PLOTTING QUADRATIC GRAPHS

Answer all of these questions. Remember to show your working out in all questions.

MAIN QUESTIONS

1. $y = x^2$ | vertex: (0,0), x-intercept: (0,0), y-intercept: (0,0)

2. $y = x^2 + 1$ | vertex: (0,1), no real x-intercepts, y-intercept: (0,1)

3. $y = x^2 - 1$ | vertex: (0,-1), x-intercepts: (-1,0) and (1,0), y-intercept: (0,-1)

4. $y = x^2 + 2x$ | vertex: (-1,-1), x-intercepts: (-2,0) and (0,0), y-intercept: (0,0)

5. $y = x^2 - 2x$ | vertex: (1,-1), x-intercepts: (0,0) and (2,0), y-intercept: (0,0)

6. $y = x^2 - 4x + 4$ | vertex: (2,0), x-intercept: (2,0), y-intercept: (0,4)

7. $y = 2x^2$ | vertex: (0,0), x-intercept: (0,0), y-intercept: (0,0)

8. $y = 2x^2 + 4x$ | vertex: (-1,-2), x-intercepts: (-2,0) and (0,0), y-intercept: (0,0)

9. $y = 2x^2 - 8$ | vertex: (0,-8), x-intercepts: (-2,0) and (2,0), y-intercept: (0,-8)

10. $y = -x^2$ | vertex: (0,0), x-intercept: (0,0), y-intercept: (0,0)

11. $y = -x^2 + 4$ | vertex: (0,4), x-intercepts: (-2,0) and (2,0), y-intercept: (0,4)

12. $y = -x^2 - 2x$ | vertex: (-1,1), x-intercepts: (-2,0) and (0,0), y-intercept: (0,0)

13. $y = x^2 + 4x + 3$ | vertex: (-2,-1), x-intercepts: (-3,0) and (-1,0), y-intercept: (0,3)

14. $y = 3x^2 - 6x$ | vertex: (1,-3), x-intercepts: (0,0) and (2,0), y-intercept: (0,0)

15. $y = 2x^2 + 8x + 6$ | vertex: (-2,-2), x-intercepts: (-3,0) and (-1,0), y-intercept: (0,6)

16. $y = -2x^2 + 8x - 6$ | vertex: (2,2), x-intercepts: (1,0) and (3,0), y-intercept: (0,-6)

17. $y = x^2 + x + 1$ | vertex: (-0.5,0.75), no real x-intercepts, y-intercept: (0,1)

18. $y = 0.5x^2 - 2$ | vertex: (0,-2), x-intercepts: (-2,0) and (2,0), y-intercept: (0,-2)

19. $y = (1/2)x^2 + 2x$ | vertex: (-2,-2), x-intercepts: (-4,0) and (0,0), y-intercept: (0,0)

20. $y = -3x^2 +$

MASTER QUESTIONS

M1. The area of a rectangle is 35 square metres and its perimeter is 24 metres. Find its dimensions.

The rectangle is 7 metres by 5 metres

M2. A ball thrown upwards follows $h = 20t - 5t^2$ where h is height in metres and t is time in seconds. Find maximum height and when it hits the ground.

Maximum height: 20 metres at t=2 seconds. Hits ground at t=4 seconds

M3. The product of two consecutive positive integers is 156. Find the integers.

The integers are 12 and 13

M4. A farmer uses 60 metres of fencing for a rectangular pen against a barn. Find dimensions maximising area and the maximum area.

Dimensions: 15 metres by 30 metres. Maximum area: 450 square metres

M5. A stone thrown from a 20-metre cliff follows $h = -5t^2 + 10t + 20$. When does it hit the ground? What maximum height above the cliff?

Hits ground at $t=1+\sqrt{5}$ seconds. Maximum height above cliff: 5 metres