1. **[6]** Evaluate the following expressions.
   (a) $9-5(2^3-3^0)$
   (b) $\dfrac{4}{2(1-4)} \div \dfrac{2(3-5)}{1-(-2)}$
   (c) $\left|-2^2-6\right|-\left|(-2)^2-10\right|$
2. **[4]** Expand and simplify the following algebraic expressions.
   (a) $(x^3+8)(6-2x)-(x+3)^2$
   (b) $(2a-3)[1-(4+b)a]-3ab$
3. **[6]** Solve for x.
   (a) $2-(x+5)=1-4x$
   (b) $\dfrac{2}{3}x+2=\dfrac{1}{2}\left(\dfrac{5}{3}-\dfrac{x}{2}\right)$
   (c) $\dfrac{4}{3}=\dfrac{3}{x+2}$
4. **[4]** Simplify. Your answers should have no negative exponents.
   (a) $\left(\dfrac{15a^{-1}b^3}{9a^{-2}b^{-2}}\right)^{-2}$
   (b) $(-2x^2y^{-3})^2(3x^{-1}y)$
5. **[4]** Factor completely.
   (a) $4x^3+22x^2-12x$
   (b) $8x^7-64x^4$
6. **[6]** Solve *by factoring*.
   (a) $x^2-77=-4x$
   (b) $x^4-5x^2+4=0$
   (c) $x^3-14x+10=2(x+5)$
7. **[3]** My local pet food store marks up its products by 25%. If I paid $65 for a bag of dog food, what is the store's cost?
8. **[2]** My initial investment of $5000 earned an interest of $600 after 4 years. What was the interest rate? (Recall: $I=Prt$)
9. **[8]** Simplify.
   (a) $-xy^2z^3\sqrt{144x^4y^8z^5}$
   (b) $\dfrac{y\sqrt{32x^7y^3z^8}}{z^2\sqrt{x^7y^9z^3}}$
   (c) $2\sqrt{121}-\sqrt{28}+3\sqrt{63}-\sqrt{81}$
   (d) $(\sqrt{3}-5\sqrt{8})(2\sqrt{8}+\sqrt{3})$
10. **[3]** Solve for x or show that there is no solution. Check your answer.
    $x=\sqrt{x+44}-2$
11. **[4]** Rationalize the denominator and simplify.
    (a) $\dfrac{\sqrt{10}}{4\sqrt{5}}$
    (b) $\dfrac{\sqrt{16}}{\sqrt{7}-\sqrt{3}}$
12. **[3]** *Using the Quadratic Formula*, find the solution(s) to $2x^2+3x-1=0$.
13. **[3]** *By completing the square*, find the solution(s) to $x^2-8x-20=0$.
14. **[3]** *By taking square roots*, find the solution(s) to $-2(2x-3)^2+18=0$.
15. **[3]** Solve the system by *substitution*.
    $5x+6y=1$
    $2x+3y=1$
16. **[3]** Solve the system by *elimination*.
    $3x+4y=-8$
    $-6x-7y=14$
17. **[3]** For the points A(1,-11) and B(5,-17):
    (a) Find the distance between A and B.
    (b) Find the midpoint of the line segment joining A and B.
18. **[5]**
    (a) Find an equation for the line that passes through (-3,-1) and (2,-4).
    (b) What is the slope of this line?
    (c) What is the y-intercept of this line?
    (d) What is the x-intercept of this line?
19. **[4]**
    (a) Sketch the lines $y=-2x+4$ and $y=\dfrac{1}{2}x+3$
    (b) Find the point of intersection of the two lines.
    (c) Determine whether the lines are parallel, perpendicular, or neither. Explain your answer.

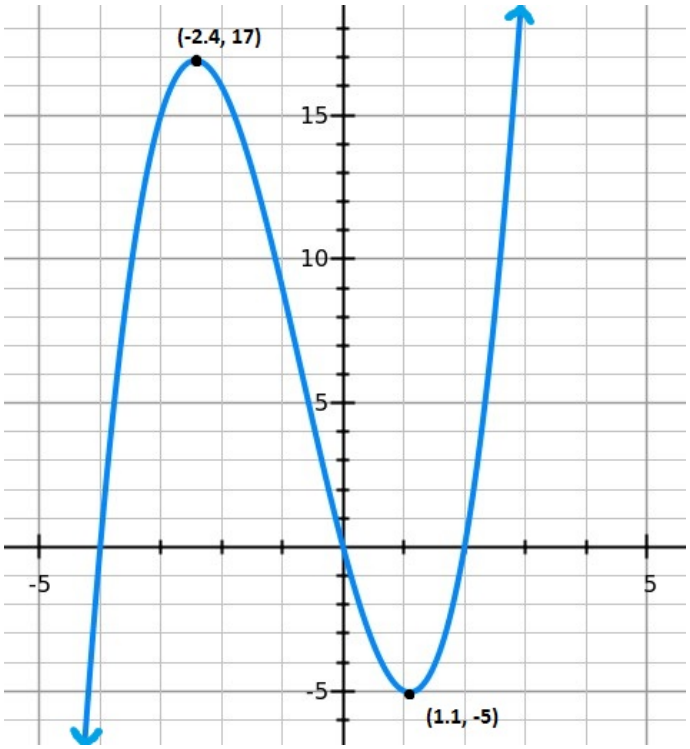
20. **[5]** Given $f(x) = x^2+5x$ and $g(x)=2-5x$, find the following:

(a) $f(\frac{1}{2})$

(b) The value(s) of x for which $f(x) = 0.$

(c) $f(-2)-g(\frac{1}{3})$

21. **[4]** Find the domain, range, intercepts, and extrema (local max/min) of the following function.



22. **[6]** Solve for $x.$

(a) $9^{2-x} = 27^{x-2}$

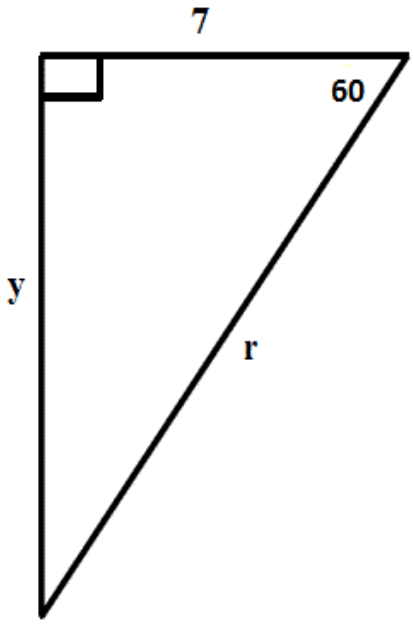
(b) $3 = 2 + \frac{4^{x+1}}{4^2}$

(c) $5 = -1+2(1+e^{\frac{x}{3}})$

23. **[3]** Let θ be an acute angle of a right triangle. Given $csc\,\theta = \sqrt{5},$ find the values of the other five trigonometric functions.

24. **[2]** Find the acute angle θ given $sec\,\theta = \frac{2}{\sqrt{3}}.$

25. **[3]** Find **y** and **r**.



ANSWERS

1.
   (a) -26
   (b) 1/2
   (c) 4
2.
   (a) $-2x^4+6x^3-x^2-22x+39$
   (b) $-8a^2-2a^2b+14a-3$
3.
   (a) 4/3
   (b) -14/11
   (c) 1/4
4.
   (a) $\frac{9}{25a^2b^{10}}$
   (b) $\frac{12x^3}{y^5}$
5.
   (a) $2x(x+6)(2x-1)$
   (b) $8x^4(x-2)(x^2+2x+4)$
6.
   (a) $x=-11,7$
   (b) $x=2,-2,1,-1$
   (c) $x=0, x=4, x=-4$
7. $52
8. 3%

9.
(a) $-12x^3y^6z^5\sqrt{z}$
(b) $\frac{4}{y^2}\sqrt{2z}$
(c) $13+7\sqrt{7}$
(d) $-6\sqrt{6}-77$

10. x = 5 is the only solution.

11.
(a) $\frac{\sqrt{2}}{4}$
(b) $\sqrt{7}+\sqrt{3}$

12. $\frac{-3\pm\sqrt{17}}{4}$

13. $x=-2,10$

14. $x=0,3$

15. $x=-1, y=1$

16. $x=0, y=-2$

17.
(a) $2\sqrt{13}$
(b) $(3,-14)$

18.
(a) $y=-\frac{3}{5}x-\frac{14}{5}$
(b) $-\frac{3}{5}$
(c) $(0-\frac{14}{5})$
(d) $x=-\frac{14}{3}$

19.
(a)
(b) $x=\frac{2}{5}, y=\frac{16}{5}$
(c) perpendicular

20.
(a) 11/4
(b) $x=0, x=-5$
(c) -19/3

21. Domain: **R,** Range: **R,** x-ints: $x=-4,0,2$, y-ints: $y=0$, local max: (-2.4, 17) , local min: (1.1, -5)

22.
(a) $x=2$
(b) $x=1$
(c) $x=3\ln 2$

23. $\sin\theta=\frac{\sqrt{5}}{5}$ $\cos\theta=\frac{2\sqrt{5}}{5}$
$\tan\theta=\frac{1}{2}$ $csc\,\theta=\sqrt{5}$ $sec\,\theta=\frac{\sqrt{5}}{2}$
$\cot\theta=2$

24. $\theta=30\,degrees$

25. $y=7\sqrt{3},\ r=14$