{array} \begin{array}{c} \mathbf{Gallons of Milk Sold} \\ \begin{array}{ccc} \text{Whole} & \text{Low Fat} & \text{Skim} \end{array} \\ \left[ \begin{array}{ccc} 181 & 450 & 102 \\ 194 & 530 & 127 \end{array} \right] \end{array}$$

$$D = \begin{array}{l} \text{Whole} \\ \text{Low Fat} \\ \text{Skim} \end{array} \begin{array}{c} \mathbf{Dollar Amount per Gallon} \\ \begin{array}{cc} \text{Revenues} & \text{Advertising Fee} \\ (\$) & (\$) \end{array} \\ \left[ \begin{array}{cc} 2.89 & 0.29 \\ 2.79 & 0.32 \\ 2.69 & 0.35 \end{array} \right] \end{array}$$

If matrix  $P$  is the product of  $G$  and  $D$ , which element in matrix  $P$  represents the total advertising fees for Week 1?

$$P = G \times D = \begin{bmatrix} p_{11} & p_{12} \\ p_{21} & p_{22} \end{bmatrix}$$

- A  $p_{11}$   
 B  $p_{21}$   
 C  $p_{12}$   
 D  $p_{22}$

## End of Goal 1 Sample Items

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## Answers to EOC Algebra II Sample Items

### Goal 1

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- Objective 1.01**  
Simplify and perform operations with rational exponents and logarithms (common and natural) to solve problems.  
**Thinking Skill:** Integrating                      **Correct Answer:** A
- Objective 1.01**  
Simplify and perform operations with rational exponents and logarithms (common and natural) to solve problems.  
**Thinking Skill:** Analyzing                      **Correct Answer:** A
- Objective 1.02**  
Define and compute with complex numbers.  
**Thinking Skill:** Applying                      **Correct Answer:** D
- Objective 1.02**  
Define and compute with complex numbers.  
**Thinking Skill:** Applying                      **Correct Answer:** B
- Objective 1.03**  
Operate with algebraic expressions (polynomial, rational, complex fractions) to solve problems.  
**Thinking Skill:** Applying                      **Correct Answer:** A
- Objective 1.03**  
Operate with algebraic expressions (polynomial, rational, complex fractions) to solve problems.  
**Thinking Skill:** Applying                      **Correct Answer:** D
- Objective 1.04**  
Operate with matrices to model and solve problems.  
**Thinking Skill:** Integrating                      **Correct Answer:** C

1. If  $f(x) = x^2 - x$  and  $g(x) = x - 1$ , what is  $f(g(x))$ ?
- A  $x^2 - x - 1$
- B  $x^2 - x - 2$
- C  $x^2 - 3x + 2$
- D  $x^2 - 3x + 1$
2. A car insurance company has a special plan for safe drivers. For each year that a driver has no tickets or violations, the premium is reduced by 10%, and a credit of \$15.00 is awarded. Which equation shows the amount a driver with no tickets or violations owes in the  $(n + 1)$ th year as a function of the amount owed in the  $n$ th year?
- A  $f(n + 1) = f(n) - 0.10 f(n) - 15$
- B  $f(n + 1) = f(n) + 0.10 f(n) + 15$
- C  $f(n + 1) = f(n) + 0.10 f(n) - 15$
- D  $f(n + 1) = f(n) - 0.10 f(n) + 15$
3. A company found that its monthly profit,  $P$ , is given by  $P = -10x^2 + 120x - 150$  where  $x$  is the selling price for each unit of product. Which of the following is the **best** estimate of the maximum price per unit that the company can charge without losing money?
- A \$300
- B \$210
- C \$11
- D \$6
4. If  $3 + 2i$  is a solution for  $x^2 + mx + n = 0$ , where  $m$  and  $n$  are real numbers, what is the value of  $m$ ?
- A  $-13$
- B  $-6$
- C  $6$
- D  $13$

5. James purchased a truck for \$25,900. The value of the truck decreases by 12% per year. What will the **approximate** value be 8 years after the purchase?
- A \$3,100  
B \$7,200  
C \$9,300  
D \$22,800
6. The Wongs bought a new house three years ago for \$92,000. The house is now worth \$113,000. Assuming a steady annual percentage growth rate, **approximately** what was the yearly rate of appreciation?
- A 7.1%  
B 18.6%  
C 22.8%  
D 61%
7. The equation  $c = 523,430(1.193)^t$  models the pounds of U.S. copper produced from 1987 to 1992. Which statement **best** interprets the coefficient and base of this equation?
- A The copper production in 1987 was 523,430 pounds, and it increased at a rate of 1.93% per year during that period.  
B The copper production in 1987 was 523,430 pounds, and it increased at a rate of 19.3% per year during that period.  
C The copper production increased by a factor of  $523,430 \times 1.193$  pounds per year during that period.  
D The copper production at the beginning of 1987 was at 1.193 pounds, and it increased by a factor of 523,430 pounds per year during that period.

8. The table shows the growth of a certain bacteria.

<b>Time in Hours, <math>x</math></b>	0	1	2	3	4	5
<b>Number of Cells, <math>N</math></b>	50	71	100	141	200	283

If  $N$  represents the number of cells at time  $x$ , which equation **best** models this set of data?

- A  $N = 45.51x + 27.05$
- B  $N = 27.05x + 45.51$
- C  $N = (1.41)(50.06)^x$
- D  $N = (50.06)(1.41)^x$
- 
9. The chart below shows the weight of fish (in thousands of pounds) caught in area lakes for six consecutive years.

<b>Elapsed Time, <math>t</math></b> (in years)	<b>Weight</b> (in thousands of pounds)
0	13.7
1	14.6
2	15.5
3	15.1
4	14.2
5	12.4

Based on the best-fit quadratic model, at which value of  $t$  will the amount of fish caught be **approximately** 6,700 pounds?

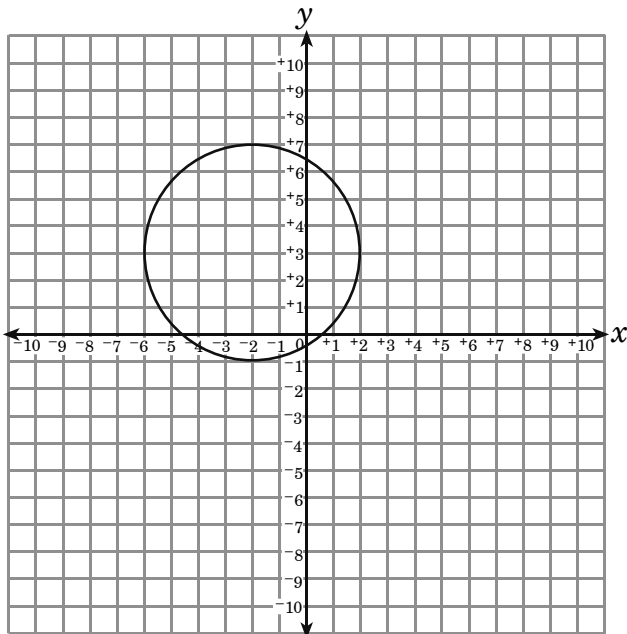
- A 6
- B 7
- C 8
- D 9

10. Solve:  $\frac{3}{x^2+x-2} + \frac{3}{x-1} = \frac{1}{x+2}$
- A  $\{-3\}$
- B  $\{-5\}$
- C  $\{2\}$
- D  $\{5\}$
11. In which direction must the graph of  $y = \frac{1}{x}$  be shifted to produce the graph of  $y = \frac{1}{x+2}$  ?
- A up
- B down
- C right
- D left
12. Which of the following is a horizontal asymptote of  $f(x) = \frac{1}{x^2-16}$ ?
- A  $x = -4$
- B  $y = 4$
- C  $x = 1$
- D  $y = 0$
13. The graph of  $g(x) = x^3 - 9x^2 + 3x - 1$  is translated up 5 units to produce the graph of the function  $h(x)$ . Which of the following could be  $h(x)$ ?
- A  $h(x) = x^3 - 9x^2 + 3x - 5$
- B  $h(x) = x^3 - 9x^2 + 3x - 4$
- C  $h(x) = x^3 - 9x^2 + 3x + 4$
- D  $h(x) = x^3 - 9x^2 + 3x + 5$
14. Mr. Greene has 8.5 in. by 11 in. cardboard sheets. As a class project, Mr. Greene asked each of his students to make an open-top box under these conditions:
- I) Each box must be made by cutting small squares from each corner of a cardboard sheet.
- II) The box must have a volume of  $48 \text{ in}^3$ .
- III) The amount of cardboard waste must be minimized.
- What is the **approximate** side length for the small squares that would be cut from the cardboard sheet?
- A 3.65 in.
- B 2.66 in.
- C 0.71 in.
- D 0.57 in.

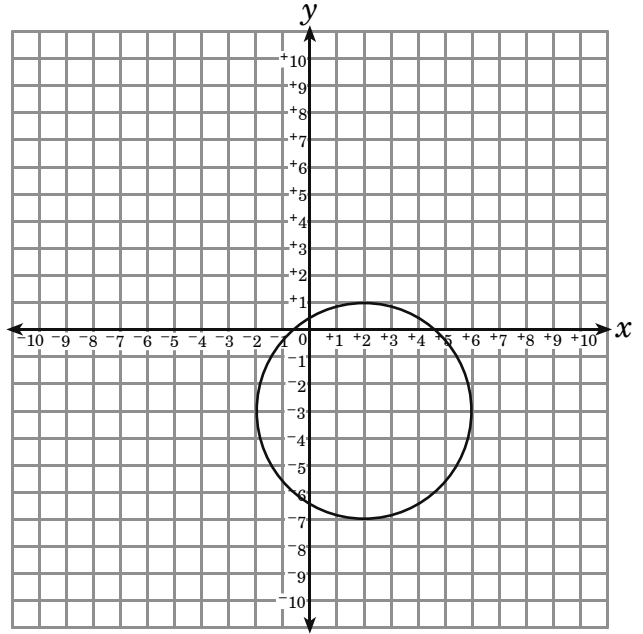
15. Solve:  $\sqrt{x+5} + \sqrt{x-3} = 4$
- A  $\{4\}$
- B  $\{\frac{1}{4}, 1\}$
- C  $\{-1, 4\}$
- D no solution
16. The point  $(3, 4)$  lies on the graph of  $f(x) = \sqrt{2x+a}$ . Which ordered pair below lies on the graph of  $g(x) = \frac{1}{2}\sqrt{2x+a}$ ?
- A  $(\frac{3}{2}, 2)$
- B  $(\frac{5}{2}, \frac{3}{2})$
- C  $(3, 2)$
- D  $(27, 8)$
17. A survey at a local high school shows 18.6% of the students read the newspaper. Results of surveys of this size can be off by as much as 1.5 percentage points. Which inequality describes the results compared to the actual percentage of students that read the newspaper,  $x$ ?
- A  $x - 0.186 \leq 0.015$
- B  $x - 0.186 > 0.015$
- C  $|x - 0.186| \leq 0.015$
- D  $|x - 0.186| > 0.015$
18. For  $y = 3|7 - 2x| + 5$ , which set describes  $x$  when  $y < 8$ ?
- A  $\{x | 3 < x < 4\}$
- B  $\{x | 3 < x < 10\}$
- C  $\{x | x < 3 \text{ or } x > 4\}$
- D  $\{x | x < 3 \text{ or } x > 10\}$

19. Which is the graph of a circle with equation  $x^2 + 4x + y^2 - 6y = 3$ ?

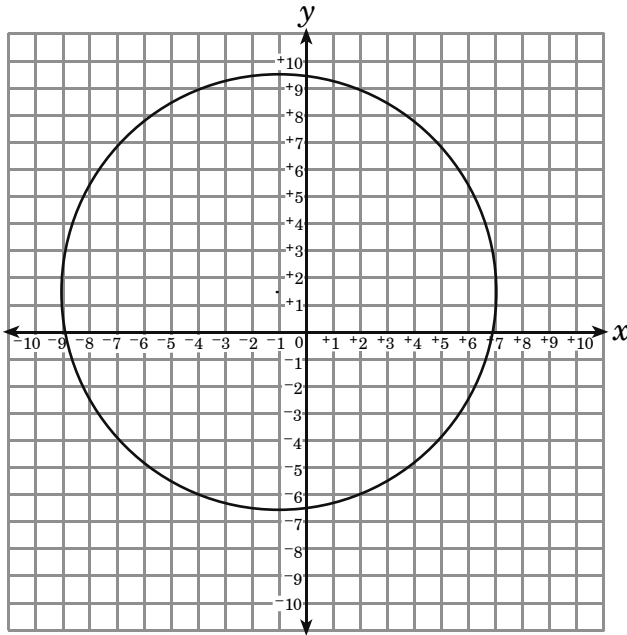
A



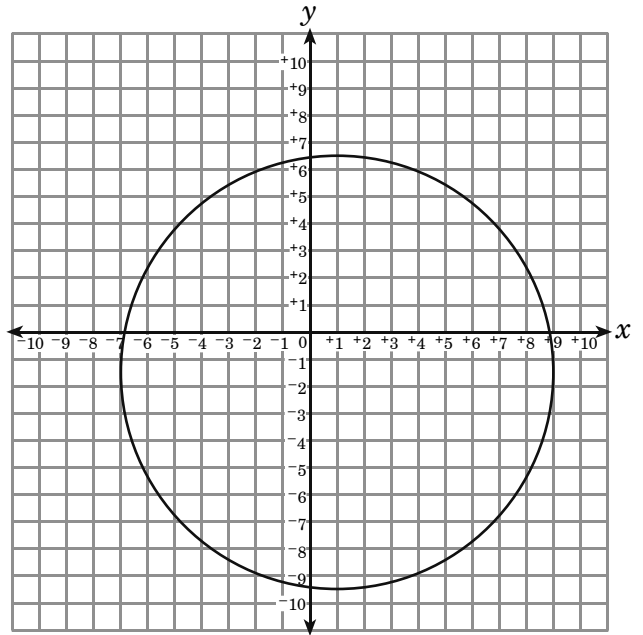
B



C



D



20. Which is an equation for the parabola that has vertex  $(-2, 3)$  and passes through the point  $(-1, 5)$ ?

A  $y = x^2 + 4x + 7$

B  $y = x^2 - 4x + 7$

C  $y = 2x^2 - 8x + 11$

D  $y = 2x^2 + 8x + 11$

21. Solve:  $y = 3x^2 + 3$   
 $y = 5 - 5x$

A  $\left\{\left(\frac{1}{3}, \frac{10}{3}\right), (2, 15)\right\}$

B  $\left\{\left(\frac{1}{3}, \frac{10}{3}\right), (-2, 15)\right\}$

C  $\left\{\left(-\frac{1}{3}, \frac{20}{3}\right), (2, -5)\right\}$

D  $\left\{\left(-\frac{1}{3}, \frac{10}{3}\right), (-2, -5)\right\}$

22. A pizza parlor charges price  $x$  for a slice of pizza and price  $y$  for a drink. Two slices of pizza and one drink cost Mary Ann \$4.50. Three slices and two drinks cost Elmo \$7.25. Which matrix could be multiplied by  $\begin{bmatrix} 4.50 \\ 7.25 \end{bmatrix}$  to find  $x$  and  $y$ ?

A  $\begin{bmatrix} -1 & 1 \\ 2 & -1 \end{bmatrix}$

B  $\begin{bmatrix} 2 & -1 \\ -3 & 2 \end{bmatrix}$

C  $\begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$

D  $\begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix}$

### End of Goal 2 Sample Items

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## Answers to EOC Algebra II Sample Items

### Goal 2

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**1. Objective 2.01**

Use the composition and inverse of functions to model and solve problems; justify results.

**Thinking Skill:** Applying

**Correct Answer:** C

**2. Objective 2.01**

Use the composition and inverse of functions to model and solve problems; justify results.

**Thinking Skill:** Analyzing

**Correct Answer:** A

**3. Objective 2.02**

Use quadratic functions and inequalities to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants and coefficients in the context of the problem.

**Thinking Skill:** Integrating

**Correct Answer:** C

**4. Objective 2.02**

Use quadratic functions and inequalities to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants and coefficients in the context of the problem.

**Thinking Skill:** Applying

**Correct Answer:** B

**5. Objective 2.03**

Use exponential functions to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants, coefficients, and bases in the context of the problem.

**Thinking Skill:** Analyzing

**Correct Answer:** C

**6. Objective 2.03**

Use exponential functions to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants, coefficients, and bases in the context of the problem.

**Thinking Skill:** Integrating

**Correct Answer:** A

**7. Objective 2.03**

Use exponential functions to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants, coefficients, and bases in the context of the problem.

**Thinking Skill:** Analyzing

**Correct Answer:** B

## Answers to EOC Algebra II Sample Items

### Goal 2

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- 8. Objective 2.04**  
Create and use best-fit mathematical models of linear, exponential, and quadratic functions to solve problems involving sets of data. a) Interpret the constants, coefficients, and bases in the context of the data. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make  
**Thinking Skill:** Generating                      **Correct Answer:** D
- 9. Objective 2.04**  
Create and use best-fit mathematical models of linear, exponential, and quadratic functions to solve problems involving sets of data. a) Interpret the constants, coefficients, and bases in the context of the data. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make  
**Thinking Skill:** Generating                      **Correct Answer:** B
- 10. Objective 2.05**  
Use rational equations to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants and coefficients in the context of the problem. c) Identify the asymptotes and intercepts graphically and algebraically.  
**Thinking Skill:** Applying                      **Correct Answer:** B
- 11. Objective 2.05**  
Use rational equations to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants and coefficients in the context of the problem. c) Identify the asymptotes and intercepts graphically and algebraically.  
**Thinking Skill:** Analyzing                      **Correct Answer:** D
- 12. Objective 2.05**  
Use rational equations to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants and coefficients in the context of the problem. c) Identify the asymptotes and intercepts graphically and algebraically.  
**Thinking Skill:** Analyzing                      **Correct Answer:** D
- 13. Objective 2.06**  
Use cubic equations to model and solve problems. a) Solve using tables and graphs. b) Interpret constants and coefficients in the context of the problem.  
**Thinking Skill:** Applying                      **Correct Answer:** C

## Answers to EOC Algebra II Sample Items

### Goal 2

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**14. Objective 2.06**

Use cubic equations to model and solve problems. a) Solve using tables and graphs. b) Interpret constants and coefficients in the context of the problem.

**Thinking Skill:** Integrating **Correct Answer:** C

**15. Objective 2.07**

Use equations with radical expressions to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the degree, constants, and coefficients in the context of the problem.

**Thinking Skill:** Applying **Correct Answer:** A

**16. Objective 2.07**

Use equations with radical expressions to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the degree, constants, and coefficients in the context of the problem.

**Thinking Skill:** Analyzing **Correct Answer:** C

**17. Objective 2.08**

Use equations and inequalities with absolute value to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants and coefficients in the context of the problem.

**Thinking Skill:** Analyzing **Correct Answer:** C

**18. Objective 2.08**

Use equations and inequalities with absolute value to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants and coefficients in the context of the problem.

**Thinking Skill:** Applying **Correct Answer:** A

**19. Objective 2.09**

Use the equations of parabolas and circles to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants and coefficients in the context of the problem.

**Thinking Skill:** Applying **Correct Answer:** A

**20. Objective 2.09**

Use the equations of parabolas and circles to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties. b) Interpret the constants and coefficients in the context of the problem.

**Thinking Skill:** Applying **Correct Answer:** D

## Answers to EOC Algebra II Sample Items

### Goal 2

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**21. Objective 2.10**

Use systems of two or more equations or inequalities to model and solve problems; justify results. Solve using tables, graphs, matrix operations, and algebraic properties.

**Thinking Skill:** Applying

**Correct Answer:** B

**22. Objective 2.10**

Use systems of two or more equations or inequalities to model and solve problems; justify results. Solve using tables, graphs, matrix operations, and algebraic properties.

**Thinking Skill:** Generating

**Correct Answer:** B