SKETCHING BASIC FUNCTIONS

1 Sketch each function. State the gradient and the x- and y-intercepts for each.

(a) $y = 3x + 1$ **(b)** $3x + 2y - 6 = 0$ **(c)** $y = 4 - 2x$ **(d)** $y = x - 1$ **(e)** $4x - y - 8 = 0$

(f) $y = -x$ **(g)** $y = 3$ **(h)** $x = 4$ **(i)** $x + 2y + 5 = 0$

2 For each part of question **1**, determine whether the function is increasing, decreasing or neither. What do you notice about the gradient in each case?

3 Sketch each function, showing any intercepts on the coordinate axes. State the domain for which each function is increasing.

(a) $f(x)=x$ **(b)** $f(x)=-x^2$ **(c)** $f(x)=x^3$ **(d)** $f(x)=-\frac{1}{x}$ **(e)** $f(x)=x^4$ **(f)** $f(x)=\frac{1}{x^2}$

4 For each part of question **3**, determine whether the function is odd, even or neither.

SKETCHING BASIC FUNCTIONS

5 If $f(x) = 2x^2$ and $g(x) = \frac{3}{x}$, which of the following statements is correct?

A f and g are both odd functions
B f is an even function and g is an odd function
C f and g are both even functions
D f and g are neither even nor odd functions

6 For $y = 2x - 3$, indicate whether each statement is correct or incorrect.

(a) gradient = 2 **(b)** x-intercept = 3 **(c)** y is an increasing function **(d)** y-intercept = 3

Show that $g(x) = x^8 + 3x^4 - 2x^2$ is an even function.

Show that $h(x) = -x^3 + 4x$ is an odd function.

SKETCHING BASIC FUNCTIONS

Are these functions even, odd or neither?

a) $f(x) = \frac{x^3}{x^4 - x^2}$

b) $g(x) = \frac{1}{x^3 - 1}$

c) $h(x) = \frac{3}{x^2 - 4}$

d) $f(x) = \frac{x-3}{x+3}$

e) $h(x) = \frac{x^3}{x^5 - x^2}$

SKETCHING BASIC FUNCTIONS

HSC questions

2. Functions, 2ADV F1 2013 HSC 3 MC

Which inequality defines the domain of the function $f(x) = \dfrac{1}{\sqrt{x+3}}$?

(A) $x > -3$

(B) $x \geq -3$

(C) $x < -3$

(D) $x \leq -3$

3. Functions, 2ADV F1 2020 HSC 1 MC

Which inequality gives the domain of $y = \sqrt{2x-3}$?

A. $x < \dfrac{3}{2}$

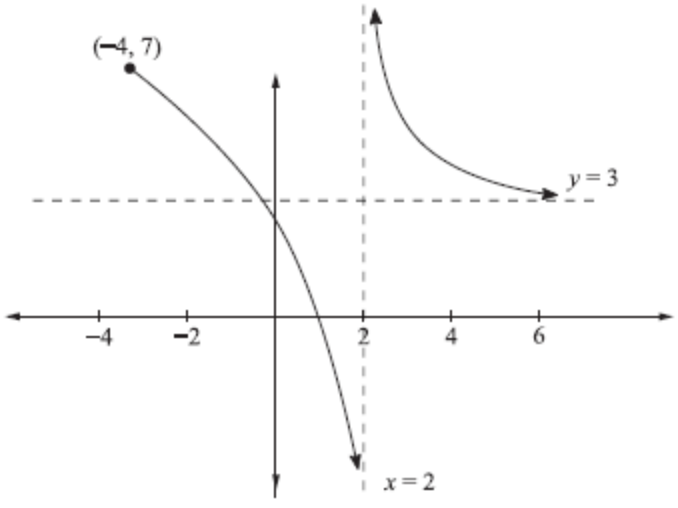
B. $x > \dfrac{3}{2}$

C. $x \leq \dfrac{3}{2}$

D. $x \geq \dfrac{3}{2}$

21. Functions, 2ADV F1 EQ-Bank 6

The graph of $f(x)$ is shown below. It has asymptotes at $y = 3$ and $x = 2$.



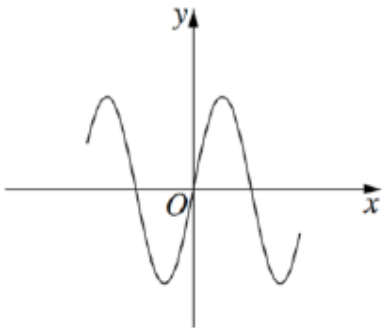
Using interval notation, state the domain and range of $f(x)$. *(2 marks)*

SKETCHING BASIC FUNCTIONS

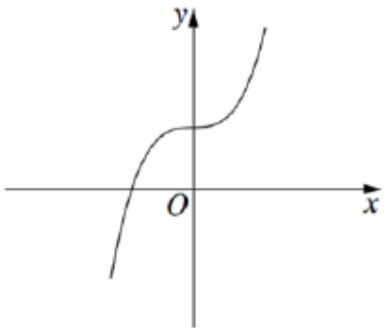
4. Functions, 2ADV F1 2016 HSC 4 MC

Which diagram shows the graph of an odd function?

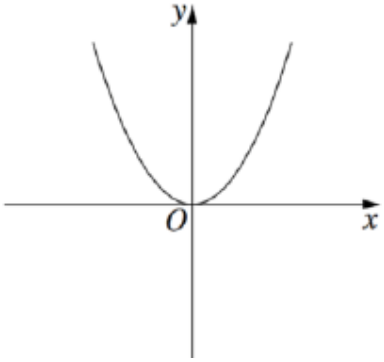
(A)



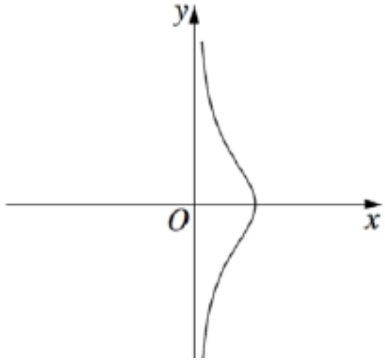
(B)



(C)



(D)



1. Functions, 2ADV F1 SM-Bank 2 MC

Let $f(x)$ and $g(x)$ be functions such that $f(2) = 5$, $f(3) = 4$, $g(2) = 5$, $g(3) = 2$ and $g(4) = 1$.

The value of $f(g(3))$ is

A. 1

B. 2

C. 4

D. 5

4. Functions, 2ADV F1 SM-Bank 13 MC

Which one of the following functions satisfies the functional equation $f(f(x)) = x$?

A. $f(x) = 2 - x$

B. $f(x) = x^2$

C. $f(x) = 2\sqrt{x}$

D. $f(x) = x - 2$

29. Functions, 2ADV F1 2017 HSC 11h

Find the domain of the function $f(x) = \sqrt{3 - x}$. *(2 marks)*