Name _____ Block _____ Date _____

Unit 9: Quadratic Equations Study Guide (INACTIVE)

Directions: Answer each question completely. You may not use a calculator.

1.) The function $f(t) = -16t^2 + 96t + 112$ models the approximate height of an object t seconds after it is launched. How many seconds does it take the object to hit the ground? → ROOTS

$-16t^2+96t+112=0 \quad -16=0$

$-16(t^2-6t-7)=0 \quad t+1=0$

$t=-1$

$-16(t-7)(t+1)=0. \quad t-7=0$

$t=7$ sec

2.) What is the smallest of three consecutive positive integers if the product of the smaller two integers is 4 less than 4 times the largest integer?

$n(n+1)=4(n+2)-4$

$n^2+n=4n+8-4 \quad (n+1)(n-4)=0$

$n^2+n=4n+4 \quad n+1=0 \quad n-4=0$

$n^2-3n-4=0 \quad n=-1 \quad n=4$

3.) The larger leg of a right triangle is 4 inches longer than the shorter leg. The hypotenuse is 8 inches longer than the shorter leg. Use the Pythagorean Theorem to find the length of the shorter leg.

$x^2+(x+4)^2=(x+8)^2$

$x^2+x^2+8x+16=x^2+16x+64$

$2x^2+8x+16=x^2+16x+64$

$x^2-8x-48=0 \quad (x-12)(x+4)=0$

$x=12$ units

4.) A company models its net income, in thousands of dollars, with the function, $p(n) = 2n^2 + 6n - 108$, where x is the number of units of its product sold. How many units of its product does the company need to sell in order for the net income to equal \$0?

$2(n^2+3n-54)=0$

$2(n+9)(n-6)=0$

$2=0 \quad n+9=0 \quad n-6=0$

$n=-9 \quad n=6$ units

5.) Which is the graph of $y = (x-2)^2 + 4$?

a.

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

$x^2-4x+4+4$

$y=x^2-4x+8$

AOS $x=\frac{4}{2(1)}$

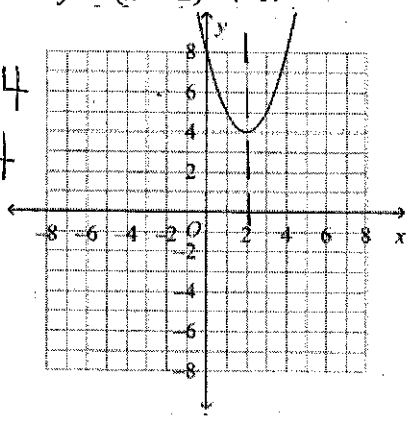
$x=2$

$y=(2)^2-4(2)^1+8$

$=4-8+8$

$y=4$

$(2,4)$



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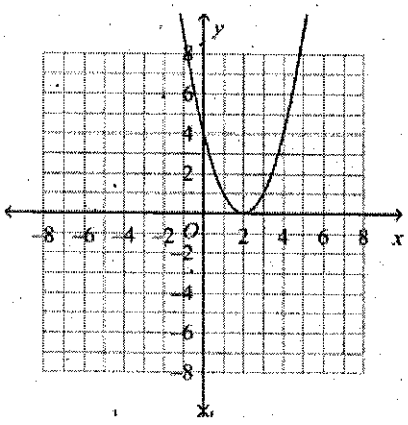

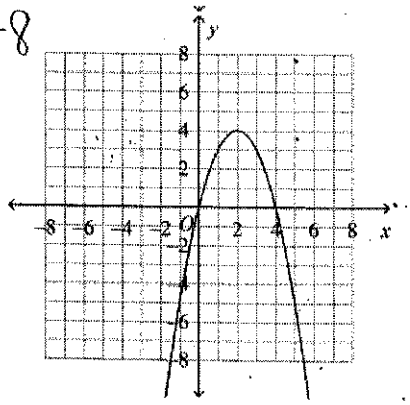

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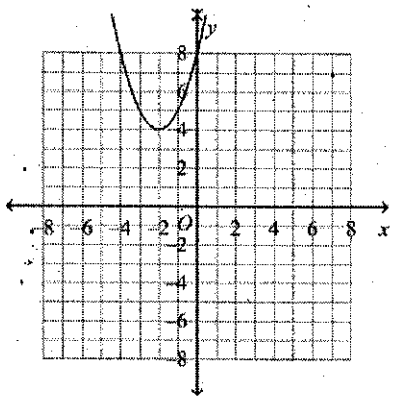


6.) What is the negative root of $y = 4x^2 - 36$?

$4(x^2-9)=0$

$4=0$ $x+3=0$ $x-3=0$

$x=-3$ $x=3$

7.) What is the value of the larger zero of $y = 4x^2 + 10x - 24$?

$2(2x^2+5x-12)$

$2(2x^2+8x-3x-12)=0$

$2x(x+4)-3(x+4)=0$

$2(2x-3)(x+4)=0$

$2x-3=0$

$2x=3$

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

$x+4=0$

$x=-4$

8.) Graph $f(x) = 2x^2 + 2x - 2$. Label the vertex and axis of symmetry.

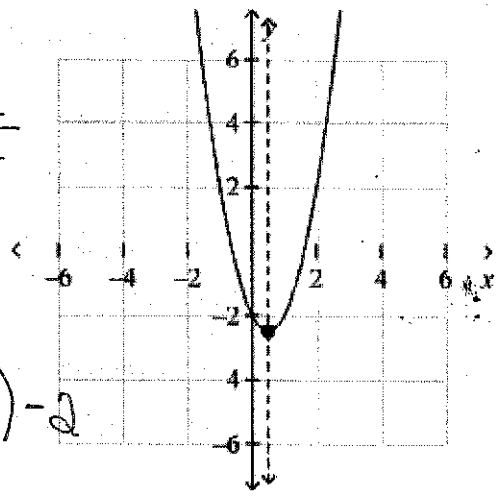
~~A~~

$x=\frac{-2}{2(2)}=\frac{-2}{4}$

$x=-\frac{1}{2}$

$f(x)=2(-\frac{1}{2})^2+2(-\frac{1}{2})-2$

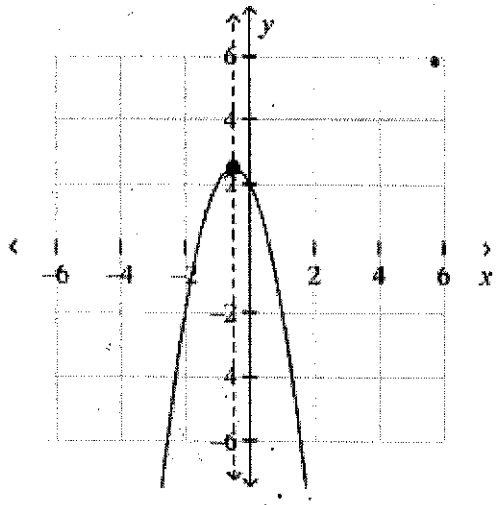
$f(x)=-2.5$



Axis of symmetry: $x=0.5$

Vertex: $(0.5, -2.5)$

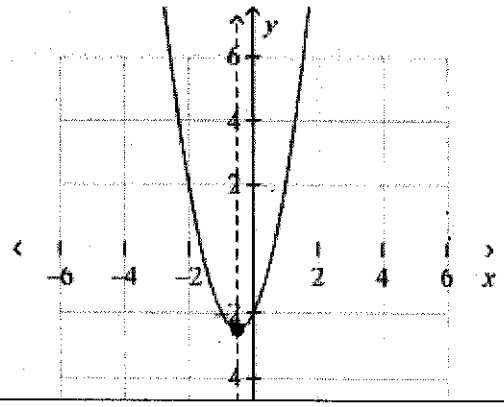
~~C~~



Axis of symmetry: $x=-0.5$

Vertex: $(-0.5, 2.5)$

B



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