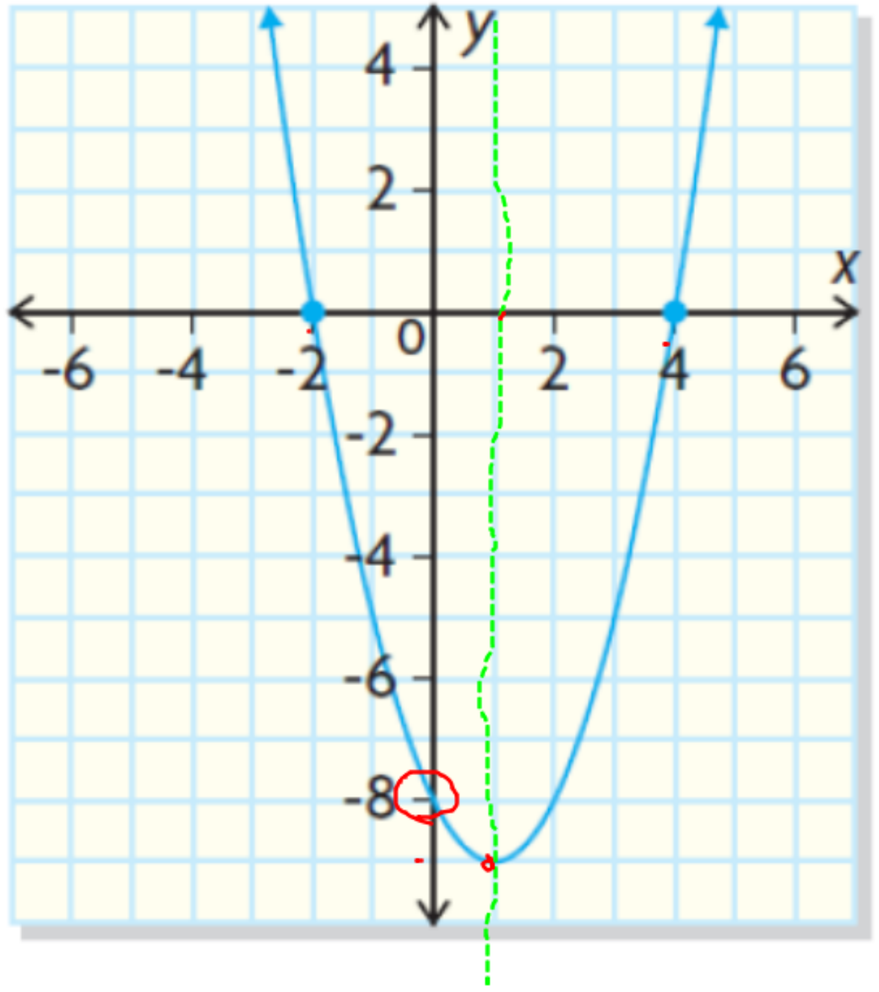
1. For the graph and equation, find (in no particular order), zeros, y-intercept, equation of axis of symmetry and vertex (indicating whether it is a maximum or minimum). Clearly label everything.

a)



Zeros : -2 and 4

y. int: -8

eqn of symmetry: x = -1

vertex : (1, -9) is a minimum

/6

1. For the graph and equation, find (in no particular order), zeros, y-intercept, equation of axis of symmetry and vertex (indicating whether it is a maximum or minimum). Clearly label everything.

b) $y=\frac{-1}{2}(x+7)(x+3)$

zeros: -7 and -3

$\frac{-7+-3}{2} = \frac{-10}{2} = -5$

$\therefore x = -5$

$(-5, \_\_)$

$y = \frac{-1}{2}(-5+7)(-5+3)$

$y = \frac{-1}{2}(2)(-2)$

$y = 2$

Vertex is $(-5, 2)$ is a Max

$x=0$

$y = \frac{-1}{2}(0+7)(0+3)$

$y = \frac{-1}{2}(21) = -10.5$

y-int

/6

2. A parabola has x-intercepts at -4 and 12 and the point (2,84) lies on the parabola. Find the equation of the parabola in both factored and standard form, then find the vertex, state whether it is a max or min, and then state the y-intercept.

$y = a(x-r)(x-s)$

$84 = a(2+4)(2-12)$ ✓

$84 = a(6)(-10)$

$\frac{84}{-60} = a$

$\frac{-7}{5} = a$

-1.4 ✓

Factored $y = -1.4(x+4)(x-12)$ ✓

$y = -1.4(x^2 - 12x + 4x - 48)$

$y = -1.4(x^2 - 8x - 48)$

Standard: $y = -1.4x^2 + 11.2x + 67.2$ ✓

y-int

$\frac{-4+12}{2} = \frac{8}{2} = 4$ ✓

vertex $(4, \underline{89.6})$ is a ✓

max

$y = -1.4(4+4)(4-12)$

$y = -1.4(8)(-8)$

$y = 89.6$ ✓

3. The height of a ball thrown vertically upward from a rooftop is modelled by $y=-5x^2+20x+50$, where h is the height of the ball above the ground in metres, and x is time in seconds.

a) When will the ball hit the ground? $y=0$, x-ints/zeros

✓ at 5.75 seconds

b) Determine the maximum height of the ball.

✓ y The max height is 70m

c) When did the ball reach its maximum height?

✓ At 2 second

d) How high is the rooftop?

✓ time = 0 ($x=0$) ∴, y-int

50m

e) At what times is the ball at 65m?

✓ at 1sec and 3sec.

4. A ticket to school dance is $8. Usually, 300 students attend. The dance committee knows that for every $1 increase in the price of a ticket, 30 fewer students attend the dance. What ticket price will maximize the revenue. **Write the equation, then use technology to answer the question.**

$R = \$ \times \#$

$x = \#$ of increase

$R = (8)(300) = \$2400$

/4

$R = (8 + 1x)(300 - 30x)$ ✓✓

Max: (1, 2430)

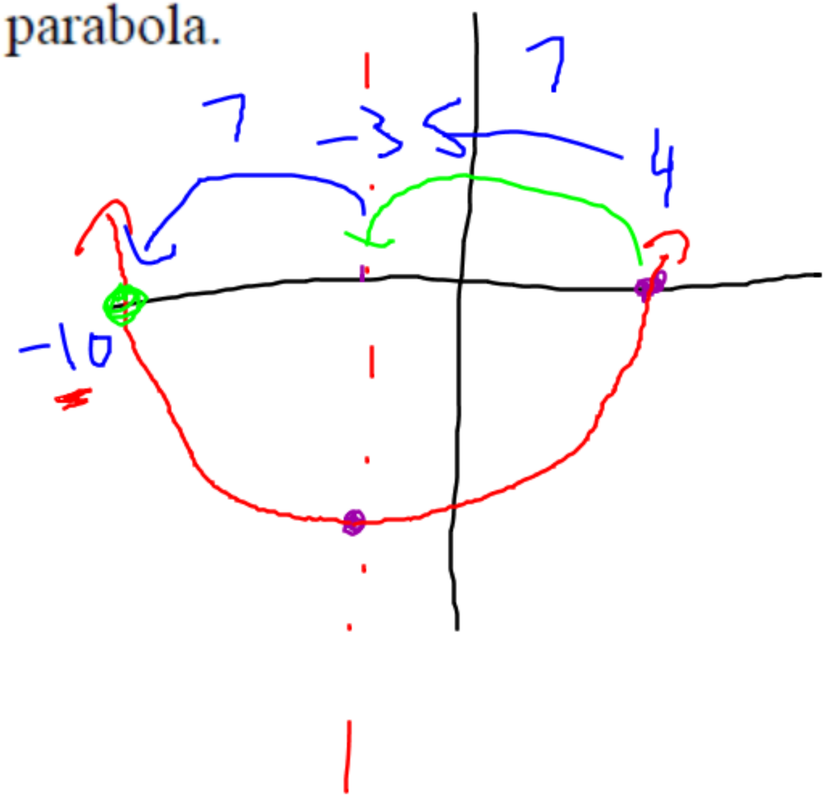
X R

✓

Ticket price to maximize is $\$8 + 1 = \$9$ ✓

Bonus: x y

A parabola has a vertex (-3,21) and a zero at 4. Determine the other zero and write the equation to the parabola.



$$y = a(x-r)(x-s)$$

$$21 = a(-3+10)(-3-4)$$

$$21 = a(7)(-7)$$

$$\frac{21}{-49} = \frac{a(-49)}{-49}$$

$$-\frac{3}{7} = a$$

$$y = -\frac{3}{7}(x+10)(x-4)$$