

No calculator. Show all work for full credit.

1. Solve the equations by square rooting:

a)  $\frac{1}{3}x^2 = 12$

$$x^2 = 36$$

$$x = \pm 6$$

b)  $25x^2 = 9$

$$x^2 = \frac{9}{25}$$

$$x = \pm \frac{3}{5}$$

c)  $9x^2 - 3 = 10$

$$9x^2 = 13$$

$$x^2 = \frac{13}{9}$$

$$x = \pm \frac{\sqrt{13}}{3}$$

d)  $(x+2)^2 = 9$

$$x+2 = \pm 3$$

$$x = 1, -5$$

2. Simplify.

a)  $7\sqrt{2} - \sqrt{2}$

$$6\sqrt{2}$$

b)  $\sqrt{32} + \sqrt{18}$

$$4\sqrt{2} + 3\sqrt{2}$$

$$7\sqrt{2}$$

c)  $2\sqrt{6t} - 3\sqrt{5t} + 2\sqrt{6t}$

$$4\sqrt{6t} - 3\sqrt{5t}$$

d)  $5\sqrt{12x} - \sqrt{3x}$

$$5 \cdot 2\sqrt{3x} - \sqrt{3x}$$

$$10\sqrt{3x} - \sqrt{3x}$$

$$9\sqrt{3x}$$

3. Multiply.

a)  $(\sqrt{2})(\sqrt{7})$

$$\sqrt{14}$$

b)  $(4\sqrt{2})^2$

$$4^2 \cdot \sqrt{2}^2$$

$$16 \cdot 2$$

$$32$$

c)  $\sqrt{3}(5-\sqrt{3})$

$$5\sqrt{3} - \sqrt{9}$$

$$5\sqrt{3} - 3$$

d)  $(3+\sqrt{2})(5-\sqrt{2})$

$$15 - 3\sqrt{2} + 5\sqrt{2} - \sqrt{4}$$

$$13 + 2\sqrt{2}$$

e)  $(3+\sqrt{2})^2$

$$(3+\sqrt{2})(3+\sqrt{2})$$

$$9 + 3\sqrt{2} + 3\sqrt{2} + \sqrt{4}$$

$$11 + 6\sqrt{2}$$

4. Divide. (Rationalize the denominator).

a)  $\frac{4}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$$\frac{4\sqrt{2}}{2} = 2\sqrt{2}$$

b)  $\frac{9}{2\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$$\frac{9\sqrt{3}}{6} = \frac{3\sqrt{3}}{2}$$

c)  $\frac{\sqrt{3}}{\sqrt{x}} \cdot \frac{\sqrt{x}}{\sqrt{x}}$

$$\frac{\sqrt{3x}}{x}$$

5. Solve each equation. I recommend checking your answers!

a)  $3 = \sqrt{-2x}$

$$9 = -2x$$

$$x = -\frac{9}{2}$$

b)  $\sqrt{4x-2} = 3$

$$4x - 2 = 9$$

$$x = \frac{11}{4}$$

c)  $\frac{3\sqrt{x}}{4} = 6$

$$\sqrt{x} = 8$$

$$x = 64$$

d)  $-2\sqrt{x-4} = 6$

$$\sqrt{x-4} = -3$$

No solution

e)  $3\sqrt{3x-2} = 4$

$$\sqrt{3x} = 2$$

$$3x = 4$$

$$x = \frac{4}{3}$$

f)  $\sqrt{3x-1} = \sqrt{2x+4}$

$$3x - 1 = 2x + 4$$

$$x = 5$$

6. Solve:  $\sqrt{5x+4} = x-4$

$$5x + 4 = (x-4)^2$$

$$5x + 4 = x^2 - 8x + 16$$

$$x^2 - 13x + 12 = 0$$

$$(x-12)(x-1) = 0$$

$$x = 12, x = 1$$

check this answer... it will not work

7. Find the domain of each of the following functions:

a)  $y = \sqrt{2x-3}$

$$2x - 3 \geq 0$$

$$x \geq \frac{3}{2}$$

$$\text{Domain: } \left[\frac{3}{2}, \infty\right)$$

b)  $y = \sqrt{4-2x} + 4$

$$4 - 2x \geq 0$$

$$x \leq 2$$

$$\text{Domain: } (-\infty, 2]$$

c)  $y = 6 - \sqrt{5x}$

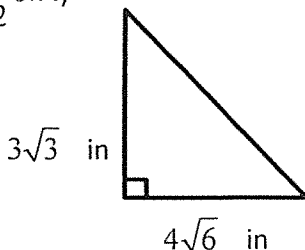
$$5x \geq 0$$

$$x \geq 0$$

$$\text{Domain: } [0, \infty)$$

8. Find the area of each figure. Give the exact answer in simplest form. (Note: the area of a triangle is

$$A = \frac{1}{2}bh.)$$



$$A = \frac{1}{2}(3\sqrt{3})(4\sqrt{6})$$

$$= 6\sqrt{18} = 6 \cdot 3\sqrt{2} = 18\sqrt{2} \text{ in}^2$$



$$A = \sqrt{5}(6\sqrt{2}-2)$$

$$= 6\sqrt{10} - 2\sqrt{5} \text{ cm}^2$$

9. Give the domain, fill in a table, then graph.

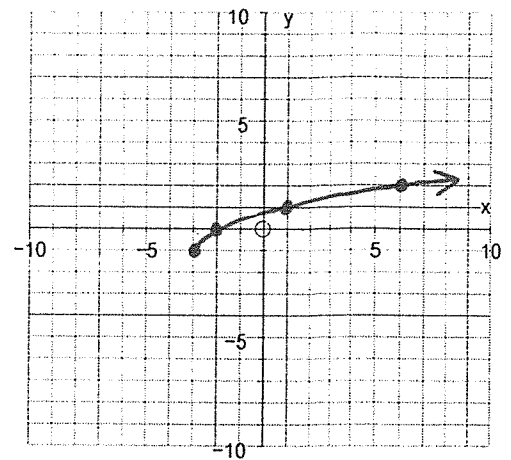
$$y = \sqrt{x+3} - 1$$

$$x+3 \geq 0$$

$$x \geq -3$$

$$\text{Domain: } [-3, \infty)$$

x	y
-3	-1
-2	0
1	1
6	2



10. Give the domain, fill in a table, then graph.

$$y = -\sqrt{2x} + 4$$

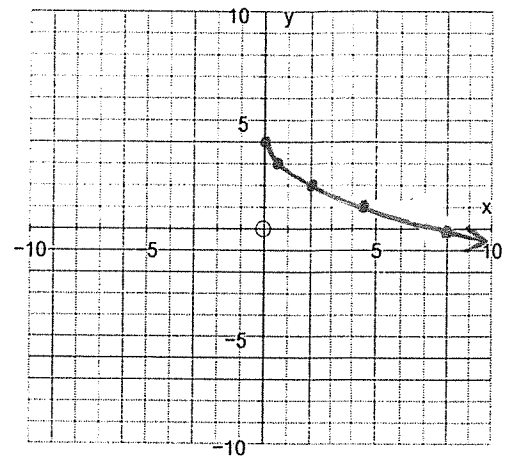
$$2x \geq 0$$

$$x \geq 0$$

$$\text{Domain: } [0, \infty)$$

x	y
0	4
$\frac{1}{2}$	3
2	2
$4\frac{1}{2}$	1
8	0

Don't need  
5 points...  
4 is enough.



### Review!

11. Solve.

a.  $\frac{3}{x+13} = \frac{6}{x}$

$$3x = 6(x+13)$$

$$3x = 6x + 78$$

$$\boxed{x = -26}$$

b.  $\frac{2}{x-3} = \frac{x+2}{3x-1}$

$$2(3x-1) = (x+2)(x-3)$$

$$6x-2 = x^2-x-6$$

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

$$x = \frac{7 \pm \sqrt{(-7)^2 - 4(1)(-4)}}{2(1)} = \boxed{\frac{7 \pm \sqrt{65}}{2}}$$

12. Find the equation of the line through the points (4, 140) and (6, 200).

$$m = \frac{200-140}{6-4} = \frac{60}{2} = 30$$

$$\boxed{y - 140 = 30(x - 4) \quad \text{or} \quad y = 30x + 20}$$