Graphs of parabolas, circles, hyperbolas and exponentials: 10 practice questions

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Name: _____ Date: _____

Attempt all questions and show your working. Suggested time: 15 to 20 minutes.

Section A: Consolidating (Questions 1-4)

Question 1

Name the type of graph (parabola, hyperbola, circle or exponential curve) for each equation.

(a) $y = x^2 - 4$

(b) $y = 3/x$

(c) $x^2 + y^2 = 25$

(d) $y = 2^x$

Question 2

Copy and complete the table of values for $y = x^2$.

x	-3	-2	-1	0	1	2	3
y							

Question 3

The circle $x^2 + y^2 = 49$ is drawn on a set of axes. Write its centre and its radius.

Question 4

Copy and complete the table of values for $y = 2^x$.

x	-1	0	1	2	3
y					

Section B: Standard (Questions 5-10)

Question 5

For the parabola $y = x^2 - 2x - 8$, find:

(a) the y-intercept

(b) the x-intercepts

(c) the equation of the axis of symmetry

(d) the coordinates of the turning point, and whether it is a maximum or a minimum

Question 6

Describe how the graph of $y = x^2$ is changed to give each graph, and write the coordinates of the turning point.

(a) $y = x^2 + 3$

(b) $y = (x - 2)^2$

(c) $y = -x^2$

(d) $y = 3x^2$

Question 7

For the parabola $y = (x + 1)^2 - 4$, find:

(a) the turning point

(b) the y-intercept

(c) the x-intercepts

Question 8

(a) Copy and complete the table of values for $y = 6/x$.

x	-6	-3	-2	-1	1	2	3	6
y								

(b) Write the equations of the two asymptotes of the graph.

(c) In which quadrants does the graph lie?

(d) Explain why $x = 0$ is not included in the table.

Question 9

Consider the hyperbola $y = -4/x$.

(a) In which quadrants does the graph lie?

(b) Does the point (2, -2) lie on the graph? Show how you know.

(c) Does the point (-1, 4) lie on the graph? Show how you know.

Question 10

(a) Write the equation of the circle with centre (0, 0) and radius 5.

(b) Show that the point (3, -4) lies on this circle.

(c) Does the point (4, 4) lie inside, on or outside the circle? Explain.

(d) Write the x-intercepts of the circle.

Graphs of parabolas, circles, hyperbolas and exponentials: answers

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Question 1

Answer: (a) parabola (b) hyperbola (c) circle (d) exponential curve

Question 2

Answer: 9, 4, 1, 0, 1, 4, 9

Question 3

Answer: Centre (0, 0), radius 7

Question 4

Answer: ½ (or 0.5), 1, 2, 4, 8

Question 5

Answer: (a) -8 (b) $x = 4$ and $x = -2$ ($(x - 4)(x + 2) = 0$) (c) $x = 1$ (d) (1, -9), a minimum

Question 6

Answer: (a) moved up 3 units, (0, 3) (b) moved right 2 units, (2, 0) (c) reflected in the x-axis, (0, 0) (d) dilated (stretched) by a factor of 3 from the x-axis, so it is narrower, (0, 0)

Question 7

Answer: (a) (-1, -4) (b) -3 (c) $x = 1$ and $x = -3$

Question 8

Answer: (a) -1, -2, -3, -6, 6, 3, 2, 1 (b) $x = 0$ and $y = 0$ (c) first and third (d) 6/0 is undefined: you cannot divide by zero

Question 9

Answer: (a) second and fourth (b) Yes: -4/2 = -2 (c) Yes: -4/-1 = 4

Question 10

Answer: (a) $x^2 + y^2 = 25$ (b) $3^2 + (-4)^2 = 9 + 16 = 25$ (c) outside, because $4^2 + 4^2 = 32 > 25$ (d) 5 and -5