

## CUMULATIVE REVIEW

(Chapters 1, 2, 3, 5, 6)

1. Solve  $|2x + 6| \leq 4$
2. Solve and graph the solution set:  $4x - 10 < -10$  or  $6x + 4 \geq 10$
3. Solve and graph the solution set:  $12 \leq 3x + 3 \leq 21$
4. Solve  $|3x + 7| \geq 26$
5. Simplify  $3 + 21 \div 7 - 8 \div 4$
6. Solve  $2|2y - 6| = 4$
7. Evaluate  $\frac{a}{b^2} + c$  if  $a = -9, b = \frac{2}{3}, c = 8$
8. To what sets of numbers does 10 belong?
9. Graph  $y = |x + 4|$
10. Graph  $x - 2y < 1$
11. If  $f(x) = x^3 - 3x^2 + 2x + 5$ , find  $f(2)$
12. Find the slope of the line that passes through  $(2, -3)$  and  $(-1, 6)$
13. State the domain of the following relation and then tell if it is a function:  
 $\{(3, 2), (2, 2), (-1, 5), (0, 0)\}$
14. Write the equation of a line that has a slope of 3 and passes through  $(3, 4)$
15. Write the equation of a line that is perpendicular to  $y = \frac{2}{3}x + 4$  and passes through  $(-2, 1)$
16. Graph  $f(x) = |x| - 2$
17. Graph  $g(x) = \begin{cases} x & \text{if } x < 0 \\ 2 & \text{if } x = 0 \\ x - 1 & \text{if } x > 0 \end{cases}$

Solve each system of linear equations:

18.  $\begin{cases} 5x + 3y = -4 \\ 7x - y = 36 \end{cases}$

19.  $\begin{cases} 7x + y = 9 \\ 5x - y = 15 \end{cases}$

20.  $\begin{cases} 5x - 3y = 19 \\ 7x + 2y = 8 \end{cases}$

21.  $\begin{cases} 8x + 3y = 5 \\ 6x - 2y = -9 \end{cases}$

$$22. \quad \text{Solve } \begin{cases} y + 2z = 5 \\ 7x - 3y + z = 20 \\ 2z = 8 \end{cases}$$

$$23. \quad \text{Solve } \begin{cases} x + 2y - z = 1 \\ x + 3y + 2z = 7 \\ 2x + 6y + z = 8 \end{cases}$$

Solve for  $x$ :

$$24. \quad tx - ux = 3t$$

$$25. \quad \frac{x-3}{6} + 3 = a$$

$$26. \quad \frac{x-2}{2} = m + n$$

$$27. \quad A = \frac{1}{2}h(x + b_2)$$

$$28. \quad \frac{3}{4}(x+1) = g$$

29. Denim Duds makes denim jackets and jeans. Each garment must be cut from a pattern and sewn. There are 40 worker hours per day available for cutting and 52 hours per day for sewing. The jacket requires 1 hour of cutting and 4 hours of sewing. The jeans require 2 hours of cutting and 2 hours of sewing. If the profit of the jacket is \$14.00 and the profit of the jeans is \$8.00, how many of each should be made to maximize profit?

$$30. \quad \text{Given } y = x^2 + 4x + 1$$

a. Graph

b. State the vertex

c. State the axis of symmetry

d. What is the maximum or minimum value?

$$31. \quad \text{Which way does the parabola } y = -\frac{1}{2}x^2 - 4x + 12 \text{ open?}$$

$$32. \quad \text{State the vertex of } y = -3(x-2)^2 - 4$$

$$33. \quad \text{Write } y = x^2 + 6x - 2 \text{ into vertex form}$$

Factor the following:

$$34. \quad 6x^2 + 13x + 6$$

$$35. \quad x^2 - 5x + 6$$

$$36. \quad x^2 + 3x - 10$$

$$37. \quad 3x^3 - 3x$$

$$38. \quad x^3 - 8$$

$$39. \quad x^4 - 2x^2 - 8$$

40. Solve by factoring:  $2x^2 - 11x = -15$
41. Solve by completing the square:  $x^2 - 3x = 28$
42. Solve by the quadratic formula:  $2x^2 + 8x + 12 = 0$

Solve by any method over {Complex}:

43.  $x^2 + 12 = 0$
44.  $x^2 + 2x = -5$
45.  $9x^2 + 12x = 5$
46.  $x^3 + 64 = 0$

Simplify the following:

47.  $(2 + 3i) + (5 - 2i)$
48.  $-2i(4 - i)$
49.  $(3 + i)(2 + 3i)$
50.  $(4 - 3i)(4 + 3i)$

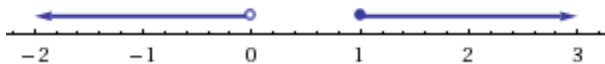
51. State the type and number of solutions to  $x^2 + 5x + 5 = 0$
52. State the degree of  $x^4 + 5x^3 - 2x + 7$
53. Simplify  $(3x^2 + 2x - 4) + (x^3 - x^2 - 2x - 5)$
54. Simplify  $(3x^2 + 2x - 4) - (x^3 - x^2 - 2x - 5)$
55. Multiply  $5x^2(x - 4)$
56. Multiply  $(x^3 + 2)^2$
57. Find the zeros of  $y = (x - 2)(x + 3)(x + 1)$
58. Write in factored form:  $y = x^4 + 3x^3 + 2x^2$
59. Divide  $(x^3 + 3x^2 - 6x - 7)$  by  $(x + 4)$  and state whether  $(x + 4)$  is a factor of the polynomial
60. If  $P(x) = x^4 - 3x^3 + 2x^2 + x - 4$ , find  $P(2)$

61. Solve  $x^4 - 2x^2 - 8 = 0$
62. If  $P(x)$  is a polynomial with rational coefficients where  $2i$  and  $3 - \sqrt{5}$  are roots, what are two additional roots?
63. List all possible rational roots of  $3x^4 - 7x^3 + 2x^2 + x - 4 = 0$
64. Find all the zeros of  $y = x^3 - 3x^2 - x + 3$
65. If  $(x+1)$  is a factor of  $(x^3 - 3x^2 - x + 3)$ , what are the other factors?
66. Write an equation with real coefficients that has roots 4 and  $(2+i)$
67. A group of 9 students are to make a presentation on 3 issues. In how many ways can this assignment be made?
68. A traveler can visit 4 of 6 cities. In itinerary for the trip is a list of the 4 cities in the order to be visited. How many different itineraries are there for the trip?
69. Expand  $(2x+3)^4$
70. Find the 5th term of  $(x-2y)^{12}$

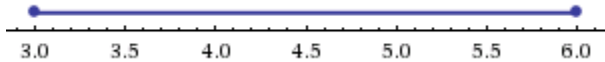
## ANSWERS

1.  $-5 \leq x \leq -1$

2.  $x < 0$  or  $x \geq 1$



3.  $3 \leq x \leq 6$



4.  $x \geq \frac{19}{3}$  or  $x \leq -11$

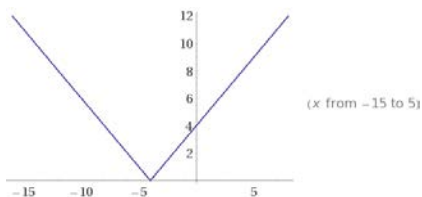
5. 4

6.  $y = 4$  or  $2$

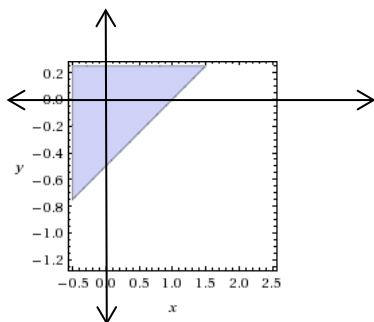
7.  $-\frac{49}{4}$

8.  $\{\text{Real}\}, \{\text{Rational}\}, \{\text{Integer}\}, \{\text{Whole}\}, \{\text{Natural}\}$

9.



10.



11.  $f(2) = 5$

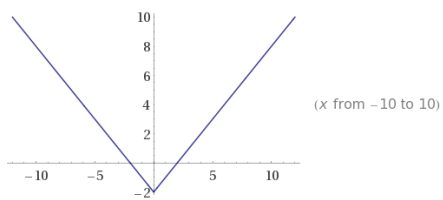
12.  $m = -3$

13.  $D = \{-1, 0, 2, 3\}$ ; Yes

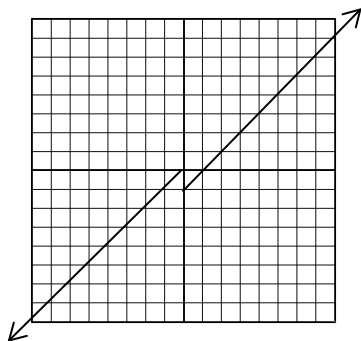
14.  $y - 4 = 3(x - 3)$  or  $y = 2x - 2$  or  $2x - y = 2$

15.  $y - 1 = -\frac{3}{2}(x + 2)$  or  $y = -\frac{3}{2}x - 2$  or  $3x + 2y = -4$

16.



17.



18.

$(4, -8)$

19.

$(2, -5)$

20.

$(2, -3)$

21.

$(-\frac{1}{2}, 3)$

22.

$(1, -3, 4)$

23.

$(3, 0, 2)$

24.

$$x = \frac{3t}{t-u}$$

25.

$$x = 6a - 15$$

26.

$$x = 2m + 2n + 2$$

27.

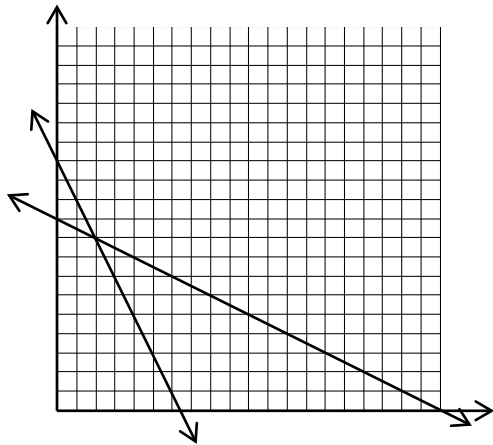
$$x = \frac{2A}{h} - b_1$$

28.

$$x = \frac{4}{3}g - 1$$

29.  $x$  = number of jackets,  $y$  = number of jeans

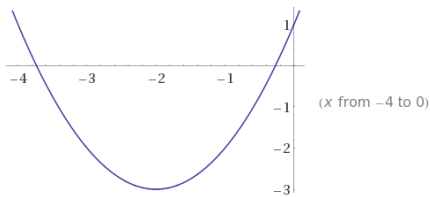
$$x \geq 0 \quad y \geq 0 \quad x + 2y \leq 40 \quad 4x + 2y \leq 52$$



$$P = 14x + 8y$$

The company should make 4 jackets and 18 jeans to get a maximum profit of \$200

30. a.



b.  $(-2, -3)$

c.  $x = -2$

d. Minimum value of  $-3$

31. Down

32.  $(2, -4)$

33.  $y = (x + 3)^2 - 11$

34.  $(2x + 3)(3x + 2)$

35.  $(x - 3)(x - 2)$

36.  $(x - 2)(x + 5)$

37.  $3x(x - 1)(x + 1)$

38.  $(x - 2)(x^2 + 2x + 4)$

39.  $(x - 2)(x + 2)(x^2 + 2)$

40.  $x = 3 \text{ or } \frac{5}{2}$

41.  $x = -4 \text{ or } 7$

42.  $x = -2 \pm i\sqrt{2}$

43.  $x = \pm 2i\sqrt{3}$

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

45.  $x = -\frac{5}{3}, \frac{1}{3}$
46.  $x = -4, 2 \pm 2i\sqrt{3}$
47.  $7 + i$
48.  $-2 - 8i$
49.  $3 + 11i$
50. 25
51.  $D = 5$ ; 2 real solutions
52. 4
53.  $x^3 - 2x^2 - 9$
54.  $-x^3 + 4x^2 + 4x + 1$
55.  $5x^3 - 20x^2$
56.  $x^6 + 4x^3 + 4$
57. zeros = 2, -1, -3
58.  $x^2(x+2)(x+1)$
59.  $x^2 - x - 2 + \frac{1}{x+1}$ ;  $(x+4)$  is not a factor
60. -2
61.  $x = \pm 2, \pm i\sqrt{2}$
62.  $-2i$  and  $3 + \sqrt{5}$
63.  $\pm 1, \pm 2, \pm 4, \pm \frac{1}{3}, \pm \frac{2}{3}, \pm \frac{4}{3}$
64.  $\pm 1, 3$
65.  $(x-3)$  and  $(x-1)$
66.  $x^3 - 8x^2 + 21x - 20 = 0$
67. 84
68. 360
69.  $16x^4 + 96x^3 + 216x_2 + 216x + 81$
70.  $7920x^8y^4$