



4. (2.3 Example 1) The table shows the average salaries for professors at four-year colleges and universities. Let  $s(t)$  be the function that represents the average salary (in thousands of dollars) at  $t$  years since 1970.

Year	Average Salary (thousands of dollars)
1975	16.6
1980	22.1
1985	31.2
1990	41.9
1995	49.1
2000	57.7

- a. Use the regression capability of your calculator to find the **linear regression** equation for  $s(t)$ . Write constants to the nearest hundredth.

$$s(t) = 1.70t + 6.71$$

- b. Predict the average salary in 2008.

$$s(38) = 1.70(38) + 6.71 = 71.31 \quad \$71,310 \text{ per year}$$

- c. Predict when the average salary will be \$75,000.

$$75 = 1.70t + 6.71 \quad t = 40.2 \quad \text{year 2010}$$

5. Solve each system by elimination or substitution.

a. (3.1 Example 2)

$$\begin{aligned} y &= 2x + 1 \\ y &= -3x + 6 \end{aligned} \quad (1, 3)$$

- b. (3.1 Example 6)
- $$\begin{aligned} y &= 2x + 1 \\ 6x - 3y &= -3 \end{aligned} \quad \begin{array}{l} \text{dependent system} \\ \text{every point on the line is a solution} \end{array}$$

6. (3.4 #21) Solve and express your solution set in **interval notation**.

$$7(x+1) - 8(x-2) \leq 0 \quad [23, \infty)$$

7. Simplify each expression.

a. (4.1 #39)  $\left(\frac{b^5 c^{-2}}{b^2 c^4}\right)^2$   $\frac{b^6}{c^{12}}$

b. (4.2 #39)  $(b^{3/5} c^{-1/4})(b^{2/5} c^{-7/4})$   $\frac{b}{c^2}$

c. (4.2 #47)  $\left(\frac{9b^3 c^{-2}}{25b^{-5} c^2}\right)^{1/2}$   $\frac{3b^4}{5c^2}$

8. (4.4 #47) Find the equation of the exponential curve that passes through the points (3, 4) and (5, 9). Write the constants  $a$  and  $b$  in fractional form (not as decimal numbers).

$$y = \frac{32}{27} \left( \frac{3}{2} \right)^x$$

9. (4.5 #9) Suppose that someone invests \$4000 in stocks today and the value of the stocks doubles every 6 years. Let  $f(t)$  represent the value (in dollars) of the investment at  $t$  years from today.
- a. Find the equation for  $f(t)$ . Write constants to the nearest thousandth.

$$f(t) = 4000(1.122)^t$$

- b. Find the value of the investment 20 years from now. \$39,986.84
- c. How long will it take the investment to reach a value of \$20,000.  
14 years

10. (5.3 #9) Write the equation  $5^3 = 125$  in logarithmic form.

$$\log_5(125) = 3$$

11. (5.3 #45) Solve for  $x$  (to the nearest thousandth).

$$8 + 5(2^x) = 79 \quad x = 3.828$$

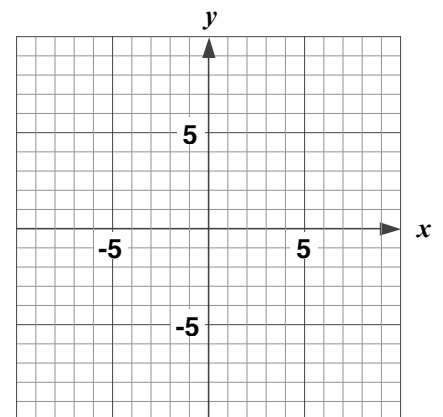
12. (5.5 #21) Solve for  $x$  (to the nearest thousandth):

$$3\log(5x) + 4\log(2x) = 3$$

$$x = \left(\frac{1}{2}\right)^{1/7} \approx 0.906$$

13. (6.1 #17) Find the vertex and  $x$ -intercepts (to the nearest hundredth) of  $y = 3(x + 5)^2 - 7$ . Then sketch its graph.

$V(-5, 7)$      $x$ -ints  $(-3.47, 0)$  and  $(-6.53, 0)$



14. (6.2 #65) Expand (multiply):  $(2x - 3)(3x^2 + x - 4)$

$$6x^3 - 7x^2 - 11x + 12$$

15. (6.4 #61) Factor  $5x^4 - 35x^3 + 60x^2$

$$5x^2(x - 4)(x - 3)$$

16. (6.5 # 53) Solve  $-17x = 28 - 3x^2$

7 and  $-4/3$

17. (7.3 #37) Solve  $(4x + 3)^2 + 2 = 22$

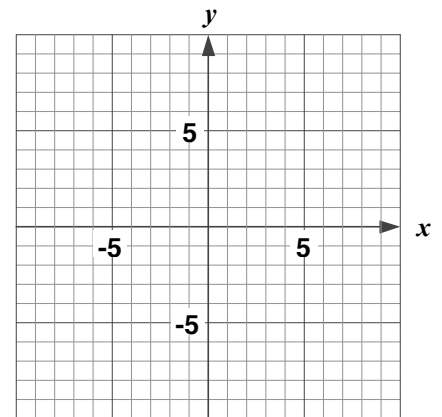
$$\frac{-3 \pm 4\sqrt{5}}{4}$$

18. (6.6 #29) Let  $y = 2x^2 - 7x + 7$ .

a. Find the y-intercept and its symmetric point.

b. Find the vertex.

c. Sketch an accurate graph of the function.



19. (11.4 #75) Solve  $(5x + 3)^2 = -7$

no real solution

20. (9.3 33) Simplify  $\sqrt[5]{\frac{2}{x^3}}$   $\frac{\sqrt[5]{2x^2}}{x}$

21. (7.4 Example 2) Find the equation of the parabola that contains the points (0, 1), (3, 7) and (4, 5).

$$y = -x^2 + 5x + 1$$

22. Perform the indicated operation(s) and simplify.

a. (8.2 #25)  $\frac{-x+3}{x^2-16} \cdot \frac{x^2+8x+16}{x^2-2x-3}$   $-\frac{x+4}{(x-4)(x+1)}$

b. (8.3 #25)  $\frac{2x+1}{x^2-4x-21} + \frac{3}{14-2x}$   $\frac{1}{2(x+3)}$

23. (8.5 #21) Solve  $\frac{x}{x-5} + \frac{2}{x-6} = \frac{2}{x^2 - 11x + 30}$   $x = 2$

24. (9.2 #53) Simplify (expand)  $(4\sqrt{x} + 5)^2$

$$16x + 40\sqrt{x} + 25$$

25. (9.5 #25) Solve  $\sqrt{12x + 13} + 2 = 3x$   $x = 3$

26. (2 points each) Circle TRUE if the statement is always true, otherwise circle FALSE.

TRUE FALSE All horizontal lines have an undefined slope.

TRUE FALSE In a graph the dependent variable is represented on the horizontal axis.

TRUE FALSE All relations are functions.

TRUE FALSE The domain of a function is the set of all values of the independent variable.

TRUE FALSE The equation  $y = x^2$  is a function.

TRUE FALSE The range of a function is the set of all output values of the function.

TRUE FALSE A system of two linear equations that have the same slope and same y-intercept is called a dependent system.

TRUE FALSE For positive integer  $n$ ,  $(a + b)^n = a^n + b^n$

TRUE FALSE A negative exponent means to take the reciprocal.

TRUE FALSE  $-5^2 = 25$

TRUE FALSE For an exponential function in the form  $y = ab^x$ , if the value of independent variable is increased by one, then the value of the dependent variable is multiplied by the base  $b$ .

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