

Real functions

[Solutions](#)[Main Menu](#)31 What is the value of $f(-1)$ if $f(x) = x^3 - x^2$?

- (A) -2
 (B) -1
 (C) 0
 (D) 2

32 What is the value of $f(2a+1)$ if $f(x) = 3x - 2$?

- (A) $6a - 2$
 (B) $6a - 1$
 (C) $6a + 1$
 (D) $6a + 2$

33 Consider $f(x) = \frac{6}{x}$ and $g(x) = 2x + 4$. What are the values for x for which $f(x) = g(x)$?

- (A) $x = -1$ or $x = 3$
 (B) $x = -1$ or $x = -3$
 (C) $x = 1$ or $x = 3$
 (D) $x = 1$ or $x = -3$

34 What is the domain and range of the function $f(x) = \sqrt{1 - x^2}$?

- (A) Domain: $0 \leq x \leq 1$, Range: $-1 \leq y \leq 1$
 (B) Domain: $-1 \leq x \leq 1$, Range: $-1 \leq y \leq 1$
 (C) Domain: $-1 \leq x \leq 1$, Range: $0 \leq y \leq 1$
 (D) Domain: $0 \leq x \leq 1$, Range: $0 \leq y \leq 1$

35 What is the domain and range of the function $f(x) = \sqrt{9 - x^2}$?

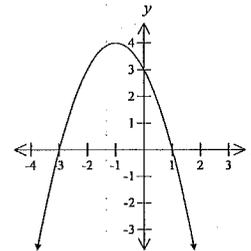
- (A) Domain: $-3 \leq x \leq 3$, Range: $0 \leq y \leq 3$
 (B) Domain: $-3 \leq x \leq 3$, Range: $-3 \leq y \leq 3$
 (C) Domain: $0 \leq x \leq 9$, Range: $-9 \leq y \leq 9$
 (D) Domain: $0 \leq x \leq 9$, Range: $0 \leq y \leq 9$

36 What is the centre and radius of the circle with the equation $x^2 + y^2 + 6x - 8y - 11 = 0$?

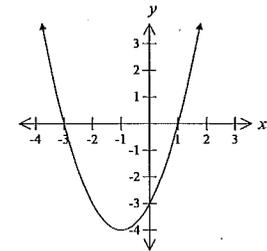
- (A) Centre $(-3, -4)$ and radius 36
 (B) Centre $(-3, 4)$ and radius 36
 (C) Centre $(-3, -4)$ and radius 6
 (D) Centre $(-3, 4)$ and radius 6

37 Which graph best represents $y = x^2 + 2x - 3$?

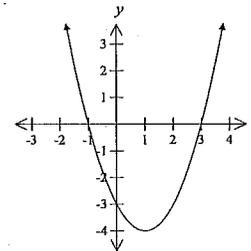
(A)



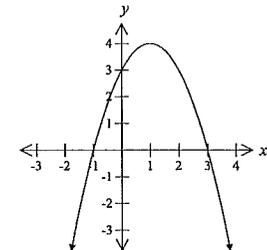
(B)



(C)

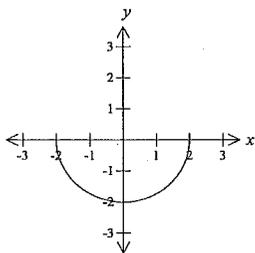


(D)

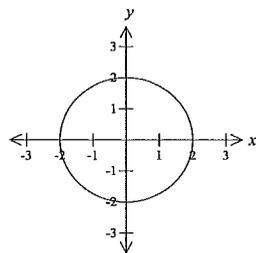


38 Which graph best represents $y = \sqrt{4 - x^2}$?

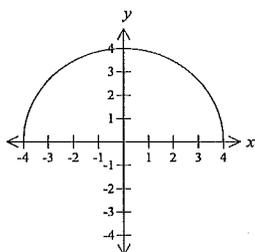
(A)



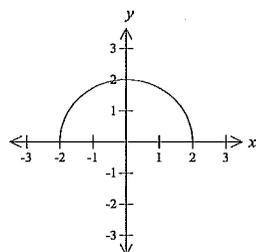
(B)



(C)

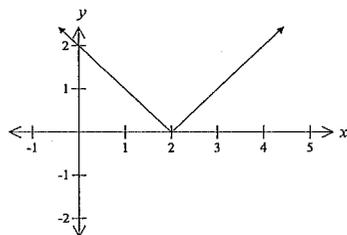


(D)

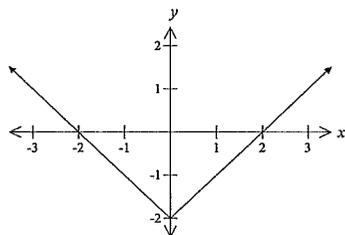


39 Which graph best represents $y = |x| - 2$?

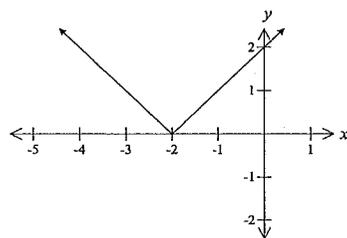
(A)



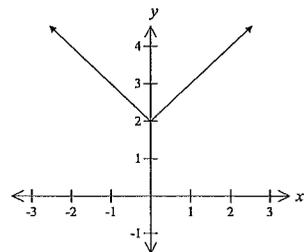
(B)



(C)

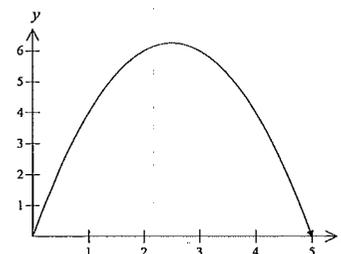


(D)

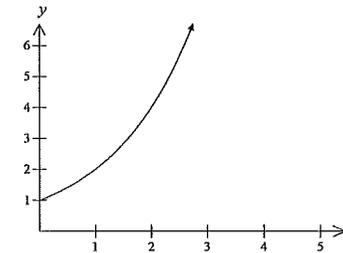


40 Which graph best represents $y = 2^x$?

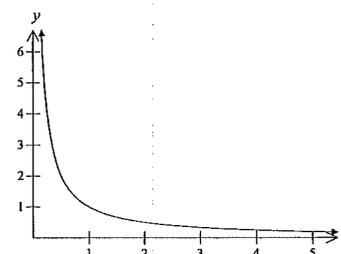
(A)



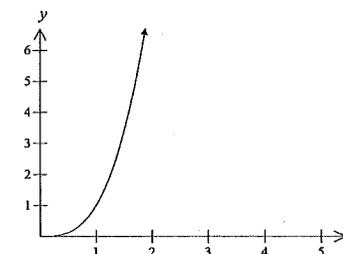
(B)



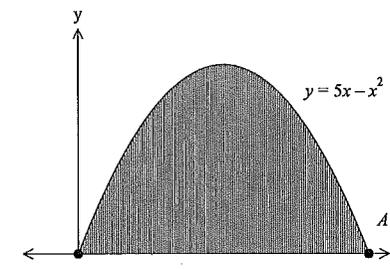
(C)



(D)



41 The diagram shows the graph of the function $y = 5x - x^2$.



What pair of inequalities specify the shaded region?

- (A) $y \leq 5x - x^2$ and $y \leq 0$.
- (B) $y \leq 5x - x^2$ and $y \geq 0$.
- (C) $y \geq 5x - x^2$ and $y \leq 0$.
- (D) $y \geq 5x - x^2$ and $y \geq 0$.

42 What is the value of $\lim_{x \rightarrow -1} \frac{x^2 + 2x + 1}{x + 1}$?

- (A) Undefined
- (B) -1
- (C) 0
- (D) 1

43 What is the value of $\lim_{x \rightarrow c} \frac{x^3 - c^3}{x - c}$?

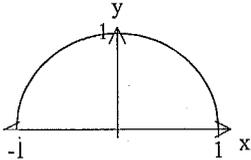
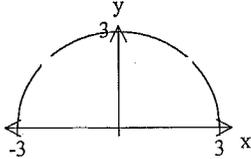
- (A) Undefined
- (B) c^2
- (C) $3c^2$
- (D) c^3

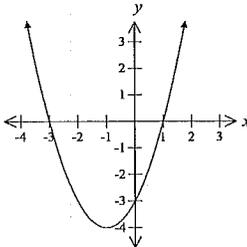
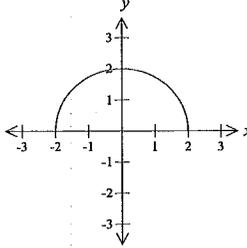
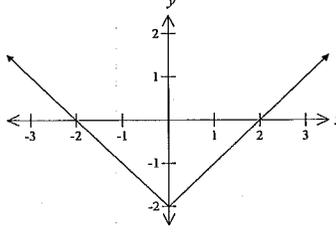
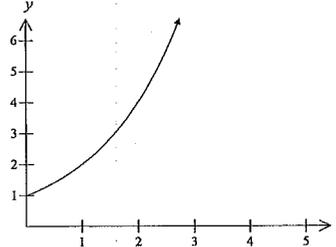
44 Which of the following is true for the function $f(x) = \frac{1}{x^2}$?

- (A) Even function
- (B) Odd function
- (C) Neither odd or even
- (D) Zero function

45 Which of the following is true for the function $f(x) = 3x^2 - x$?

- (A) Even function
- (B) Odd function
- (C) Neither odd or even
- (D) Zero function

Real functions		Main Menu
	Solution	Criteria
31	$f(-1) = (-1)^3 - (-1)^2$ $= -1 - 1$ $= -2$	1 Mark: A
32	$f(2a+1) = 3 \times (2a+1) - 2$ $= 6a + 3 - 2$ $= 6a + 1$	1 Mark: C
33	$\frac{6}{x} = 2x + 4$ $x \times \left(\frac{6}{x}\right) = (2x + 4) \times x \quad x \neq 0$ $6 = 2x^2 + 4x$ $2x^2 + 4x - 6 = 0$ $2(x+3)(x-1) = 0$ $\therefore x = 1 \text{ or } x = -3$	1 Mark: D
34	 <p>Domain: $-1 \leq x \leq 1$, Range: $0 \leq y \leq 1$</p>	1 Mark: C
35	 <p>Domain: $-3 \leq x \leq 3$, Range: $0 \leq y \leq 3$</p>	1 Mark: A
36	$x^2 + y^2 + 6x - 8y - 11 = 0$ $x^2 + 6x + 9 + y^2 - 8y + 16 = 9 + 16 + 11$ $(x+3)^2 + (y-4)^2 = 36$ <p>Centre $(-3, 4)$ and radius 6</p>	1 Mark: D

37	 <p>Parabola $y = x^2 + 2x - 3 = (x+3)(x-1)$, y-intercept of -3</p>	1 Mark: B
38	 <p>Semi-circle – centre $(0,0)$ and radius 2</p>	1 Mark: D
39		1 Mark: B
40	 <p>Exponential function. Check $(0, 1)$ on each graph.</p>	1 Mark: B

41	<p>Point A lies on the x axis ($y=0$).</p> <p>To find x when $y=0$ substitute into $y=5x-x^2$.</p> $0 = 5x - x^2$ $= x(5-x)$ <p>$\therefore x=0$ or $x=5$ Point A is $(5,0)$</p> <p>Inequalities are $y \leq 5x - x^2$ and $y \geq 0$.</p> <p>Test by substituting points into the inequalities.</p> <p>$(2,1): 1 \leq 5 \times 2 - 2^2$ and $1 \geq 0$ True.</p>	1 Mark: B
42	$\lim_{x \rightarrow -1} \frac{x^2 + 2x + 1}{x + 1} = \lim_{x \rightarrow -1} \frac{(x+1)(x+1)}{(x+1)}$ $= \lim_{x \rightarrow -1} (x+1)$ $= -1 + 1 = 0$	1 Mark: C
43	$\lim_{x \rightarrow c} \frac{x^3 - c^3}{x - c} = \lim_{x \rightarrow c} \frac{(x-c)(x^2 + cx + c^2)}{(x-c)}$ $= \lim_{x \rightarrow c} (x^2 + cx + c^2)$ $= c^2 + c \times c + c^2$ $= 3c^2$	1 Mark: C
44	$f(-x) = \frac{1}{(-x)^2}$ $= \frac{1}{x^2}$ $= f(x)$ <p>Function is even.</p>	1 Mark: A
45	$f(x) = 3x^2 - x$ $f(-x) = 3(-x)^2 - (-x)$ $= 3x^2 + x$ <p>Function is neither odd or even</p>	1 Mark: C