

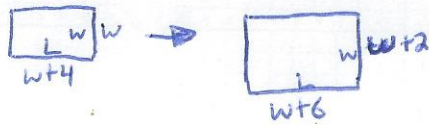
1. Which expression is equivalent to  $t^2 - 36$ ?

- A.  $(t-6)(t-6)$
- B.  $(t+6)(t-6)$
- C.  $(t-12)(t+3)$
- D.  $(t-12)(t+3)$

$$\begin{aligned} & (t+6)(t-6) \\ & t^2 - 6t + 6t - 36 \\ & t^2 - 36 \end{aligned}$$

2. The floor of a rectangular cage has a length 4 feet greater than its width,  $w$ . James will increase both dimensions of the floor by 2 feet. Which equation represents the new area,  $N$ , of the floor of the cage?

- A.  $N = w^2 + 4w$
- B.  $N = w^2 + 6w$
- C.  $N = w^2 + 6w + 8$
- D.  $N = w^2 + 8w + 12$



$$\begin{aligned} A &= L \cdot W \\ &= (w+6)(w+2) \\ &= w^2 + 2w + 6w + 12 \\ &= w^2 + 8w + 12 \end{aligned}$$

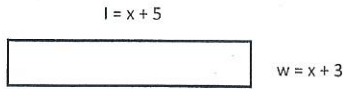
3. A rectangular garden measured 4 feet wide and 6 feet long. Each dimension is increased by  $x$  feet. Which equation represents the new area,  $A$ , of the garden?

- A.  $A = 2x + 10$
- B.  $A = x^2 + 10$
- C.  $A = x^2 + 24$
- D.  $A = x^2 + 10x + 24$



$$\begin{aligned} A &= L \cdot W \\ &= (x+6)(x+4) \\ &= x^2 + 4x + 6x + 24 \\ &= x^2 + 10x + 24 \end{aligned}$$

4. The area is found using the formula  $A = lw$ , where  $A$  is the area,  $l$  is the length, and  $w$  is the width. The rectangle below has an area of 63 square feet.



What is the width of the rectangle to the nearest foot?

$$\begin{aligned} w &= x + 3 \\ &= 4 + 3 = 7 \end{aligned}$$

5. What is the sum of the zeros of the function  $f(x) = x^2 - 6x + 8$ ?

$$\begin{aligned} x^2 - 6x + 8 &= 0 \\ (x-4)(x-2) &= 0 \end{aligned}$$

$$x = 4, 2$$

$$4 + 2 = 6$$

6. While standing on a cliff 24 feet above the lake, Serena threw a rock with an initial velocity of 20 feet per second. The equation  $h = -16t^2 + 20t + 24$  gives the height  $h$  of the rock after  $t$  seconds. How many seconds does it take for the rock to hit the water? (no calculator)

looking for the xI, pull out GCF then factor

$$t = 2$$

$$\begin{aligned} & 4(-4t^2 + 5t + 6) \\ & 4(-t+2)(4t+3) \end{aligned}$$

$-4t^2$	6	$-24t^2$
$4t$	2	8t
$-1t$	3	$-3t$

$$\begin{aligned} -t+2 &= 0 \\ -t &= -2 \\ t &= 2 \end{aligned}$$

$$\begin{aligned} 4t+3 &= 0 \\ 4t &= -3 \\ t &= -3/4 \end{aligned}$$

7. The function  $f(t) = -5t^2 + 20t + 60$  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? (no calculator)

$$t = 6$$

$$\begin{aligned} & 5(-t^2 + 4t + 12) \\ & 5(t+2)(-t+6) \end{aligned}$$

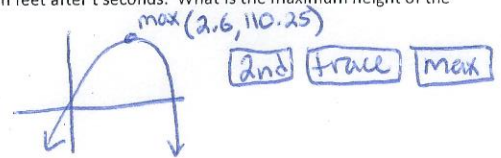
$-t^2$	12	$-12t^2$
$1t$	6	6t
$-1t$	2	$-2t$

$$\begin{aligned} t+2 &= 0 \\ -t &= -2 \\ t &= 2 \end{aligned}$$

$$\begin{aligned} -t+6 &= 0 \\ -t &= -6 \\ t &= 6 \end{aligned}$$

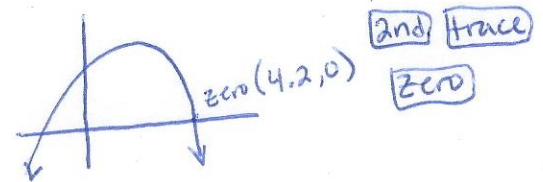
8. A rock is thrown up from the ground at an initial velocity of 84 feet per second. The formula  $h = -16t^2 + 84t$  gives the rock's height in feet after  $t$  seconds. What is the maximum height of the rock?

- A. 68 feet
- B. 84 feet
- C. 110 feet
- D. 179 feet



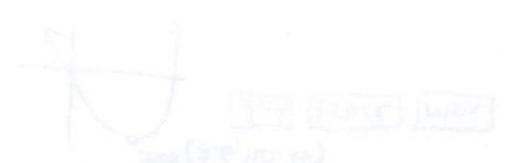
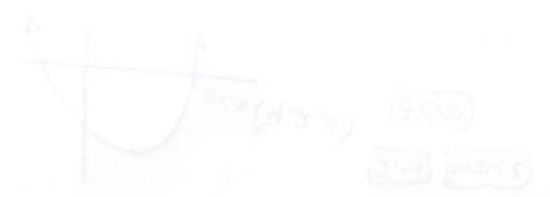
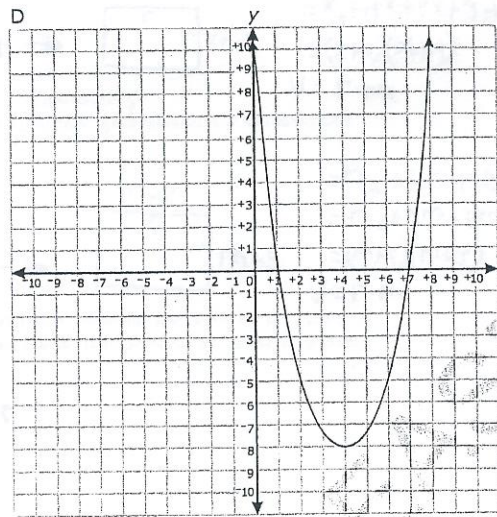
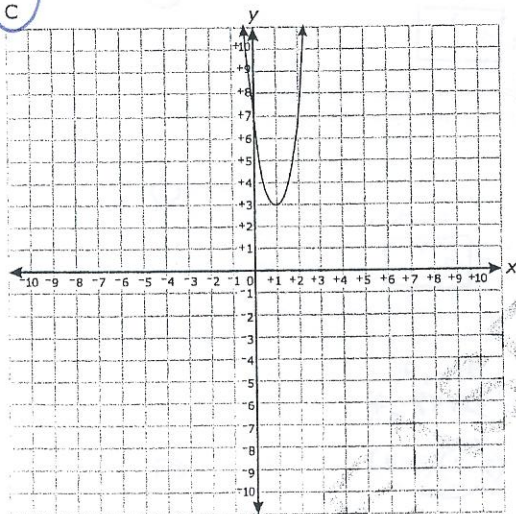
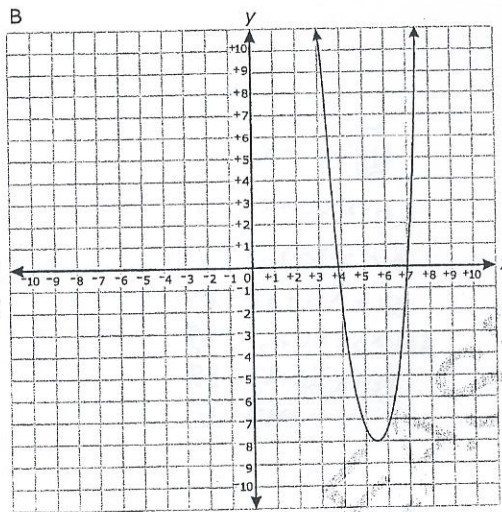
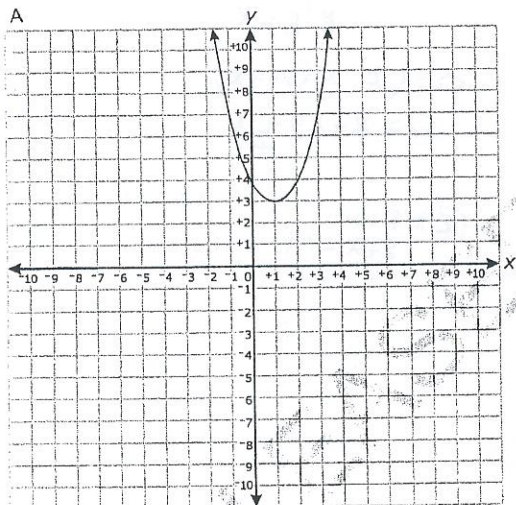
9. A baseball is thrown upward from the top of a building. The height of the ball  $t$  seconds after it was thrown into the air is modeled by the function  $h(t) = -16t^2 + 50t + 75$ . How many seconds does it take for the ball to hit the ground?

- A. 1.5 seconds
- B. 3 seconds
- C. 4.2 seconds
- D. 6.3 seconds



10. Which is the graph of the function  $f(x) = 4x^2 - 8x + 7$ ?

$\downarrow yI=7$



Handwritten notes and calculations:

$f(x) = 4x^2 - 8x + 7$

$f(1) = 4(1)^2 - 8(1) + 7 = 4 - 8 + 7 = 3$

$f(2) = 4(2)^2 - 8(2) + 7 = 16 - 16 + 7 = 7$

$f(3) = 4(3)^2 - 8(3) + 7 = 36 - 24 + 7 = 19$

$f(4) = 4(4)^2 - 8(4) + 7 = 64 - 32 + 7 = 39$

$f(5) = 4(5)^2 - 8(5) + 7 = 100 - 40 + 7 = 67$

$f(6) = 4(6)^2 - 8(6) + 7 = 144 - 48 + 7 = 103$

$f(7) = 4(7)^2 - 8(7) + 7 = 196 - 56 + 7 = 147$

$f(8) = 4(8)^2 - 8(8) + 7 = 256 - 64 + 7 = 199$

$f(9) = 4(9)^2 - 8(9) + 7 = 324 - 72 + 7 = 259$

$f(10) = 4(10)^2 - 8(10) + 7 = 400 - 80 + 7 = 327$

$f(-1) = 4(-1)^2 - 8(-1) + 7 = 4 + 8 + 7 = 19$

$f(-2) = 4(-2)^2 - 8(-2) + 7 = 16 + 16 + 7 = 39$

$f(-3) = 4(-3)^2 - 8(-3) + 7 = 36 + 24 + 7 = 67$

$f(-4) = 4(-4)^2 - 8(-4) + 7 = 64 + 32 + 7 = 103$

$f(-5) = 4(-5)^2 - 8(-5) + 7 = 100 + 40 + 7 = 147$

$f(-6) = 4(-6)^2 - 8(-6) + 7 = 144 + 48 + 7 = 199$

$f(-7) = 4(-7)^2 - 8(-7) + 7 = 196 + 56 + 7 = 259$

$f(-8) = 4(-8)^2 - 8(-8) + 7 = 256 + 64 + 7 = 327$

$f(-9) = 4(-9)^2 - 8(-9) + 7 = 324 + 72 + 7 = 403$

$f(-10) = 4(-10)^2 - 8(-10) + 7 = 400 + 80 + 7 = 487$