



Mathematics Placement Test: SAMPLE PROBLEMS

**QUESTION 1:**

Find the value of:

a) $\frac{0}{4}$	b) $\frac{4}{0}$	c) $32 \div 8(4) - 4^2$	d) $(-25) \div (-5)$	e) $(-1)^{\frac{3}{5}} - 1$
f) $5 \div (-25)$	g) $-5^2 + (-5)^2 + 5^2 - 5^0$		h) $1 + \left(-\frac{27}{64}\right)^{-\frac{1}{3}} + \left(2 + \frac{14}{25}\right)^{\frac{1}{2}}$	
i) $5^0 - [7 - (-3)]^2 - [6 \div (-4)] \cdot (-2)^3$		j) $48 \div 2 \cdot 3 - 4^2$		

**QUESTION 2:**

Solve the following equations for x:

a) $3x - 5x = -9 + 2x + 11$	b) $\frac{x}{2} - \frac{2x-3}{3} + \frac{5x}{6} = 2$	c) $\frac{x}{15} - \frac{3x+3}{25} = \frac{5x+4}{5}$
d) $\frac{x-2}{8} = \frac{x+1}{12} - \frac{7}{20}$	e) $\frac{2x+3}{3} - \frac{1-x}{20} = \frac{-5x-1}{14}$	f) $\frac{1}{x-3} - \frac{4-x}{3x+5} = 1$
g) $\frac{1}{x-4} - \frac{5-x}{3x+2} = 1$	h) $\frac{4x+3}{36} - \frac{1-x}{3x} = \frac{5x+14}{45}$	i) $\frac{1}{4x} + \frac{3}{x(x+1)} = 0$
j) $\frac{1+x}{3} - \frac{2}{x} = \frac{7}{6}$	k) $\frac{1}{6(x-3)} + \frac{1}{9(x+3)} = \frac{x}{3(x-3)(x+3)}$	

**QUESTION 3:**

Solve the following system of equations:

a) $4x + 7y = 15$	b) $3x - 5y = 11$
$3x - 5y = 1$	$4x + 2y = 6$

**QUESTION 4:**

Solve the following quadratic equations for all real values of x:

a) $x^2 = 0$	b) $x^2 = 9$	c) $x^2 = -9$
d) $x^2 - 4x + 3 = 0$	e) $(x-3)(x+1) = 0$	f) $(x-3)(x+1) = -1$
g) $(x-5)(x-3) = 24$	h) $(x-1)^2 = -2$	i) $(x-1)^2 = 2$
j) $x^2 - 6x + 11 = 0$	k) $x^2 - 6x + 9 = 0$	l) $(10x+100)^2 = -10$



**QUESTION 5:**

a) Solve the following expressions for x:

i) $y = (x+4)^{3/5} - 1$	ii) $y = 3 \left[ (2-5x)^{-1/3} \right] - 7$	iii) $y + 1 = \frac{6y-x}{x-2}$
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b) Solve the following expressions for x in terms of a and b.

i) $\frac{1}{3a} = \frac{5}{6x} - \frac{1}{9b}$	ii) $\frac{1}{4a} = \frac{3}{8x} - \frac{1}{3b}$
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c) Solve the equation  $P(V-b) = nRT$  for V.

d) Given that  $v^2 = u^2 + 2as$  and  $u \leq 0$ . First express u in terms of v, a, and s and then proceed to calculate the value of u when  $v = 10$ ,  $a = 8$ , and  $s = 4$ .

**QUESTION 6:**

a) Find the equation of the line that:

- i) Has slope  $m=4$  and passes through the point  $(-2, 2)$ .
- ii) Passes through the points  $(2, -3)$  and  $(2, 7)$ .
- iii) Passes through the points  $(2, -3)$  and  $(5, 3)$ .

b) Find the x-intercept and the y-intercept of the line  $5y - 3x = 15$ . Hence sketch its graph.

c) Find the value of the constant k such that the line  $5x + ky = 3$ :

- i) is parallel to the line  $y = -2x - 1$ .
- ii) is perpendicular to the line  $5y - x - 1 = 0$ .

d) Given that  $(4, p)$  are the coordinates of a point on the line with equation  $3x - y = 5$ , find p.

e) Find the distance between the points  $(9, 4)$  and  $(1, -2)$ .

**QUESTION 7:**

a) Solve  $4^{3x-1} = \frac{1}{8^x}$  for x.

b) If  $5^x - 5^{x-1} = 500$ , what is the value of  $10^x$ ?

c) Express  $\frac{x}{5y} \div \frac{2x}{3y}$  in its simplest form.

d) Express  $\sqrt{50x^4 y^{10}}$  in its simplest radical form.

e) Combine into a single fraction and simplify:  $\frac{2}{x+3} + \frac{2x+1}{(x+3)^2 x}$

f) Find A, given that  $(2-A)[(4-A) \cdot (3-A) - 12] = 0$ .

**QUESTION 8:**

For the first triangle i) below calculate  $\cos\theta$ ,  $\sin\theta$  and  $\tan\theta$ . For triangles ii) and iii) calculate the value of unknown side x, given that  $\sin(30)=0.5$  and  $\cos(60)=0.5$ .

