Lecture 40: Parabolas

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Question 1.

Find the vertex for the parabola $y + x^2 + 2x = 0$.

A (2, -4)B (1, -1)C (-1, -1)D (1, 1)E (-1, 1)



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A (2,-4) B (1,-1) C (-1,-1) D (1,1) E (-1,1) Completing the square gives $y + x^2 + 2x + 1 - 1 = 0$. This simplifies to $y - 1 = -(x + 1)^2$



4 15 14 15 15

Image: A matrix and a matrix

Question 2.

Which direction does the parabola $x + 1 = -2y^2$ open?

- A Left
- **B** Right
- C Up
- D Down
- E East



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The parabola opens to the left. As *y* increases, *x* becomes large and negative.



4 3 5 4 3

Question 3.

Find the focus of the parabola $x = -4y^2 + 4$.

- A(3,0)
- **B** (5,0)
- C (63/16,0)
- D (65/16,0)
- E None of the above.



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The parabola can be written as $-\frac{1}{4}(x-4) = y^2$. This graph of this equation is obtained by shifting the graph of $-\frac{1}{4}x = y^2$ to the right by 4 units. The focus for $-\frac{1}{4}y = x^2$ is (-1/16, 0). Shifting this point 4 units to right gives (63/16, 0) as the focus of $-\frac{1}{4}(x-4) = y^2$.



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