Directions: Show all work in the appropriate box and circle your final answer. Follow the directions specific for each question.

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1. Simplify: $4(4 - 9) \div [2^2 - 4 + 3(-4 + 2) - 4]$

$4(-5) \div [4 - 4 + 3(-2) - 4]$

$-20 \div [4 - 4 - 6 - 4]$

$-20 \div [-10]$

$\boxed{2}$

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2. Solve for x: $72 = 4(3 + 4x) - 10x$

$72 = 12 + 16x - 10x$

$72 = 12 + 6x$

$60 = 6x$

$\boxed{10 = x}$

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3. Solve for x: $6(x + 5) = 10 - (7x - 7)$

$6x + 30 = 10 - 7x + 7$

$6x + 30 = 17 - 7x$

$13x = -13$

$\boxed{x = -1}$

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4. Solve using an algebraic equation. You must show the equation and precisely how you solved it.

Janet has 4 more dollars than Marta. Together they have $38. How much does each person have?

$J = m + 4$

$J + m = 38$

$m + 4 + m = 38$

$2m + 4 = 38$

$2m = 34$

$m = 17$

$\boxed{\text{marta: } 17 \quad \text{Janet: } 21}$

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5. Solve using an algebraic equation. You must show the equation and precisely how you solved it.

Three times the sum of 4 and a number is twice the number. Find the number.
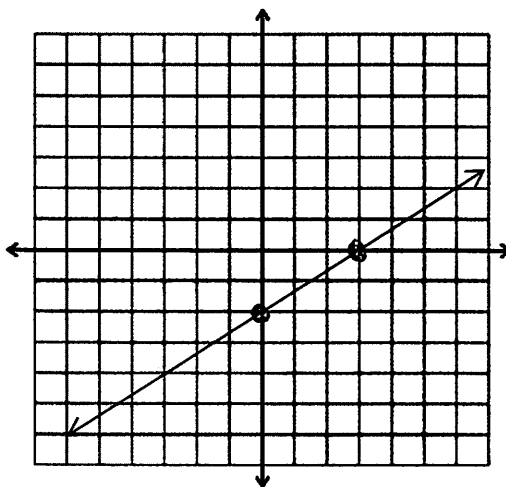
$3(n + 4) = 2n$

$3n + 12 = 2n$

$12 = -n$

$\boxed{-12 = n}$

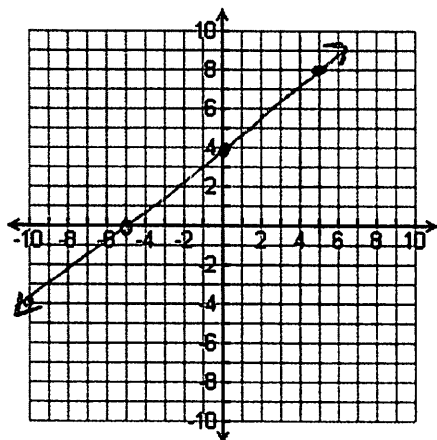**6.** Find the equation of the line shown below:

$y = \frac{2}{3}x - 2$

or $\quad 2x - 3y = 6$

7. Graph the line on the coordinate grid:

$4x - 5y = -20$

x-int: -5

y-int: 4

or

$-5y = -4x - 20$

$y = \frac{4}{5}x + 4$

8. Find the slope of the line that passes through the points (-4, 7) and (3, -2).

$$m = \frac{7 - (-2)}{-4 - 3} = \frac{9}{-7}$$

$$\boxed{-\frac{9}{7}}$$

9. Find the equation of the line with a slope of $-\frac{2}{5}$ that passes through the point (10, -3). Write your answer in slope-intercept form.

$y + 3 = -\frac{2}{5}(x - 10)$

$y = -\frac{2}{5}x + 4 - 3$

$\boxed{y = -\frac{2}{5}x + 1}$

OR

$y = mx + b$

$-3 = -\frac{2}{5}(10) + b$

$-3 = -4 + b$

$1 = b$

$\boxed{y = -\frac{2}{5}x + 1}$

10. Solve the system of equations using any algebraic method.
Write your answer as an ordered pair.
You must show all work.
Do not use guess and check.

$$\begin{array}{l} 2 \\ 3 \end{array} \begin{cases} 3x + 5y = -4 \\ -2x - 4y = 2 \end{cases}$$

$6x + 10y = -8$

$-6x - 12y = 6$

$-2y = -2$

$y = 1$

$3x + 5 = -4$

$3x = -9$

$x = -3$

$\boxed{(-3, 1)}$

11. Solve using a system of equations. You must show all of your work. **Do not** use guess and check.

Your school had a bake sale and 110 cakes were sold. Chocolate cakes were $3.50 and vanilla cakes were $5.00. Your school collected $457 from the sale of these cakes.

- How many chocolate cakes were sold?
- How many vanilla cakes were sold?

$(c + v = 110)\, -5$

$3.5c + 5v = 457$
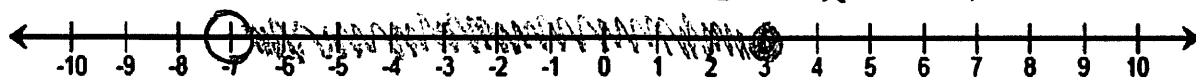
$-5c - 5v = -550$

$-1.5c = -93$

$c = 62$

$v = 48$

$\boxed{62 \text{ chocolate and } 48 \text{ vanilla}}$

12. Solve for x and graph on the number line below: $-5 \le -3x + 4 < 25$

$$-4 \quad -4 \quad -4$$

$$\frac{-9}{-3} \le \frac{-3x}{-3} < \frac{21}{-3}$$

$$3 \ge x > -7$$

13. Simplify completely. Write the answer with no negative exponents: $\dfrac{36x^6 y^3 z^3}{48x^2 y^3 z^7}$

$$\boxed{\dfrac{3\,x^4}{4\,z^4}}$$

14. Simplify:

$$(-4x^2 + 3x - 7) - (4x^2 - 2x + 4)$$

$$-4x^2 + 3x - 7 - 4x^2 + 2x - 4$$

$$\boxed{-8x^2 + 5x - 11}$$

15. Multiply: $(2x + 6)(3x - 4)$

$$6x^2 - 8x + 18x - 24$$

$$\boxed{6x^2 + 10x - 24}$$

16. Factor completely: $9x^2 - 25$

$$\boxed{(3x + 5)(3x - 5)}$$

17. Factor completely: $x^2 + 21x - 72$

$$\boxed{(x - 3)(x + 24)}$$

18. Factor completely: $4x^4 - 2x^3 + 6x$

$$2x(2x^3 - x^2 + 3)$$

$$\boxed{2x(2x^3 - x^2 + 3)}$$

19. Solve for x: $6x^2 - 7x - 3 = 0$

$$(2x - 3)(3x + 1) = 0$$

$$2x - 3 = 0 \qquad 3x + 1 = 0$$

$$2x = 3 \qquad 3x = -1$$

$$\boxed{x = \dfrac{3}{2} \qquad x = -\tfrac{1}{3}}$$

20. Solve for x: $x^2 - 13x = 48$

$$x^2 - 13x - 48 = 0$$

$$(x - 16)(x + 3) = 0$$

$$\boxed{x = 16 \text{ or } -3}$$

PART B Show all work and circle your final answer. Follow the directions specific to each question.

21. What is the common ratio for the geometric sequence -3, 6, -12, 24, …? $r = \frac{6}{-3} = \boxed{-2}$

22. Solve the following quadratic by factoring: $12x^2 - 2x = 4$.

$$12x^2 - 2x - 4 = 0$$
$$2(6x^2 - x - 2) = 0$$
$$2(3x - 2)(2x + 1) = 0$$

$3x - 2 = 0 \qquad 2x + 1 = 0$

$\boxed{x = \frac{2}{3} \qquad x = -\frac{1}{2}}$

23. Solve the following quadratic by taking the square root: $(x-1)^2 = 45$

$$x - 1 = \pm\sqrt{45}$$
$$\boxed{x = 1 \pm 3\sqrt{5}}$$

24. Solve the following quadratic by the quadratic formula: $x^2 - 3x - 24 = 0$?

$x = \dfrac{3 \pm \sqrt{9 - 4 \cdot 1 \cdot -24}}{2}$

$\boxed{x = \dfrac{3 \pm \sqrt{105}}{2}}$

25. Simplify $\sqrt{32}$ completely. $= \sqrt{16}\sqrt{2} = \boxed{4\sqrt{2}}$

26. Find the vertex of the following function: $y = -2(x-3)^2 + 4$

$\boxed{(3, -4)}$

Use the graph to the right to answer #27 – 30.

27. State the range for the following graph. $\boxed{(-\infty, 3] \ \text{or} \ \{x \mid x \le 3\}}$

28. State the domain for the graph $\boxed{\mathbb{R} \ \text{or} \ (-\infty, \infty)}$

29. State the axis of symmetry $\boxed{x = -4}$

30. State the vertex and indicate if it is a max or min

$\boxed{(-4, 3) \quad max}$