

1. Simplify. Give answers only with positive exponents.

(a)  $8^0 + 2(3)^0$       (b)  $\frac{(6r^{-1})^2(2r^{-4})^{-1}}{r^5(r^2)^{-3}}$       (c)  $\left(\frac{2a^2b^3}{ab^{-2}}\right)^{-2}$

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

(a)  $5(5t + 1) - t(t - 2)$       (b)  $(4x + 3y)(2x - y)$   
(c)  $(a + 2)(a^2 - 4a + 1)$       (d)  $\frac{y^3 - 3y^2 + 8y - 6}{y - 1}$   
(Use long division)

3. Factor completely.

(a)  $2a^2 + 2ab + 3a + 3b$       (b)  $6y^2 - 17y + 5$   
(c)  $9x^3 + 12x^2 + 4x$       (d)  $x^4 - 16$

4. Solve the following equations.

(a)  $7(2x + 1) = 6(2x - 9)$       (b)  $3y(y^2 + 6y + 9) = 0$   
(c)  $3 - 5x = 8x^2$       (d)  $25y^2 = 20y$   
(e)  $\frac{3m - 2}{5} = \frac{4 - m}{3}$       (f)  $\frac{4x}{3} = \frac{12}{x}$   
(g)  $\frac{1}{x - 1} + \frac{2}{x^2 - 1} = \frac{3}{x + 1}$       (h)  $(x + 2)^2 = 25$   
(i)  $2x^2 = 4x + 3$

5. Using algebraic techniques and defining variables, solve the following problems.

- (a) If 12 is subtracted from three times a number, and the difference is multiplied by 2, the result is  $-42$ . Find the number.  
(b) A family of four with a monthly income of \$2650 spends 75% of its income and saves the rest. Find the annual savings for this family.  
(c) Find two pairs of consecutive odd integers such that their product is one less than four times their sum.

6. For the line with equation  $3x - 6y = 12$

- (a) find the  $x$ -intercept, the  $y$ -intercept and the slope.  
(b) sketch its graph.

7. Give an equation of the line

- (a) with slope  $-\frac{3}{4}$  and passing through  $(2, -4)$ .  
(b) passing through the points  $(-1, -2)$  and  $(-4, 7)$ .  
(c) passing through the point  $(-1, 1)$  and parallel to  $2x - y = 2$ .  
(d) passing through the points  $(-1, -2)$  and  $(-1, 7)$ .

8. Perform the indicated operations and write your answer in lowest terms.

(a)  $\frac{x^2 + 3x + 2}{4x^2 - 4x + 1} \cdot \frac{2x^2 - x}{x^3 + 5x^2 + 6x}$       (b)  $\frac{y^2 - 1}{2y^2 + 3y + 1} \div \frac{-y^2 + 3y - 2}{2y^2 - 3y - 2}$   
(c)  $\frac{1}{x + 1} - \frac{1}{x^2 + 3x + 2}$       (d)  $\frac{1 - \frac{1}{x}}{1 + \frac{1}{x}}$

9. Solve the linear system:  $\begin{cases} 4x + 2y = 2 \\ -x + y = -5 \end{cases}$

10. Perform the indicated operation(s) and simplify your answer. Do not give decimal answers.

(a)  $\sqrt{6m^2n^3} \cdot \sqrt{15mn}$       (b)  $3\sqrt{27} - 2\sqrt{12}$   
(c)  $(2\sqrt{2} + \sqrt{3})(\sqrt{2} + 2\sqrt{3})$       (d)  $(6\sqrt{3} + \sqrt{5})(6\sqrt{3} - \sqrt{5})$

11. Rationalize the denominator of  $\frac{t - 9}{\sqrt{t + 3}}$ .

12. Use your calculator, with 4 decimal place accuracy, to find:

(a)  $\cos 31^\circ$       (b)  $\tan 72^\circ$       (c)  $\sin \frac{2\pi}{3}$

13.  $\triangle ABC$  has a right angle at  $C$ . If  $\angle A = 23^\circ$  and side  $b = 10$ , find side  $a$ .

14. Use the law of sines to find side  $a$  if  $\angle B = 35^\circ$ ,  $\angle C = 82^\circ$  and side  $c = 7$ .

15. Use the law of cosines to find  $a$  if  $\angle A = 32^\circ$ , side  $b = 6$  and side  $c = 7$ .

ANSWERS

1. (a) 3, (b)  $18r^3$ , (c)  $\frac{1}{4a^2b^{10}}$ .

2. (a)  $-t^2 + 27t + 5$ , (b)  $8x^2 + 2xy - 3y^2$ ,  
(c)  $a^3 - 2a^2 - 7a + 2$ , (d)  $y^2 - 2y + 6$ .

3. (a)  $(2a + 3)(a + b)$ , (b)  $(2y - 5)(3y - 1)$ ,  
(c)  $x(3x + 2)^2$ , (d)  $(x - 2)(x + 2)(x^2 + 4)$ .

4. (a)  $x = -\frac{61}{2}$ , (b)  $y = 0, -3$ ,

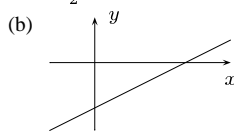
(c)  $x = \frac{3}{8}, -1$ , (d)  $y = 0, \frac{4}{5}$ , (e)  $m = \frac{13}{7}$ ,

(f)  $x = \pm 3$ , (g)  $x = 3$ , (h)  $x = 3, -7$ ,

(i)  $\frac{1}{2}(2 \pm \sqrt{10})$ .

5. (a)  $x = -3$ , (b) \$7950,  
(c)  $(7, 9)$  and  $(-1, 1)$ .

6. (a)  $x$ -intercept:  $(4, 0)$ ,  $y$ -intercept:  $(0, -2)$ ,  
slope:  $\frac{1}{2}$ .



7. (a)  $y = -\frac{3}{4}x - \frac{5}{2}$ , (b)  $y = -3x - 5$ ,  
(c)  $y = 2x + 3$ , (d)  $x = -1$ .

8. (a)  $\frac{x + 1}{(2x - 1)(x + 3)}$ , (b)  $-1$ ,

(c)  $\frac{1}{x + 2}$ , (d)  $\frac{x - 1}{x + 1}$ .

9.  $(2, -3)$

10. (a)  $3mn^2\sqrt{10m}$ , (b)  $5\sqrt{3}$ ,  
(c)  $10 + 5\sqrt{6}$ , (d) 103.

11.  $\sqrt{t - 3}$

12. (a) 0.8572, (b) 3.0777, (c) 0.8660.

13.  $a \approx 4.24$

14.  $a \approx 6.3$

15.  $a \approx 3.71$