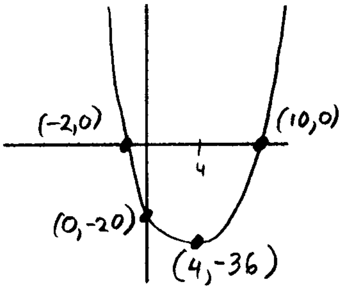
S-6

Summary of Chapter Six.

Analyze and sketch each parabola by the method indicated.

1. $y = x^2 - 8x - 20 = (x-10)(x+2)$
   (*factoring*)



2. $y = 2x^2 + 12x + 10$
   (*completing the square*)

$y = 2(x^2+6x \quad)+10$

$y = 2(x+3)^2 - 8$

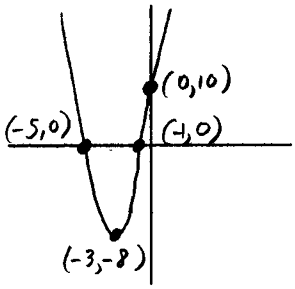
x-intercepts:

$8 = 2(x+3)^2$

$4 = (x+3)^2$

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

or $x+3 = -2$ so $x = -5$



3. $y = -4x^2 + 16x - 12$
   (*using the formulas*)

$a = -4,\ b = 16,\ c = -12$

① opens down

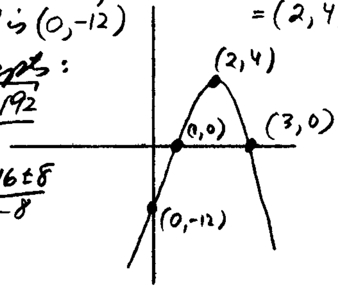
② vertex at $\left(-\frac{16}{-8}, -12 - \frac{256}{-16}\right) = (2,4)$

③ y-intercept is $(0,-12)$

④ x-intercepts:

$\frac{-16 \pm \sqrt{256-192}}{-8} = \frac{-16 \pm \sqrt{64}}{-8} = \frac{-16 \pm 8}{-8}$

$= +3$ or $+1$

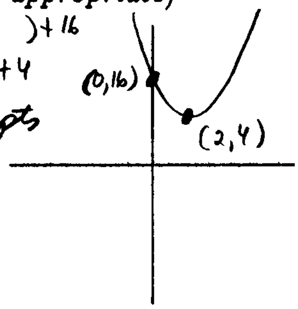


4. $y = 3x^2 - 12x + 16$
   (*whatever is appropriate*)

$y = 3(x^2-4x \quad)+16$

$y = 3(x-2)^2+4$

no x-intercepts



Find the intersection point(s) (if any) of each pair of equations, sketch them and shade in the region between them (if such a region exists).

5. $y = 2x + 2$ and $y = x^2 - 1$

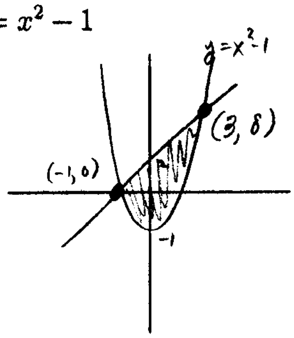
$2x+2 = x^2-1$

$0 = x^2-2x-3$

$0 = (x-3)(x+1)$

so $x = 3$ or $x = -1$

$y = 8 \quad y = 0$



6. $y = -x + 7$ and $y = -x^2 + 6x + 7 = -(x-7)(x+1)$

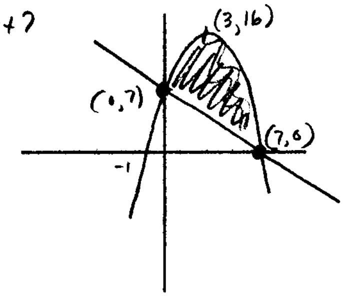
$-x+7 = -x^2+6x+7$

$0 = -x^2+7x$

$0 = -x(x-7)$

$x = 0$ or $x = 7$

$y = 7 \quad y = 0$



Simplify each square root.

7. $\sqrt{12} = \sqrt{4\cdot 3} = 2\sqrt{3}$

8. $\sqrt{72} = \sqrt{36\cdot 2} = 6\sqrt{2}$

Set up and solve the following problems.

9. Find the maximum of $-x^2 + 2x - 3$.

a

∩ so max at vertex

max is $-3 - \frac{4}{-4}$

$= -2$

10. Find two numbers whose sum is ten and whose product is sixteen.

let a and b be the #'s

$a+b = 10$ so $b = 10-a$

$a\cdot b = 16$ so $a(10-a) = 16$

$-a^2+10a = 16$

$0 = a^2-10a+16$

$0 = (a-8)(a-2)$

so $a = 8$, $b = 2$ or $a = 2$, $b = 8$

The #'s are 8 and 2.