**(Part 1) Multiple Choice**: Identify the choice that best completes the statement or answers the question.

|  |  |  |
| --- | --- | --- |
| 1. Determine the axis of symmetry if the *x*-intercepts of the parabola are $(5, 0)$ and$ (27, 0)$A. $x=11$B. $x=16$C. $x=32$D. $x=22$ |  | 6. Which is the absolute maximum of the function  $f\left(x\right)=-x^{2}+20x$A. $(10, 100)$B. $(100, 10)$C. $(-300,-10)$D. $(-10,-300)$ |
| 2. What is the range of the function represented by the graph?A. $y\geq 1$B. $y\geq -1$C. $y\leq 3$D. $y\geq 3$ |  | 7. Which polynomial does the graph represent?A. $y=(x-3)(x+1)$B. $y=(x-3)(x-1)$C. $y=(x+3)(x+1)$D. $y=(x+3)(x-1)$ |
| 3. Which correctly factors the polynomial?$$10x^{2}+3x-4$$A. $(5x+4)(2x-1)$B. $(5x-4)(2x+1)$C. $(x+8)(x-5)$D. $(x+5)(x-8)$ |  | 8. Which is equivalent to the radical expression?$$\sqrt{189}$$A. $3\sqrt{21}$B. $9\sqrt{21}$C. $3\sqrt{7}$D. $9\sqrt{7}$ |
| 4. Determine the product.$$(4x-3)(2x+8)$$A. $8x^{2}-24$B. $8x^{2}-26x-24$C. $8x^{2}+38x-24$D. $8x^{2}+26x-24$ |  | 9. What are the solutions to this system of equations?$$\left\{\begin{array}{c}y=5x+18\\y=5x^{2}+40x+78\end{array}\right.$$A. $\left(4,-2\right);(3, 3)$B. $\left(-4,-2\right);(-3, 3)$C. $\left(4,2\right);(-3, -3)$D. $\left(-4,2\right);(3, 3)$ |
| 5. What are the solutions to the system of equations shown?A. $\left(0,-1\right);(0,-3)$B. $\left(1,0\right);(-1,-4)$C. $\left(0,1\right);(-4,-1)$D. $\left(-3,0\right);(0,-3)$ |  | 10. The point $(-4,2)$ identifies what feature of the graph below?A. VertexB. Y-interceptC. Axis of SymmetryD. X-intercept |
| 11. What is the inverse of $f\left(x\right)=5x-2$?A. $f^{-1}\left(x\right)=\frac{1}{5}x+\frac{2}{5}$B. $f^{-1}\left(x\right)=-\frac{1}{5}x-\frac{2}{5}$C. $f^{-1}\left(x\right)=\frac{1}{5}x+\frac{1}{2}$D. $f^{-1}\left(x\right)=-\frac{1}{5}x-\frac{1}{2}$ |  | 18. What is the inverse of the point $(-2, 7)$?A. $(-7, 2)$B. $(7, -2)$C. $(-2, 7)$D. $(2, -7)$ |
| 12. Determine the *x*-intercept for $$f\left(x\right)=-2x^{2}-16x-30$$A. $\left(5, 0\right) and (-3, 0)$B. $\left(-5, 0\right) and (3, 0)$C. $\left(-5, 0\right) and (-3, 0)$D. $\left(0, 5\right) and (0, -3)$ |  | 19. Which function opens downward?A. $f\left(x\right)=(-3x-4)(-x+8)$B. $f\left(x\right)=-(x+2)(-x-4)$C. $f\left(x\right)=-4\left(x+5\right)^{2}-3$D. $f\left(x\right)=x^{2}+2x-4$ |
| 13. A park is in the shape of a square. The area of the park is 153 square meters. The exact length of a side of the park is between which two lengths?A. 11 meters and 12 metersB. 12 meters and 13 metersC. 13 meters and 14 metersD. 15 meters and 16 meters |  | 20. How does this equation compare to the graph of $g\left(x\right)=x^{2}?$$$h\left(x\right)=-\left(x-4\right)^{2}+2$$A. It opens downward, and it is translated 4 units to the left and 2 units up.B. It opens downward, and it is translated 4 units to the right and 2 units up.C. It opens up, and it is translated 4 units to the left and 2 units up.D. It opens up, and it is translated 4 units to the right and 2 units up. |
| 14. Simplify. $$\left(7x^{8}+3x^{2}\right)-(3x^{5}+2x^{2}-9)$$A. $4x^{3}+x^{2}+9$B. $7x^{8}-3x^{5}+x^{2}+9$C. $7x^{8}+3x^{5}+5x^{2}-9$D. $4x^{8}+x^{2}+9$ |  | 21. Which of these functions has a *y*-intercept of $(0,-2)$?A. $f\left(x\right)=3(x+2)(x-1)$B. $f\left(x\right)=6\left(x+3\right)^{2}-2$C. $f\left(x\right)=5x^{2}-3x-2$D. $f\left(x\right)=-2x^{2}+3x+5$ |
| 15. Which correctly completes the square to solve the polynomial?$$x^{2}+10x=-17$$A. $x^{2}+10x=-17$B. $x^{2}+10x=-17$C. $x^{2}+10x=-17$D. $x^{2}+10x=-17$ |  | 22. What are the zeros of the equation function$f\left(x\right)=-x^{2}+3x-4$?A. $x=-\frac{3\pm i\sqrt{7}}{2}$B. $x=\frac{3\pm i\sqrt{7}}{2}$C. $x=\frac{3\pm 7i}{2}$D. $x=-\frac{3\pm 7i}{2}$ |
| 16. What are the interval solutions to the quadratic inequality $x^{2}+8x+7>0$?A. $(-7, -1)$B. $[-7, -1]$C. $\left(-\infty , -7\right) ∪ (-1, \infty )$D. $\left(-\infty , -7\right] ∪ [-1, \infty )$ |  | 23. How many real solutions does the quadratic function $f\left(x\right)=3x^{2}+12x$ have?A. 0B. 1C. 2D. Infinite |
| 17. What are the zeros of the quadratic function?$$f\left(x\right)=2x^{2}+20x+42$$A. $x=3 or x=7$B. $x=-3 or x=7$C. $x=-3 or x=-7$D. $x=3 or x=-7$ |  | 24. Which of the following is NOT a one-to-one function?A. $f\left(x\right)=-\frac{1}{3}x-\frac{4}{3}$B. $f\left(x\right)=-3x$C. $f\left(x\right)=-3x+4$D. $f\left(x\right)=4$ |

**(PART 2) Constructed Response:** Show all work necessary to determining the solution.

|  |  |
| --- | --- |
| 25. The graph represents the function $f\left(x\right)=-3x^{2}+12x-9$. Identify each of the properties listed.Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Zeros: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Interval of increase: \_\_\_\_\_\_\_\_\_\_\_\_\_\_Interval of decrease: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 26. Show by drawing an area model or multiplication table how to find the product of $-4x+7$ and $2x+3$. Also, find the product of $-4x+7$ and $2x+3$. |
| 27. Sean was determining the roots for the quadratic equation $x^{2}+5x-9=6$. His work is shown.$$x^{2}+5x-9=6$$$$x^{2}+5x-15=0$$$$a=1, b=5, c=-9$$$$x=\frac{-5\pm \sqrt{5^{2}-4\left(1\right)\left(-9\right)}}{2(1)}$$$$x=\frac{-5\pm \sqrt{25+36}}{2}$$$$x=\frac{-5\pm \sqrt{61}}{2}=-\frac{5}{2}+\frac{\sqrt{61}}{2} or-\frac{5}{2}-\frac{\sqrt{61}}{2}$$The roots are $-\frac{5}{2}+\frac{\sqrt{61}}{2}$ or $-\frac{5}{2}-\frac{\sqrt{61}}{2}$a. What did Sean do incorrectly when determining the roots?b. Determine the roots for the given quadratic equation. | 28. Name each of the following for the quadratic function $h\left(x\right)=-x^{2}+8x-15$. Zeros \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ y-intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Vertex \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |



|  |
| --- |
| Answers to Questions 25-28 |
| 25. Domain: Range: Zeros: Interval of increase:Interval of decrease:  | 26. Area model:Product: |
| 27.a.b. | 28.Zeros: y-intercept: Vertex:  |