

**Show necessary work on the test copy. Place your answers in the blanks provided to the right of the problem. The points for a problem are to the right of the blank.**

1. Write the phrase as an algebraic expression and simplify if possible. Let  $x$  represent the unknown number. "The difference of 8 times a number and 3, added to 5 times the number."

\_\_\_\_\_ (1)

(simplified) \_\_\_\_\_ (1)

2. Solve each equation.

(a)  $\frac{b}{4} - 1 = -7$

\_\_\_\_\_ (2)

(b)  $3x + 5 = -7 + 4(x + 2)$

\_\_\_\_\_ (2)

(c)  $\frac{(x-1)}{5} = \frac{(x+2)}{2}$

\_\_\_\_\_ (2)

3. A lawn is in the shape of a trapezoid with a height of  $h = 140$  feet and bases of  $b = 60$  feet and  $B = 90$  feet. (a) Find the area of the trapezoid. (b) How many bags of fertilizer must be purchased to cover the lawn if each bag covers 3000 square feet?

Area of a trapezoid:  $A = \frac{1}{2}h(B + b)$

(a) \_\_\_\_\_ (2)

(b) \_\_\_\_\_ (1)

4. Solve  $A = P + PRT$  for  $R$

$$R = \underline{\hspace{2cm}} \quad (1)$$

5. After receiving a pay raise of 5%, this year's salary is \$44,205. What was last year's salary?

$$\underline{\hspace{2cm}} \quad (3)$$

6. Dennis and Nancy Wood are celebrating their 30th wedding anniversary by having a reception at Tiffany Oaks reception hall. They have budgeted \$4000 for their reception. If the reception hall charges a \$70.00 cleanup fee plus \$32 per person, find the greatest number of people that they may invite and still stay within their budget. Express the situation mathematically as an inequality, and then solve this inequality. Let  $x$  be the number of people they invite.

$$\text{inequality: } \underline{\hspace{2cm}} \quad (1)$$

$$\text{solution: } \underline{\hspace{2cm}} \quad (3)$$

7. Solve the compound inequality. Graph the solution set and then write your solution in interval notation.

$$6 \leq 10 - 2x \leq 16$$

$$\text{Graph: } \overline{\hspace{10cm}} \quad (3)$$

$$\text{Interval: } \underline{\hspace{2cm}} \quad (1)$$

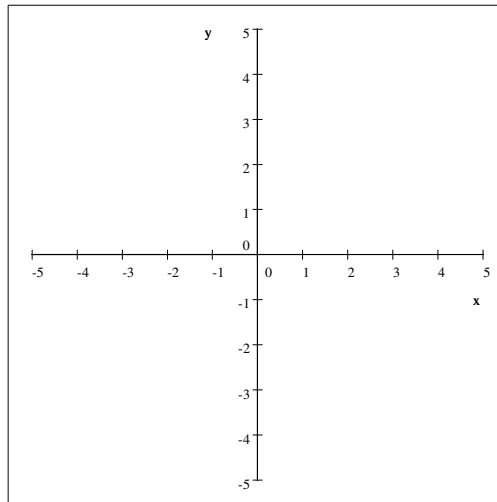
8. Solve.

$$|6x - 3| - 10 = 5$$

\_\_\_\_\_ (4)

9. Graph the linear equation by finding and plotting its intercepts.

$$-3x + 2y = 6$$



intercepts:

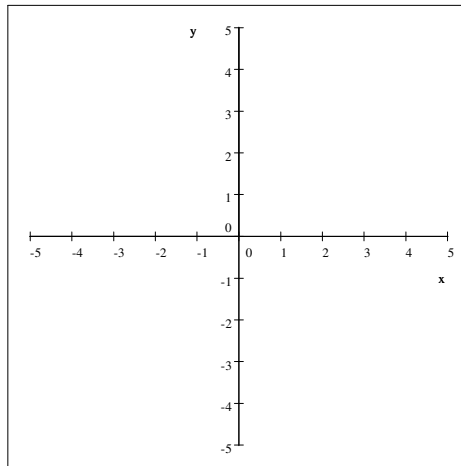
\_\_\_\_\_ (1)

\_\_\_\_\_ (1)

graph (3)

10. Graph the linear equation and indicate the slope of this line.

$$x = -3$$



slope:

\_\_\_\_\_ (1)

graph (2)

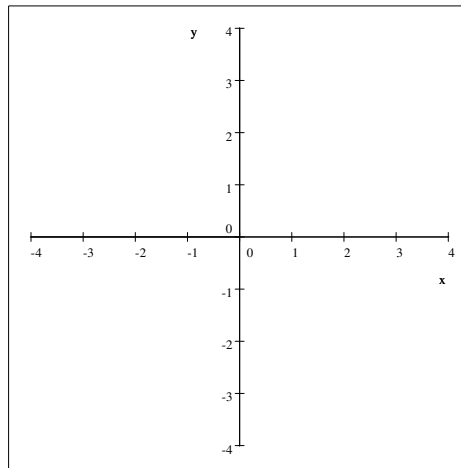
11. (a) Find the slope of the line given by  $3x + 4y = 8$ . (b) Is the line given by this equation parallel, perpendicular, or neither to the line given by the equation  $y = \frac{3}{4}x + 2$ ?

(a) \_\_\_\_\_ (1)

(b) \_\_\_\_\_ (1)

12. Find the slope and y-intercept of each line. Use these to graph each equation.

(a)  $y = 2x$

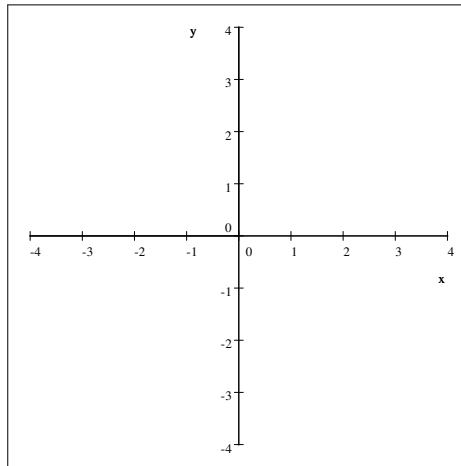


slope: \_\_\_\_\_(1)

y-intercept: \_\_\_\_\_(1)

graph (2)

(b)  $y = -\frac{1}{2}x + 1$



slope: \_\_\_\_\_(1)

y-intercept: \_\_\_\_\_(1)

graph (3)

13. Find an equation of the line that passes through (3, 4) and (5, 10) Write your answer in standard form, that is,  $Ax + By = C$ .

\_\_\_\_\_ (3)

14. Find the domain and the range of the relation. Is the relation a function?

$\{(0,0), (1,1), (-1,1), (-2,4), (2,4)\}$

domain: \_\_\_\_\_(1)

range: \_\_\_\_\_(1)

function? \_\_\_\_\_(1)

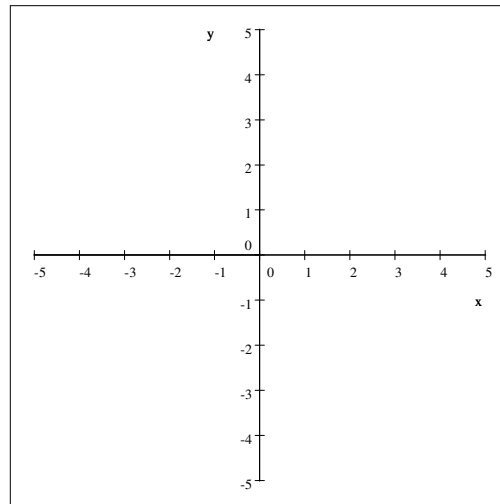
15. Given  $f(x) = 3x^2 - x + 5$  find  $f(-2)$ .

\_\_\_\_\_ (1)

16. Find an equation of the line that has a slope of  $-3$  and that passes through  $(1,2)$ . Your answer should use function notation, that is, be in the form of  $f(x) = ax + b$ .

\_\_\_\_\_ (3)

17. Graph the nonlinear function  $f(x) = \sqrt{x+1}$ .



(3)

18. Solve the system of equations by the substitution method.

$$4x + y = 23$$

$$x = 3y - 4$$

$$x =$$

$$y = \underline{\hspace{2cm}} \quad (3)$$

19. Solve the system of equations by the addition method.

$$x + 2y = 4$$

$$3x + 4y = 6$$

$$x =$$

$$y = \underline{\hspace{2cm}} \quad (4)$$

20. Find how many gallons of a 40% solution of fertilizer and a 90% solution of fertilizer should be mixed to yield 150 gallons of a 60% solution. Set up a system of equations and solve. Let  $x$  be the amount of 40% solution and let  $y$  be the amount of 90% solution.

system of  
equations: \_\_\_\_\_(2)

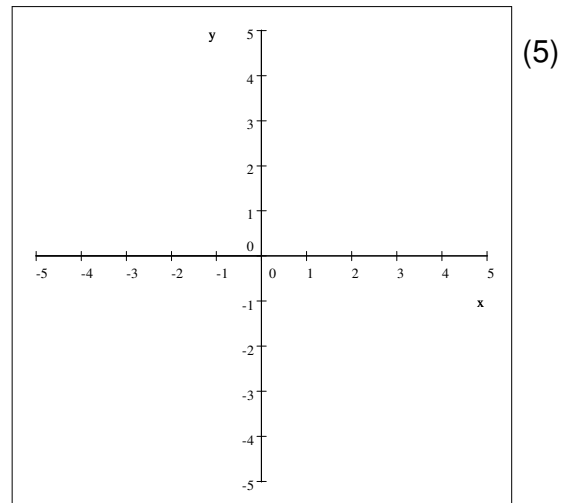
$x =$

$y =$

\_\_\_\_\_ (4)

21. Graph the solution of the system of linear inequalities.

$$\begin{aligned} 2x - y &\leq 4 \\ y &> 2 \end{aligned}$$



(5)

22. Simplify the following. Write your answer with positive exponents.

(a)  $(5z^{11})(-6z^7)(z^{-3})$  \_\_\_\_\_(1)

(c)  $\frac{7(x^2y^3)^5}{21xy^4}$  \_\_\_\_\_(2)

(b)  $\left(\frac{a^{-5}b}{ab^{-4}}\right)^{-3}$  \_\_\_\_\_(2)

23. Write 0.00000573 in scientific notation. \_\_\_\_\_(1)

24. Evaluate the expression. Write your result in standard notation.

$$\frac{7.5 \times 10^3}{5 \times 10^{-6}} \quad \text{_____}(2)$$

25. Perform the indicated operation.

(a)  $(x^2 + 4xy - 7y^2) + (3x^2 - xy + 5y^2)$   
\_\_\_\_\_ (2)

(b)  $(9x^3 - 2x^2 + 4x - 7) - (3x^3 - 5x^2 - 6x + 4)$   
\_\_\_\_\_ (2)

(c)  $-y(7x^3y^2 - 4x^2 + xy^3)$   
\_\_\_\_\_ (2)

(d)  $(x + 5)(x - 3)$   
\_\_\_\_\_ (2)

(e)  $(x + 6)(x^2 - 2x + 3)$   
\_\_\_\_\_ (3)

(f)  $(3b - 5)^2$   
\_\_\_\_\_ (2)

26. Perform the division.

(a)  $\frac{30x^5 - 18x^2 + 12x}{6x^2}$   
\_\_\_\_\_ (2)

(b)  $\frac{2x^3 + x^2 - 4x + 10}{x + 2}$   
\_\_\_\_\_ (4)

27. Factor the following polynomials.

(a)  $15x^4y^3 - 10x^4y^2 + 5x^6y^2$

\_\_\_\_\_ (2)

(b)  $6x^2 - 3xy - 8x + 4y$

\_\_\_\_\_ (2)

(c)  $z^2 + 20z + 36$

\_\_\_\_\_ (2)

(d)  $30a^2 + 11a - 6$

\_\_\_\_\_ (4)

(e)  $t^3 - 27$

\_\_\_\_\_ (2)

28. Solve.

(a)  $x^2 - 25 = 0$

\_\_\_\_\_ (2)

(b)  $x(3x - 11) = -10$

\_\_\_\_\_ (3)

(c)  $3x^3 - 6x^2 - 24x = 0$

\_\_\_\_\_ (4)