

Math 1324, Practice Test 1

#1 Simplify and rationalize: $\frac{4\sqrt{3}}{\sqrt{8}}$

#2 Rationalize: $\frac{5}{\sqrt{x}-6}$

#3 Solve: $\frac{b+8}{b} + \frac{5}{b-1} = \frac{20}{b}$

#4 Solve: $\sqrt{4x+12} + 2 = 8$

#5 Solve: $10x^2 + 19x = 12$

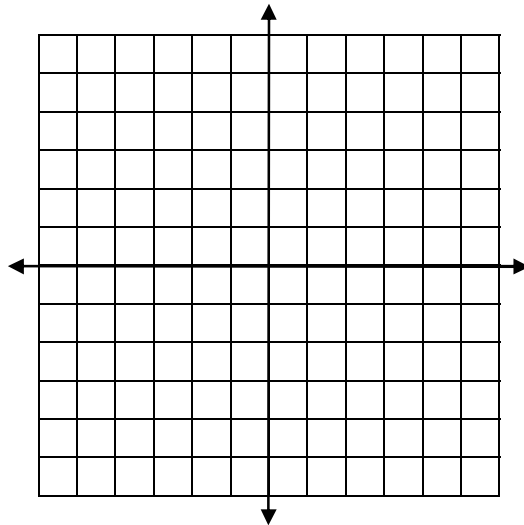
#6 Find the equation of a line passing through the points $(-2,3)$ and $(1, \frac{1}{2})$.

#7 Given $y(x) = x^2 + 8$, find $y(a+2)$.

#8 Given $s(x) = \sqrt{1-x}$ and $t(x) = \frac{1}{x+3}$, state the domain of $s(x)$ and the domain of $t(x)$.

#9 A company produces widgets. The company makes \$10 for every widget it produces each month, but, in a given month, it cost the company \$2 to produce each widget plus an additional \$400 in fixed costs each month. Find the break-even point for the company.

#10 Given $J(x) = x^2 - 4x - 12$, sketch a graph of $J(x)$. Label all intercepts. Label the vertex.



SOLUTIONS

#1 Simplify and rationalize: $\frac{4\sqrt{3}}{\sqrt{8}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{4\sqrt{6}}{\sqrt{16}} = \frac{4\sqrt{6}}{4} = \sqrt{6}$

#2 Rationalize: $\frac{5}{\sqrt{x}-6} \cdot \frac{\sqrt{x}+6}{\sqrt{x}+6} = \frac{5(\sqrt{x}+6)}{(\sqrt{x}-6)(\sqrt{x}+6)} = \frac{5(\sqrt{x}+6)}{x-36}$

#3 Solve: $\frac{b+8}{b} + \frac{5}{b-1} = \frac{20}{b}$

$$b(b-1) \cdot \left(\frac{b+8}{b} + \frac{5}{b-1} \right) = \left(\frac{20}{b} \right) \cdot b(b-1)$$
$$\frac{b(b-1)(b+8)}{b} + \frac{5 \cdot b(b-1)}{b-1} = 20(b-1)$$
$$(b-1)(b+8) + 5b = 20b - 20$$
$$b^2 + 8b - b - 8 + 5b = 20b - 20$$
$$b^2 + 12b - 8 = 20b - 20$$
$$b^2 - 8b + 12 = 0$$
$$(b-2)(b-6) = 0$$
$$b-2 = 0 \text{ or } b-6 = 0$$
$$b = 2 \text{ or } b = 6$$

#4 Solve: $\sqrt{4x+12} + 2 = 8$

$$\sqrt{4x+12} = 6$$
$$(\sqrt{4x+12})^2 = (6)^2$$
$$4x+12 = 36$$
$$4x = 24$$
$$x = 6$$

#5 Solve: $10x^2 + 19x = 12$

$$10x^2 + 19x - 12 = 0$$
$$(2x-1)(5x+12) = 0$$
$$2x-1 = 0 \text{ or } 5x+12 = 0$$
$$2x = 1 \quad \text{or} \quad 5x = -12$$
$$x = 1/2 \quad \text{or} \quad x = -12/5$$

$$10x^2 + 19x - 12 = 0$$
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
$$x = \frac{-19 \pm \sqrt{19^2 - 4 \cdot 10 \cdot -12}}{2 \cdot 10}$$
$$x = \frac{-19 \pm \sqrt{361 + 480}}{20}$$
$$x = \frac{-19 \pm \sqrt{841}}{20}$$
$$x = \frac{-19 \pm 29}{20}$$
$$x = \frac{-19 + 29}{20} \text{ or } x = \frac{-19 - 29}{20}$$
$$x = 1/2 \text{ or } x = -12/5$$

#6 Find the equation of a line passing through the points $(-2,3)$ and $(1, \frac{1}{2})$.

$$m = \frac{\frac{1}{2} - 3}{1 - (-2)} = \frac{-\frac{5}{2}}{3} = -\frac{5}{6}$$

$$y - y_1 = m(x - x_1)$$

$$y - 3 = -\frac{5}{6}(x - (-2))$$

$$y - 3 = -\frac{5}{6}(x + 2)$$

$$y - 3 = -\frac{5}{6}x - \frac{5}{3}$$

$$y = -\frac{5}{6}x - \frac{5}{3} + 3$$

$$y = -\frac{5}{6}x + \frac{4}{3}$$

#7 Given $y(x) = x^2 + 8$, find $y(a+2)$.

$$y(a+2) = (a+2)^2 + 8$$

$$y(a+2) = (a+2)(a+2) + 8$$

$$y(a+2) = a^2 + 4a + 4 + 8$$

$$y(a+2) = a^2 + 4a + 12$$

#8 Given $s(x) = \sqrt{1-x}$ and $t(x) = \frac{1}{x+3}$, state the domain of $s(x)$ and the domain of $t(x)$.

The domain of $s(x)$ includes all real numbers less than or equal to one, that is, $x \leq 1$.

The domain of $t(x)$ includes all real numbers except -3 , that is, $x \neq -3$.

#9 A company produces widgets. The company makes \$10 for every widget it produces each month, but, in a given month, it cost the company \$2 to produce each widget plus an additional \$400 in fixed costs each month. Find the break-even point for the company.

If x equals the number of widgets produced in one month, $R(x) = 10x$ and $C(x) = 2x + 400$

$$\text{Break-even: } 10x = 2x + 400$$

$$8x = 400$$

$$x = 50$$

The company will break-even if it produces 50 widgets per month.

#10 Given $J(x) = x^2 - 4x - 12$, sketch a graph of $J(x)$. Label all intercepts. Label the vertex.

vertex: $(2, -16)$

y-intercept: $(0, -12)$

x-intercepts: $(-2, 0)$ and $(6, 0)$

