

Summer Assignment
Algebra II

Name _____

1. Which is equivalent to $\frac{x^2+12x+32}{x^2-16x+64} \cdot \frac{x^2-64}{x^2+8x+16}$?

- a. $\frac{(x+8)^2}{(x-8)(x+4)}$
- b. $\frac{x+4}{(x-8)(x+8)}$
- c. $\frac{x+8}{x+4}$
- d. $x - 8$

2. Which is equivalent to $\frac{5m^{-2}n^7}{8m^5n^{-3}} \div \frac{20m^6n^5}{12m^{-1}n^2}$?

- a. $\frac{3n^7}{8m^{14}}$
- b. $\frac{20m^6}{7n^{10}}$
- c. $\frac{25n^{12}}{24m}$
- d. $\frac{8m^{10}}{3n^3}$

3. Which is equivalent to $\frac{9}{5} - \frac{3}{4x^4}$?

- a. $\frac{6}{x^4}$
- b. $\frac{36x^4-15}{20x^4}$
- c. $\frac{27x^{16}}{20}$
- d. $\frac{9x^4-15}{x^4}$

4. Solve for x : $\frac{3}{1-4x} = \frac{7}{9-x}$

- a. $x = -\frac{4}{5}$
- b. $x = 1$
- c. $x = \frac{9}{2}$
- d. no solution

5. Given $f(x) = x^3 - 2x$, $g(x) = x^2 - 4$, and $h(x) = g(x) - f(x)$. $h(3) =$

- a. -21
- b. 19

- c. 2
- d. -16

6. Given $f(x) = x^2 - 3$, $g(x) = 7 - x$, and $h(x) = g(x)/f(x)$. $h(-2) =$
- a. 5
 - b. 9
 - c. $-5/7$
 - d. $1/7$

7. A rectangle has length $\sqrt{2} + 2\sqrt{3}$ feet and width $7\sqrt{2} - 4\sqrt{3}$ feet, what is the perimeter?
- a. $16\sqrt{2} + 12\sqrt{3}$ feet
 - b. $8\sqrt{2} - 2\sqrt{3}$ feet
 - c. $16\sqrt{2} - 4\sqrt{3}$ feet
 - d. $12\sqrt{2} - 12\sqrt{3}$ feet

8. Simplify $(6 + 5i) - (9i - 4)$
- a. $1 - 3i$
 - b. $2 + 4i$
 - c. $10 - 4i$
 - d. $15 - 3i$

9. Simplify $(6 - i)^2$
- a. $36 - 12i$
 - b. $36 + i$
 - c. 37
 - d. $35 - 12i$

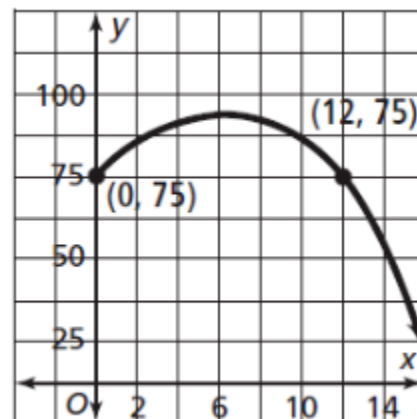
10. Which expressions are equal to a real number? Select **all** that apply.

- a. $(-3i)^{16}$
- b. $(-4i)^7$
- c. $(6i + 1)^2$
- d. $(3 + 5i)(3 + 5i)$
- e. $(8 - 2i)(8 + 2i)$

11. The graph of $y = \frac{2}{3}(x - 7)^2 + 1$
- a. Opens up with a vertex of $(7, 1)$
 - b. Opens down with a vertex of $(-7, 1)$

- c. Opens up with a vertex of $(-7, -1)$
- d. Opens down with a vertex of $(7, -1)$

12. You throw two tennis balls from the top of a building. The path of the first ball is given by the graph below, with the y -axis representing height and the x -axis representing the distance the ball travels in meters. It had a maximum height of 93 meters. The second ball does not travel as high as the first ball. Which of the following equations could model the path of the second ball? Select all that apply.

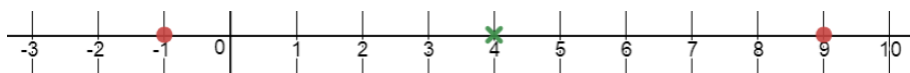


- a. $y = -0.5x^2 + 6x + 75$
- b. $y = -0.5x^2 + 2x + 75$
- c. $y = -0.2x^2 + 8x + 75$
- d. $y = -0.2x^2 + 2x + 75$

13. Solve the equation $4x^2 - 6x + 5 = 0$

- a. $x = \frac{1}{4} \pm \left(\frac{\sqrt{11}}{4}\right)i$
- b. $x = \frac{3}{4} \pm \left(\frac{\sqrt{11}}{4}\right)i$
- c. $x = \frac{3}{4} \pm (\sqrt{11})i$
- d. $x = 3 \pm \left(\frac{\sqrt{11}}{4}\right)i$

14. The solutions to an absolute value equation are shown as red circles on the number line below. What is the absolute value equation?



- a. $|x - 4| = 5$
- b. $|x + 4| = 5$
- c. $|x - 5| = 4$
- d. $|x + 5| = 4$

15. Which is another form of the absolute value function $f(x) = 3|x| - 2$?

- a. $f(x) = \begin{cases} -3x + 2 & \text{if } x < 0 \\ -3x - 2 & \text{if } x \geq 0 \end{cases}$
- b. $f(x) = \begin{cases} 3x + 2 & \text{if } x < 0 \\ 3x - 2 & \text{if } x \geq 0 \end{cases}$
- c. $f(x) = \begin{cases} 3x - 2 & \text{if } x < 0 \\ -3x - 2 & \text{if } x \geq 0 \end{cases}$

d. $f(x) = \begin{cases} -3x - 2 & \text{if } x < 0 \\ 3x - 2 & \text{if } x \geq 0 \end{cases}$

16. $(4a^3 - 9a^2 + 9a + 3) \div (a - 1)$

a. $2a^3 + 5a - 9$

b. $2a^2 + 2a + 1$

c. $4a^2 - 5a + 4 - \frac{7}{a-1}$

d. $4a^3 - 9a^2 + 9a + 3 - \frac{6}{a-1}$

17. Let $f(x) = x^3$. Which transformation is equivalent to $g(x) = -f(x - 2) + 1$?

a. $g(x) = -(x + 1)^3 - 2$

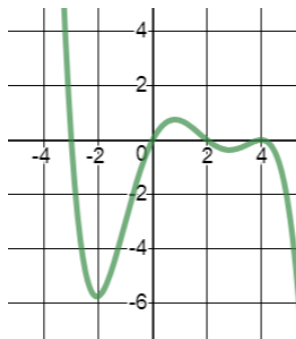
b. $g(x) = (x - 2)^3 - 1$

c. $g(x) = -2x^3 + 1$

d. $g(x) = -(x - 2)^3 + 1$

18. Using the graph, decide if the following function has an odd or even degree and the sign of the lead coefficient.

- a. odd degree; positive
- b. odd degree; negative
- c. even degree; positive
- d. even degree; negative



19. Name all of the real and imaginary zeros and state their multiplicity:

$$y = x(x^2 - 16)(x^2 + 2)(x + 4)$$

- a. Real zeros: ± 4 with multiplicity 3; Imaginary zeros: $\pm 2i$ each with multiplicity 1
- b. Real zeros: 0 with multiplicity 1, 4 with multiplicity 1, -4 with multiplicity 1; Imaginary zeros: $\pm 2i$ each with multiplicity 1
- c. Real zeros: -4 with multiplicity 3, -2 with multiplicity 2; No imaginary zeros
- d. Real zeros: 0 with multiplicity 1, -4 with multiplicity 2, 4 with multiplicity 1; Imaginary zeros: $\pm i\sqrt{2}$ each with multiplicity 1

20. Solve: $4e^{(2x+1)} + 6 = 10$

a. $x = -\frac{1}{2}$

b. $x = 0$

c. $x = 1$

d. no solution

21. Solve: $-7 + \ln \ln (2x - 5) = -7$

- a. $x = 2.5$
- b. $x = 3$
- c. $x = -1$
- d. no solution

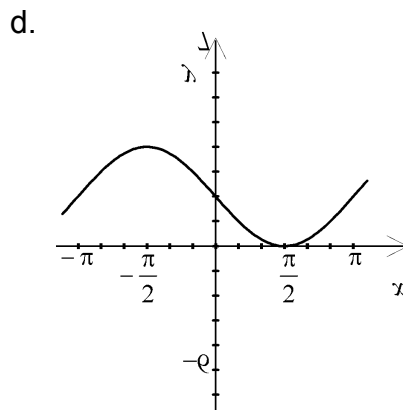
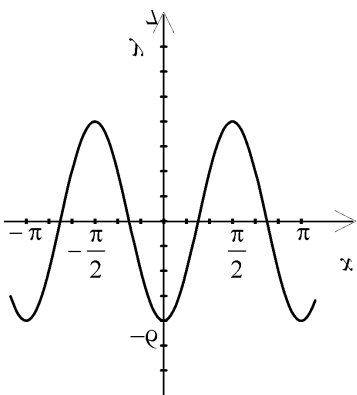
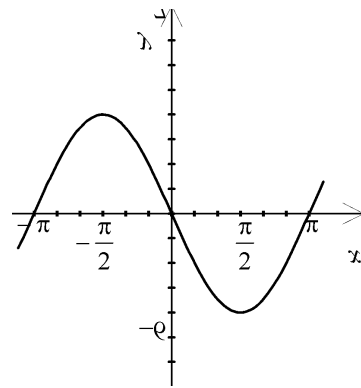
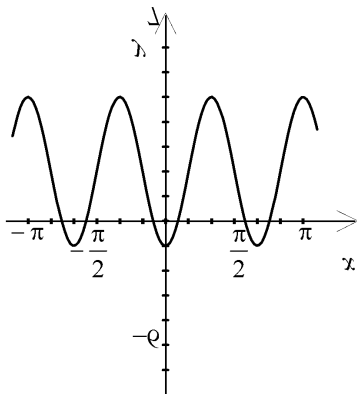
22. Given $3^{4x} = 27^{2x-1}$, find the value of x

- a. $x = 0.5$
- b. $x = 1.5$
- c. $x = 2$
- d. $x = -3$

23. Which equation is the inverse of $y = 2\sqrt{x-1} + 4$?

- a. $y^{-1} = \left(\frac{x}{2} + 1\right)^2 - 4$
- b. $y^{-1} = \frac{(x-4)^2}{2} - 4$
- c. $y^{-1} = (x-4)^2 + \frac{1}{2}$
- d. $y^{-1} = \left(\frac{x-4}{2}\right)^2 + 1$

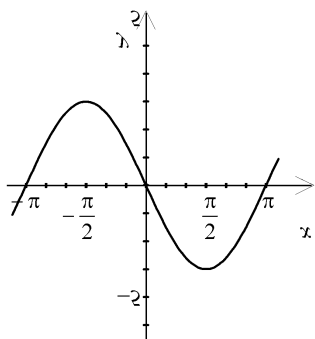
24. Which graph represents $y = -4 \cos \cos 2x$?



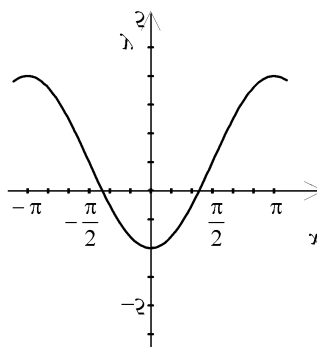
25. Given that $\sin \theta = -\frac{1}{2}$ and $\tan \theta < 0$ what is $\cos \theta$?

- a. $-\frac{\sqrt{3}}{3}$
- b. $\sqrt{3}$
- c. $-\frac{\sqrt{3}}{2}$
- d. $\frac{\sqrt{3}}{2}$

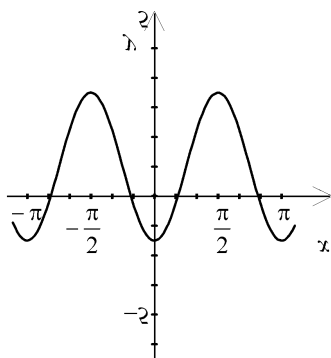
26. Which graph represents $y = -3 \cos 2x + 1$?



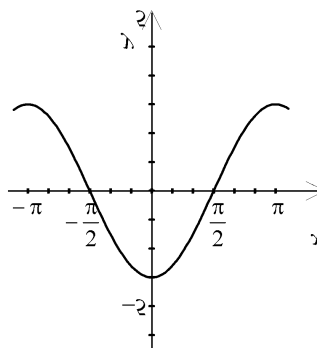
a.



b.



c.



d.

27. $a_1 = 34$ and $d = -2$ find S_{22}

- a. 286
- b. -8
- c. -47,535,434
- d. 176

28. $a_1 = 3$ and $r = 2.5$, find S_{11}

- a. 170.5
- b. 19,071.49
- c. 28,610.22
- d. 47,681.72

Determine the equations that model the sequence shown below. Select **all** that apply.

16, 31, 46, ...

- a. $a_n = 16 + 15(n - 1)$
- b. $a_n = 16n^2$
- c. $a_n = 16(1.93)^{n-1}$
- d. $a_1 = 16, a_n = a_{n-1} + 15$
- e. $a_1 = 16, a_n = 1.93a_{n-1}$

29. Solve for x : $\frac{1}{3} + \frac{5}{4x} = \frac{1}{2}$

- a. $x = -\frac{1}{2}$
- b. $x = \frac{15}{2}$
- c. $x = 3$
- d. $x = \frac{3}{2}$

30. Which is equivalent to $\frac{9w}{\sqrt[5]{w^3}}$?

- a. $9\sqrt[5]{w^2}$
- b. $9\sqrt[5]{w^5}$
- c. $9w^3$
- d. $\frac{9}{w^2}$

31. Which is equivalent to $\sqrt{32} + 3\sqrt{2} - 7\sqrt{18}$?

- a. $-4\sqrt{2}$
- b. $-14\sqrt{2}$
- c. $7\sqrt{2} - 4\sqrt{3}$
- d. $7\sqrt{2} - \sqrt{3}$

32. Solve for g : $\sqrt{3g - 7} = \sqrt{g + 3}$

- a. $g = -\frac{3}{5}$

- b. $g = \frac{5}{3}$
- c. $g = -3$
- d. $g = 5$

33. What are the coordinates of the vertex of $y = 3x^2 - 12x + 5$?

- a. $(-2, 7)$
- b. $(1, 5)$
- c. $(2, -7)$
- d. $(-1, -5)$

34. Find the zeroes of: $g(x) = (x^2 - 4x)(3x^2 + 9x - 12)(7x)$

- a. $x = \pm 2, 0, 4$
- b. $x = -4, 0, \pm 2$
- c. $x = 0, 1, \pm 4$
- d. $x = 0, 2, 3, 4$

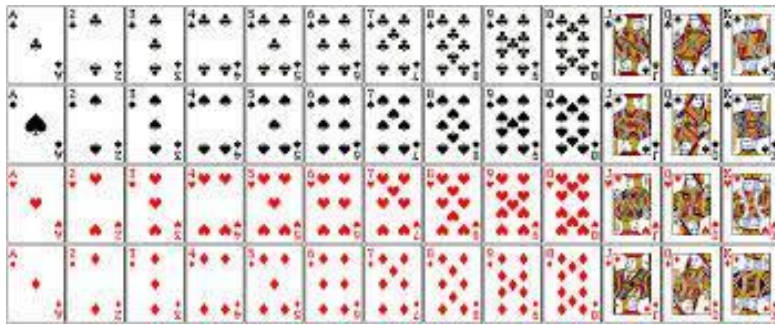
35. Write the equation of the function that has exponential growth, a y -intercept of -2 and a horizontal asymptote of -3 .

- a. $y = \left(\frac{1}{4}\right)^x - 3$
- b. $y = 5^x - 3$
- c. $y = 3^x - 2$
- d. $y = \left(\frac{1}{3}\right)^x - 2$

36. In Utah, the probability that a person owns skis is 50%, and the probability that they own both skis and a snowboard is 35%. What is the probability that a person owns a snowboard given that they already own skis?

- a. 70%
- b. 45.8%
- c. 34.1%
- d. $28.\overline{3}\%$

37. When playing a game of poker, each player is dealt 5 cards from a standard deck of 52 (see diagram below).



What is the probability of being dealt 4 of a kind (four of the same rank) in a five-card poker hand?

- a. 0.024
- b. 0.0018
- c. 0.00024
- d. 0.000018

38. A psychology student is interested in assessing public opinion about grocery prices. The student is planning to conduct a sample survey of the public population. Which of the listed methods of sample selection would be the most effective at reducing bias?
- a. Randomly select one store and survey the first 100 customers to enter the store.
 - b. Visit multiple grocery stores at different times of day and give the survey to 200 participants at random.
 - c. Post the survey on the social media and use 75 surveys from users with the most followers.
 - d. Randomly select 20 faculty members at school and give them the survey.

39. Brittney started to train for a marathon. The table shows the number of kilometers Brittney ran during each of the first three weeks after she began training.

Week	1	2	3
Distance (km)	11	12.1	13.31

If this pattern continues, which of the listed statements could model the number of kilometers Brittney runs, a_n , in terms of the number of weeks n , after she began training? Select **all** that apply.

- a. $a_n = 11 + 1.1(n - 1)$
- b. $a_n = 11(1.1)^{n-1}$
- c. $a_n = 11n^{1.1}$
- d. $a_1 = 11, a_n = 1.1a_{n-1}$
- e. $a_1 = 11, a_n = a_{n-1} + 1.1$

Free Response Questions

1. Let $f(x) = \frac{1}{2}|x + 4| + 5$ and $g(x) = 2x^2 + 16x + 30$.

- What is the value of $g(f(-6))$?
- Describe the transformations of $f(x)$ from its parent function.
- Rewrite $g(x)$ in factored form.
- Graph $f(x)$ and $g(x)$ on the provided axes.
- For what value of x does $g(x) = 0$?
- Determine the point(s) where $f(x) = g(x)$.

2. Given the equation: $y = x^2 - 6x + 5$

- Rewrite the equation in vertex form.
- What is the ordered pair for the vertex?
- Is the vertex a maximum or a minimum?
- Determine the number of real solutions for the function.
- Rewrite the equation in intercept form.
- Graph the equation.

3. Let $f(x) = (x - 4) + 7$.

- Find $f^{-1}(x)$.
- Show f and f^{-1} are inverses algebraically.