

ALGEBRA II: MISCELLANEOUS PROBLEMS (1 – 40)

1. The average of the numbers 5, 9, 10, 13, and a equals 11. Find the value of a .
 - a. 16
 - b. 17
 - c. 18
 - d. 20

2. A shirt is on sale for \$34.40, which is 20% off the original price. Find the original price of the shirt.
 - a. \$36.40
 - b. \$41.28
 - c. \$43.00
 - d. \$54.40

3. How many quarts of water does one add to 6 quarts of a 60% alcohol solution to create a 40% alcohol solution?
 - a. 2 qt.
 - b. 3 qt.
 - c. 6 qt.
 - d. 9 qt.

4. Express $(7 + 3i) - (2 - 3i)$ in the form $a + bi$ where a and b are real numbers.
 - a. $5 - 6i$
 - b. $5 + 6i$
 - c. 9
 - d. $9 + 5i$

5. Find the value of k that completes the square for $x^2 + 10x + k$.
 - a. 5
 - b. 10
 - c. 25
 - d. 100

6. Find the solutions to the equation: $|2x - 14| = 6$.
 - a. $x = -4, 10$
 - b. $x = 4, 10$
 - c. $x = 11, 17$
 - d. $x = 12, 14$

7. Solve the inequality $7 < 4x + 3 \leq 21$, and express the solution as an interval.

- a. $(1, 4.5]$
- b. $[1.75, 7)$
- c. $(7/3, 17)$
- d. $[4.5, 5.25]$

8. Solve the inequality $\frac{-18}{6x-42} > 0$, and express the solution as an interval

- a. $(-3, \infty)$
- b. $(7, \infty)$
- c. $(-\infty, -3)$
- d. $(-\infty, 7)$

9. Solve the inequality $2|x - 10| < 3$, and express the solution as an interval.

- a. $(7, 8.5)$
- b. $(8.5, 10)$
- c. $(8.5, 11.5)$
- d. $(11.5, 13)$

10. An object is shot upward with an initial velocity of 240 feet per second so that its height s (in feet) above the ground after t seconds is given by $s(t) = -16t^2 + 240t$. For what values of t will the object be at least 416 feet above the ground?

- a. $[2, 5]$
- b. $[2, 13]$
- c. $[3, 5]$
- d. $[3, 13]$

11. Find the distance $d(A, B)$ between the points $A(-1, 0)$ and $B(4, 3)$.

- a. $3\sqrt{2}$
- b. 5
- c. $\sqrt{34}$
- d. 8

12. Determine the point $A(x, y)$ so that the points $A(x, y)$, $B(0, 3)$, $C(1, 0)$, $D(7, 2)$ will be the vertices of a parallelogram.

- a. $A(-6, 1)$
- b. $A((3, 7)$
- c. $A(5, 6)$

d. $A(6, 5)$

13. Find the midpoint of the line segment from $A(-2, 9)$ to $B(4, 5)$.

a. $C(1, 7)$

b. $D(3, 7)$

c. $P(4, 9)$

d. $Q(5, 9)$

14. Find the point on the positive y -axis that is a distance 5 from the point $P(3, 4)$.

a. $A(0, 6)$

b. $B(0, 8)$

c. $C(6, 0)$

d. $D(8, 0)$

15. Find the x -intercept and y -intercept of the equation $5x - 3y = 30$.

a. 6 and 10 respectively

b. 10 and 6 respectively

c. 6 and -10 respectively

d. 6 and 2 respectively

16. Give the equation for the circle with center $C(3, -2)$ and radius 4.

a. $x^2 + y^2 = 52$

b. $(x - 3)^2 + (y - 2)^2 = 16$

c. $(x + 3)^2 + (y - 2)^2 = 42$

d. $(x - 3)^2 + (y + 2)^2 = 16$

17. Give the center of the circle with equation $x^2 + 2x + y^2 - 10y + 22 = 0$.

a. $A(2, 4)$

b. $B(1, 5)$

c. $C(-1, 5)$

d. $D(-2, 4)$

18. Find an equation for the line with slope $1/2$ and y -intercept 3.

a. $x/2 - y = 3$

b. $-x + 2y = 6$

c. $x + 2y = 6$

d. $2x - y = 3$

19. Find the slope of the line through the points $A(-1, 6)$ and $B(5, 2)$

- a. -1
- b. $-2/3$
- c. $2/3$
- d. 1

20. Find an equation for the line with y-intercept 3 that is perpendicular to the line $3y = 2x - 4$.

- a. $2y = 6 - 3x$
- b. $2y = 3x + 6$
- c. $3y = 9 - 2x$
- d. $3y = 2x + 9$

21. Fahrenheit and Celsius temperatures are related by the equation $F = 9C + 32$, where F is the temperature in degrees Fahrenheit and C is the temperature on the Celsius scale. If the temperature is a balmy 77° Fahrenheit, what is the temperature on the Celsius scale?

- a. 25°
- b. 33.8°
- c. 43°
- d. 45°

22. If $f(x) = x^2 + 5$, find $f(a + h) - f(a)$.

- a. $2ah + h^2 + 10$
- b. $2ah + h^2 + 5$
- c. $2ah + h^2$
- d. h^2

23. From a square piece of cardboard with width x inches, a square of width $x - 3$ inches is removed from the center. Write the area of the remaining piece as a function of x .

- a. $f(x) = 6x - 9$
- b. $f(x) = 6x + 9$
- c. $f(x) = 2x^2 - 9$
- d. $f(x) = 2x^2 - 6x - 9$

24. If $P(4, -5)$ is a point on the graph of the function $y = f(x)$, find the corresponding point on the graph of $y = 2f(x - 6)$.

- a. $A(1, 8)$
- b. $B(2, -5)$
- c. $C(6, 8)$
- d. $D(10, -10)$

25. Explain how the graph of $y - 5 = (x - 3)^2$ can be obtained from the graph of $y = x^2$.

- a. Shift the graph of $y = x^2$ left 3 units and down 5 units
- b. Shift the graph of $y = x^2$ left 3 units and up 5 units
- c. Shift the graph of $y = x^2$ right 3 units and down 5 units
- d. Shift the graph of $y = x^2$ right 3 units and up 5 units

26. Determine the vertex of $y = x^2 - 8x + 22$.

- a. $A(-4, 11)$
- b. $B(-4, 18)$
- c. $C(4, 6)$
- d. $D(4, 8)$

27. An object is projected upward from the top of a tower. Its distance in feet above the ground after t seconds is given by

$s(t) = -16t^2 + 64t + 80$. How many seconds will it take to reach ground level?

- a. 1 second
- b. 4 seconds
- c. 5 seconds
- d. 8 seconds

28. Find the maximum value of $y = -x^2 + 6x$.

- a. 8
- b. 9
- c. 10
- d. 11

29. Several values of the two function f and g are listed in the following tables:

X	4	5	6	7
$f(x)$	7	6	5	4

X	4	5	6	7
$g(x)$	6	7	4	5

Find $(f \circ g)(6)$.

- a. 4
- b. 5
- c. 6
- d. 7

30. Given $f(x) = 5x + 7$ and $g(x) = x^2 + 7$, find $(g \circ f)(x)$.

- a. $(g \circ f)(x) = 5x^2 + 7$
- b. $(g \circ f)(x) = 5x^2 + 42$
- c. $(g \circ f)(x) = (5x)^2 + 14$
- d. $(g \circ f)(x) = 25x^2 + 70x + 56$

31.

Find x :

$$\begin{bmatrix} 1 & 3x & 2 \\ 3 & 0 & 5 \end{bmatrix} \begin{bmatrix} 4 & 1 \\ 2 & 0 \\ 0 & 1 \end{bmatrix} - \begin{bmatrix} 16 & 3 \\ 6 & 2 \end{bmatrix} = 3 \begin{bmatrix} x-2 & 0 \\ 2 & 2 \end{bmatrix}$$

- a) 3
- b) 2
- c) 1
- d) 1/4

32.

Which of the following is a factor of $2x^4 - 6x^3 - 20x^2 + 48x$

- a) $x - 3$
- b) $x + 3$
- c) $x - 1$
- d) $x + 1$

33.

Solve for x: $\frac{2x+3}{x-1} - \frac{2x-3}{x+1} = \frac{10}{x^2-1}$

- a) No solution
- b) $x = 1$
- c) $x = 2$
- d) $x = \frac{3}{4}$

34.

When photographing a lighted object, the exposure time (t) is inversely proportional to the square of the object's distance (d) from the light source. Which equation best represents this relationship?

- a) $t^2 = kd$
- b) $t = \frac{k}{d^2}$
- c) $t = \frac{k}{d}$
- d) $t = kd$

35.

Express as a single log $2\log_3 5 - \log_3 10 + 3\log_3 4$

- a) $\log_3 \frac{5}{128}$
- b) $\log_3 16$
- c) $\log_3 160$
- d) $\log_3 64$

36.

If $\log_7(x+1) + \log_7(x-5) = 1$, then $x =$

- a) -6
- b) -2
- c) 6
- d) 7

37.

Find the fifth term in the expansion of $(x+y)^{10}$

- a) $252x^5y^5$
- b) $210x^4y^6$
- c) $210x^6y^4$
- d) $252x^6y^4$

38.

Solve the equation $3x^2 = 57x$ using the method of your choice. You might want to try graphing or the quadratic formula. The value(s) of x that solve the equation are:

- a.** $x = 19$ **b.** $x = -19$ **c.** $x = 19$ and $x = 0$ **d.** $x = -19$ and $x = 0$ **e.** $x = 0$

39.

Find $g(-1)$ if $g(x) = -\left(\frac{1}{2}\right)^x$.

- a.** $-\frac{1}{2}$ **b.** $\frac{1}{2}$ **c.** 0 **d.** -2 **e.** 2

40.

Find the length of side x of the triangle below.

- a. 13.6
- b. 16.6
- c. 6.3
- d. 15.0
- e. 7.5

