

College Algebra Placement Review

*Calculators will **NOT** be allowed on any mathematics placement test*

1. Evaluate each of the following [Express all answers in **lowest terms**]:

a) $2 - (-3 + 9) - 28$

b) $5 - (12 \cdot 3) \div (3 \cdot 4) + 2$

c) $11 + 3 \cdot 8 \div 2 - 6 \cdot 2$

d) $\left(4 - \frac{6}{12}\right) \div \left(\frac{3}{5} \cdot 4\right)$

e) $\frac{2}{5} + \left(\frac{3}{2} \div \frac{5}{4}\right) + \left(\frac{2}{2} - \frac{3}{2}\right)$

f) $\frac{7}{3} - \frac{11}{8} \div \frac{9}{2} \cdot \frac{3}{44} - \frac{3}{20} \div \frac{4}{55}$

2. Simplify [Express all answers with **positive exponents**]:

a) $\frac{4^5}{(2^3)^2}$

b) $(3a^5)^4$

c) $(x^3)(x^{-5})$

d) $(2a^2b - 5ab^2) - (a^2b - 3ab^2)$

e) $4x^2y - 2xy^2 - 3x(xy - 3y) + y(2xy - 7x)$

f) $(m + 5)^2 - (m - 5)^2$

g) $x^2(x + 1)^2 - (x^2 - 2)^2$

3. Solve each linear equation:

a) Solve for x : $15x - 12 = 13$

b) Solve for z : $3z + 2 = 6z - 7$

c) Solve for M : $3M + 13 = 6M - 7(2 - 6M)$

d) Solve for p : $\frac{7p}{4} - \frac{3}{20} = \frac{2p}{5}$

e) Solve for h : $\frac{5}{2h} = 2 - \frac{4}{3h}$

f) Solve for D : $0.1D - 0.2 = 0.3D + 0.4$

4. Solve each inequality and compound inequality. Express each solution in **interval notation**:

a) $-13 + 3x < 17$

b) $3x - 11 \leq 7x + 5$

c) $12 - 2(3x - 2) \geq 5x - 2(5 - x)$

d) $\frac{3}{5}x - 2 > \frac{3}{10} - x$

e) $-5 < 3x + 4 < 25$

f) $-16 < 1 - 3x \leq 16$

g) $\frac{2}{5} > \frac{3x-7}{2} \geq \frac{-3}{10}$

h) $\frac{10-8x}{2} < 17$ and $5x - 8 \leq 17$

i) $3x - 6 \geq 9$ or $2(10 - x) > 6$

j) $5 + 2x < 3x - 1$ or $\frac{7x-9}{4} < -2$

k) $6 - 7x \leq 3 - 9x$ and $\frac{-4x}{5} < 3x - 8$

5. Solve each **absolute value equation** and express each solution as a **solution set**:

a) $|x| + 8 = 17$

b) $|2m + 2| = -3$

c) $|22y - 13| = 9$

d) $|18 - 4a| - 100 = -64$

e) $|2q + 4| = |3q - 8|$

f) $2 = \left|\frac{n+2}{n}\right|$

g) $25 - |7h + 26| = 13$

h) $19 - |5 - 2h| = 31$

6. Simplify each **absolute inequality** and express each solution using **interval notation**:

a) $\left|\frac{m+1}{4}\right| \leq 5$

b) $|4x + 3| + 2 \leq 15$

c) $21 \leq |3x + 9| + 3$

d) $|21 - 11x| < 23$

e) $|7 - 2h| > -5$

f) $7 < \left|\frac{6c+35}{3}\right| + 1$

g) $3 - |9x - 17| \geq 17$

h) $7 \leq 14 + |10x - 5|$

7. **Solve for the specified variable:**

a) Solve for m : $3T = \frac{mv}{2}$

b) Solve for L : $aL + hL = 9$

c) Solve for h : $A = 3\pi r(2h + r)$

d) Solve for x : $B(x + 4) = 2x + B$

e) Solve for T : $\frac{2}{R} - \frac{5}{S} = \frac{3}{T}$

f) Solve for y : $\frac{5x+1}{xy} = \frac{1}{x} - \frac{x}{y}$

8. **Find the domain and range and indicate whether or not the relation defines a function:**

a) $\{(-3, -1), (0, 1), (2, 6), (4, -1), (6, 6)\}$

b) $\{(1, 1), (4, 2), (9, 7), (1, -1), (0, -2)\}$

9. **Graph the following:**

a) $y = 2x + 4$

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

c) $y = 3 - |x|$

d) $y = 5 - x^2$

e) $x + y \leq 4$

f) $3x - 6y \leq 12$

10. **Find each equation of the straight line passing through the set of given points:**

a) $(0, 2)$ and $(3, 5)$

b) $(-2, 5)$ and $(1, 5)$

c) $(-2, -3)$ and $(1, -2)$

d) $(-3, 1)$ and $(-3, -6)$

11. **Find each equation of the straight line parallel to:**

a) $-4x + 2y = 6$ and passing through $(2, -1)$

b) $5 + 6x = 2y$ and passing through $(\frac{1}{3}, 1)$

12. **Find each equation of the straight line perpendicular to:**

a) $3y = 18 - x$ and passing through $(0, 1)$

b) $2x + y = 3$ and passing through $(-4, 1)$

13. **Solve each system of equations using substitution or elimination:**

a) $\begin{cases} y = 2x - 3 \\ y = 6x + 5 \end{cases}$

b) $\begin{cases} y = 2x - 3 \\ 2x - 5y = 11 \end{cases}$

c) $\begin{cases} y = 11 - 3x \\ 6x + 2y = 5 \end{cases}$

d) $\begin{cases} x = 5y - 1 \\ 2x - 10y = -2 \end{cases}$

e) $\begin{cases} y - 5x = 1 \\ 5x + 2y = -10 \end{cases}$

f) $\begin{cases} -2x = 13y - 10 \\ 7y + x = 1 \end{cases}$

g) $\begin{cases} x = \frac{1}{3}y - 1 \\ y = 3x \end{cases}$

h) $\begin{cases} 3x - y = 4 \\ 21y - 18x = 12 \end{cases}$

14. **Factor using specific factoring formulas or any other method:**

a) $6x^5y^8 - 9x^7y^2$

b) $2x^2 - 50$

c) $t^2 - 8t + 7$

d) $x^2 + 2x - 7$

e) $2h - 15 + h^2$

f) $3z^2 - 11z - 4$

g) $64x^{10} - 169y^4$

h) $a^2 - a - 2$

i) $8x^3 + 125$

j) $2m^2 + 2 - 4m$

Factor by grouping or using the box method:

k) $10x^2 - 35x + 6x - 21$

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

m) $3a^3 - a - 6a^2 + 2$

n) $x^4 - 4x^2 + 5x^2 - 20$

15. Use [polynomial long division](#) or [synthetic division](#) to simplify each expression:

a) $\frac{2x+10}{x+5}$

b) $\frac{4x-2}{x-3}$

c) $\frac{x^3-6x^2+13x-2}{x-4}$

d) $\frac{2x^3-19}{x-2}$

e) $\frac{x^4-4x^3-6x^2+3x-2}{x^3-x^2+2x-1}$

16. Solve each polynomial equations [by factoring](#), using [the quadratic formula](#), or using any other method:

a) $x^2 - 3x + 2 = 0$

b) $\sqrt{x+6} = 5$

c) $x^2 + 3x = 10$

d) $x - 6 = -x^2$

e) $2x(3x^2 + 7) = 25x^2$

f) $5x(x - 4) = 2x(x - 9) + 5$

17. [Simplify each rational expression](#):

a) $\frac{x^2-3x+2}{x^2+3x-10}$

b) $\frac{x+2}{x-1} \div \frac{2x}{x}$

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

d) $\frac{\frac{x^2}{2x}}{\frac{3x^3}{6x}}$

e) $\frac{49-t^2}{t+7}$

f) $\frac{2x^2-6x+18}{2x^4+54x}$

g) $\frac{2x^2+2x-15}{x-4} - \frac{x^2+9}{x-4}$

h) $\frac{\frac{7}{x^2} + \frac{1}{y^2}}{\frac{1}{xy} + \frac{4}{x^2y^2}}$

i) $\frac{5}{x} - \frac{1}{x-5}$

j) $\frac{2a}{3a + \frac{2a}{3a+1}}$

18. Solve each [rational equation](#):

a) $\frac{3}{2x} + \frac{3}{3x} = 1$

b) $\frac{4}{Q+3} - \frac{6}{Q+4} = \frac{Q-5}{Q^2+7Q+12}$

c) $\frac{-3}{y+4} + \frac{4}{y-6} = \frac{5y+2}{y^2-2y-24}$

d) $\frac{15}{p} = 3 - \frac{1}{2}$

e) $\frac{2m+14}{m^2-49} = \frac{-3}{7-m}$

f) $\frac{1}{2t-3} - \frac{2t^2}{8t^3-27} = \frac{t-3}{4t^2+6t+9}$

19. Solve using the [quadratic formula](#) or by [completing the square](#):

a) $(3x - 1)^2 = 4$

b) $(3m - 1)^2 - 2 = 0$

c) $(5p - 2)^2 = 9$

d) $(6Q + 3)^2 - 36 = 0$

e) $x^2 - x = 2$

f) $35 - A^2 + 2A = 0$

g) $x^2 + 6x + 9 = 4$

h) $4w^2 - 8w = 5$

i) $x^2 - 4x - 7 = 0$

j) $x^2 + 8x + 13 = 0$

k) $2y(y + 1) = \frac{15}{2}$

l) $h^2 + 3h(h + 2) = 3(4 - 2h)$