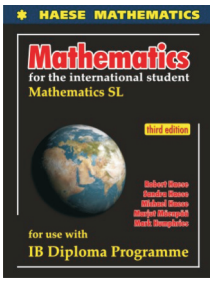



# ERRATA

## MATHEMATICS FOR THE INTERNATIONAL STUDENT

## MATHEMATICS SL (3rd edition)

### First edition - 2018 seventh reprint

### The following erratum was made on 29/Nov/2018

page 694 **ANSWERS EXERCISE 5A,** question **1 d iv** should read:

**1 d iv** Domain $= \{x \mid -5 \leqslant x \leqslant 5,\ x \neq -2\}$,
Range $= \{y \mid y < -1,\ -1 < y \leqslant 0.333\}$

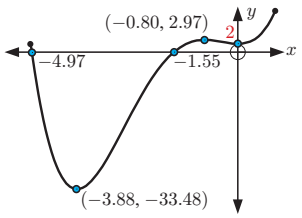
### The following errata were made on 27/Nov/2018

page 10 **SYMBOLS AND NOTATION,** bottom left of first column should display symbol:

$\leq$ or $\leqslant$ is less than or equal to
$\not>$ is not greater than
$\not<$ is not less than

page 693 **ANSWERS EXERCISE 5A,** question **1 b v** diagram should correctly display turning point at $(0, 2)$:

**2 b** **i** $x$-intercepts $-4.97$ and $-1.55$, $y$-intercept 2
**ii** min. turning points $(-3.88, -33.5)$, $(0, 2)$
and max. turning points $(-0.805, 2.97)$
**iii** none **iv** Domain $= \{x \mid -5 \leqslant x \leqslant 1\}$,
Range $= \{y \mid -33.5 \leqslant y \leqslant 12.8\}$
**v**

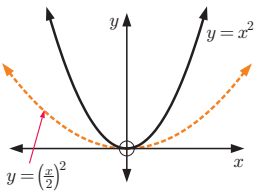



page 694 **ANSWERS EXERCISE 5A,** question **5 c iv** should read:

**5 b** one solution
**c** **i** $0 < k < 1$ **ii** $k = 0$ or $1$
**iii** $-3 \leqslant k < 0$ or $1 < k \leqslant 8$ **iv** $k < -3$ or $k > 8$

page 696 **ANSWERS EXERCISE 5D,** question **4 a** should show graph of $y = x^2$ passing through the origin:

**4 a**




### The following erratum was made on 15/May/2018

page 721 **ANSWERS EXERCISE 16B,** question **2 p** should read:

**2 p** increasing for $x \geqslant 1$, decreasing for $0 < x \leqslant 1$

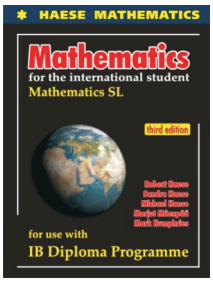
**The following erratum was made on 27/Feb/2018**

page 129 **EXERCISE 4G,** question **1 c** should read:

**1** For the following functions $f$:

**i** Find the domain and range.
**ii** Find any asymptotes and axes intercepts.
**iii** Sketch the graph of $y = f(x)$ showing all important features.
**iv** Solve $f(x) = -1$ algebraically and check the solution on your graph.
**v** Find $f^{-1}$ and explain how to verify your answer.

**a** $f : x \mapsto \log_3(x+1), \quad x > -1$
**b** $f : x \mapsto 1 - \log_3(x+1), \quad x > -1$
**c** $f : x \mapsto \log_5(x-2) - 2, \quad x > 2$
**d** $f : x \mapsto 1 - \log_5(x-2), \quad x > 2$
**e** $f : x \mapsto 1 - 2\log_2 x, \quad x > 0$




# ERRATA

## MATHEMATICS FOR THE INTERNATIONAL STUDENT

## MATHEMATICS SL (3rd edition)

### First edition - 2013 first reprint

**The following errata were made on or before 18/Aug/2014**

page 26 **EXAMPLE 10,** solution should read:

**a** For two distinct real roots, $\Delta > 0 \quad \therefore \quad k < -9$ or $k > -1$, $k \neq 0$.

**b** For two real roots, $\Delta \geqslant 0 \quad \therefore \quad k \leqslant -9$ or $k \geqslant -1$, $k \neq 0$.

page 59 **DOMAIN AND RANGE,** first line under the blue box should read:

The domain and range of a relation are often described using **interval notation**.

page 111 **LOGARITHMS IN BASE 10,** first blue box on page should read:

In fact, all positive numbers can be written in the form $10^x$ by using logarithms in base 10.

The **logarithm in base 10** of a positive number is the power that 10 must be raised to in order to obtain the number.

pages 116 and 117 **LAWS OF LOGARITHMS,** 1st proof should read:

**Proof:**

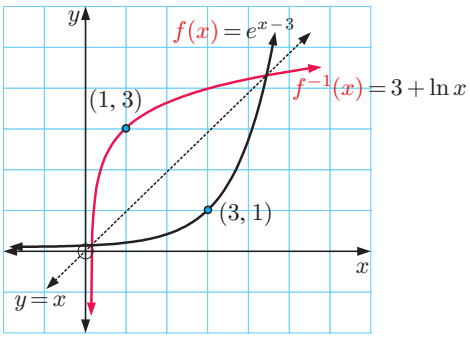
- $\log_c(AB)$
  $= \log_c\left(c^{\log_c A} \times c^{\log_c B}\right)$
  $= \log_c\left(c^{\log_c A + \log_c B}\right)$
  $= \log_c A + \log_c B$

- $\log_c\left(\frac{A}{B}\right)$
  $= \log_c\left(\frac{c^{\log_c A}}{c^{\log_c B}}\right)$
  $= \log_c\left(c^{\log_c A - \log_c B}\right)$
  $= \log_c A - \log_c B$

- $\log_c(A^n)$
  $= \log_c\left(\left(c^{\log_c A}\right)^n\right)$
  $= \log_c\left(c^{n \log_c A}\right)$
  $= n \log_c A$

page 128 **EXAMPLE 25,** part **b** solution should read:

**b**



page 350 **RATES OF CHANGE,** should read:

- Michael Jordan's average basketball scoring rate was 30.1 *points per game.*

page 354 **INVESTIGATION 4,** should read:

**INVESTIGATION 4** **GRADIENT FUNCTIONS**

The software on the CD can be used to find the gradient of the tangent to a function $f(x)$ at any point. By sliding the point along the graph we can observe the changing gradient of the tangent. We can hence generate the gradient function $f'(x)$.

page 377 **EXAMPLE 12,** solution to **b** should read:

**b**
$$y = \ln\left[\frac{x^2}{(x+2)(x-3)}\right]$$
$$= \ln x^2 - \ln[(x+2)(x-3)] \qquad \{\ln(\tfrac{a}{b}) = \ln a - \ln b\}$$
$$= 2\ln x - [\ln(x+2) + \ln(x-3)]$$
$$= 2\ln x - \ln(x+2) - \ln(x-3)$$
$$\therefore \frac{dy}{dx} = \frac{2}{x} - \frac{1}{x+2} - \frac{1}{x-3}$$

page 399 **EXAMPLE 12,** question should read:

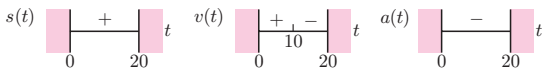
Find the exact position and nature of the stationary point of $y = (x-2)e^{-x}$.

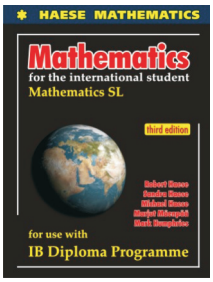
page 718 **ANSWERS REVIEW SET 14A**

**4** **a** $f'(t) = -9.6t$ m s$^{-1}$
**b** $-19.2$ m s$^{-1}$ (the $-$ sign indicates travelling downwards)

page 725 **ANSWERS EXERCISE 17A.2** Sign diagrams should note the maximum of $t$:

**2** **a** $v(t) = 98 - 9.8t$ m s$^{-1}$, $a(t) = -9.8$ m s$^{-2}$






# ERRATA

## MATHEMATICS FOR THE INTERNATIONAL STUDENT

## MATHEMATICS SL (3rd edition)

### First edition - 2012 initial print

**The following errata were made before 18/Aug/2014**

page 123 **EXAMPLE 18,** should read:

Consider the equation $2^x = 30$.

**a** Solve for $x$, giving an exact answer, by using: **i** base 2 **ii** base 10.

**b** Comment on your answers.

page 268 **INVESTIGATION,** Question **3 b** should read:

**b** Use $\triangle$ANP and the lengths in **a** to show that:

page 341 **REVIEW SET 13B,** Question **2 a ii** should read:

**ii** the velocity vector of the yacht

page 433 **EXERCISE 17C**

**13 a** Show that the volume of the container is given by $V(x) = x(36 - 2x)^2$ cm$^3$.

page 434 **EXERCISE 17C**

**18 c** For what value of $\theta$ does the gutter have maximum carrying capacity? Find the cross-sectional area for this value of $\theta$.

**20** At 1:00 pm a ship A leaves port P. It sails in the direction 30° east of north at 12 km h$^{-1}$. At the same time, ship B is 100 km due east of P, and is sailing at 8 km h$^{-1}$ towards P.

page 458 **EXERCISE 18E RULES FOR INTEGRATION** Last formula before the table should read:

$$\frac{d}{dx}(-\cos x + c) = \sin x$$

page 510 **EXERCISE 20B** Line 1 of question **1** should read:

**1** For each of the following data sets, find the: **i** mean **ii** median **iii** mode.

page 627 **REVIEW SET 23B** Question **1** should read:

**1** A discrete random variable $X$ has probability distribution function $P(x) = k\left(\frac{3}{4}\right)^x \left(\frac{1}{4}\right)^{3-x}$ where $x = 0, 1, 2, 3$ and $k$ is a constant. Find:

**a** $k$ **b** $P(X \geqslant 1)$ **c** $E(X)$.

*Disregard Question **1d**

page 670 **EXERCISE 25B** Question **33 a** should read:

**33** Let $f(x) = \frac{1}{x}$, $x \neq 0$.

**a** The graph $y = f(x)$ and the line $y = x + 2$ intersect at $x = m \pm \sqrt{n}$ where $m, n \in \mathbb{Z}$. Find $m$ and $n$.

page 681 **ANSWERS EXERCISE 1E**

**2** **a** $(0.59, 5.59)$ and $(3.41, 8.41)$ **b** $(3, -4)$ touching
**c** graphs do not meet **d** $(-2.56, -18.81)$ and $(1.56, 1.81)$

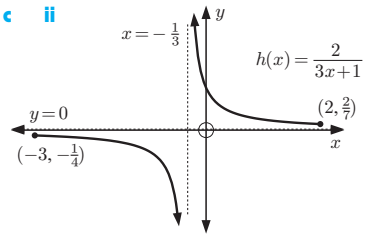
**3** **d** **i** $(-4, -1)$ and $(1, 4)$ **ii** $x < -4$ or $0 < x < 1$

page 681 **ANSWERS EXERCISE 1F**

**15** **a** $y = -\frac{8}{9}x^2 + 8$

page 686 **ANSWERS REVIEW SET 2B**

**7** **c** **ii**




**9** **c** **i** $x \approx 1.83$ **ii** $x = -3$

page 688 **ANSWERS EXERCISE 3F**

**6** **d** **iii** $y \approx 2.62$

page 691 **ANSWERS EXERCISE 4G**

**1** **e** **ii** VA is $x = 0$,
$x$-intercept $\sqrt{2}$,
no $y$-intercept
**iv** $x = 2$

page 692 **ANSWERS EXERCISE 4H**

**5** 9 years

page 693 **ANSWERS EXERCISE 5A**

**1** **a** **i** $x$-intercepts $-3$, $0$, and $4$, $y$-intercept $0$
**c** **iii** horizontal asymptote of $y = 0$

page 694 **ANSWERS EXERCISE 5A**

**d** **iii** vertical asymptote of $x = -2$,
horizontal asymptote of $y = -1$
**iv** Domain $= \{x \mid -5 \leqslant x \leqslant 5,\ x \neq 2\}$,
Range $= \{y \mid y < -1,\ -1 < y \leqslant 0.333\}$

page 702 **ANSWERS EXERCISE 7C**

**3** **a** $T_{r+1} = \binom{7}{r} x^{7-r} b^r$ **b** $b = -2$

page 702 **ANSWERS EXERCISE 8B**

**1** **a** 49.5 cm, 223 cm$^2$ **b** 23.0 cm, 56.8 cm$^2$

page 703 **ANSWERS EXERCISE 8C**

**9** **a**

| $\theta^c$ | $\sin\theta$ | $\sin(-\theta)$ | $\cos\theta$ | $\cos(-\theta)$ |
|---|---|---|---|---|
| 0.75 | 0.682 | −0.682 | 0.732 | 0.732 |
| 1.772 | 0.980 | −0.980 | −0.200 | −0.200 |
| 3.414 | −0.269 | 0.269 | −0.963 | −0.963 |
| 6.25 | −0.0332 | 0.0332 | 0.999 | 0.999 |
| −1.17 | −0.921 | 0.921 | 0.390 | 0.390 |

page 703 **ANSWERS EXERCISE 8D.2**

**2** **b** $\theta = 0$, $\pi$, or $2\pi$

page 704 **ANSWERS EXERCISE 9B**

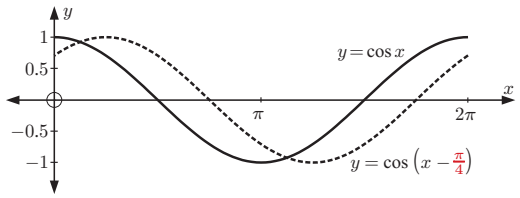
**7** **a** $\theta \approx 75.2°$

page 707 **ANSWERS EXERCISE 10E**

**2** **c** horizontal stretch factor 2 and vertical stretch with factor 2

page 708 **ANSWERS REVIEW SET 10C**

**4** **b**




page 708 **ANSWERS EXERCISE 11A.3**

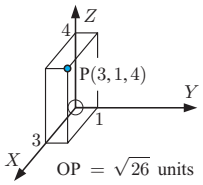
**3** **f** $-2\pi \leqslant -x \leqslant 0$

page 709 **ANSWERS REVIEW SET 11B**

**4** **c** $x \approx 0.612,\ 3.75,\ 6.90$

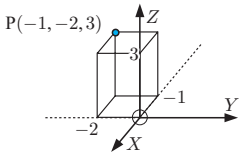
page 712 **ANSWERS EXERCISE 12G**

**2** **c**




OP $= \sqrt{26}$ units

**d**




OP $= \sqrt{14}$ units

page 714 **ANSWERS EXERCISE 13A**

**2** **a** $1.34\ \text{m s}^{-1}$ in the direction $26.6°$ to the left of intended line

**b** **i** $30°$ to the right of Q **ii** $1.04\ \text{m s}^{-1}$

**3** **a** $24.6\ \text{km h}^{-1}$ **b** $\approx 9.93°$ east of south

**4** **a** 82.5 m **b** $23.3°$ to the left of straight across **c** 48.4 s

**5** **a** The plane's speed in still air would be $\approx 437\ \text{km h}^{-1}$.
The wind slows the plane down to $400\ \text{km h}^{-1}$.

**b** $4.64°$ north of due east

page 714 **ANSWERS EXERCISE 13B**

**1** **b** **iii** $5x + 2y = 29$

page 715 **ANSWERS EXERCISE 13B**

**5 b ii** $x = t,\ y = 1 + t,\ z = 2 - 2t,\ t \in \mathbb{R}$

page 715 **ANSWERS EXERCISE 13C**

**1** $75.7°$ **2** $\mathbf{b}_1 \bullet \mathbf{b}_2 = 0$ **3** $75.5°$

page 716 **ANSWERS REVIEW SET 13A**

**3** **c** $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 5 \\ 2 \end{pmatrix} + s \begin{pmatrix} 4 \\ 10 \end{pmatrix},\quad s \in \mathbb{R}$

page 716 **ANSWERS REVIEW SET 13B**

**6** **a** $x_1(t) = 2 + t,\ y_1(t) = 4 - 3t,\ t \geqslant 0$

**b** $x_2(t) = 13 - t,\ y_2(t) = [3 - 2a] + at,\ t \geqslant 2$

**c** interception occurred at 2:22:30 pm

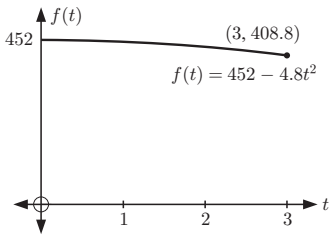
**d** bearing $\approx 12.7°$ west of south, $\approx 4.54$ units per minute

page 717 **ANSWERS REVIEW SET 13C**

**5** **a** $|\overrightarrow{\text{AB}}| = \sqrt{27}$ units

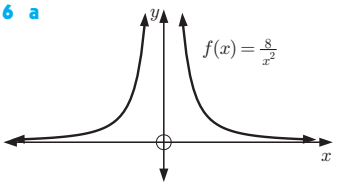
page 717 **ANSWERS EXERCISE 14C**

**1** **a**




page 721 **ANSWERS EXERCISE 16A**

**16** **a**




**b** $16x + a^3y = 24a$

**c** A is $(\frac{3}{2}a, 0)$,
B is $(0, \frac{24}{a^2})$

**d** Area $= \dfrac{18}{|a|}$ units$^2$,
area $\to 0$ as $a \to \infty$

page 721 **ANSWERS EXERCISE 16B**

**6** **b** increasing for $x \leqslant 0$, decreasing for $x \geqslant 0$

page 723 **ANSWERS EXERCISE 16D.1**

**8** **c** normal has equation
$y = -ex + 1 + e^2$

page 724 **ANSWERS REVIEW SET 16B**

**7** **a** local minimum at $(0, 1)$ **b** as $x \to \infty$, $f(x) \to \infty$

**c** $f''(x) = e^x$, $\overset{+}{\longleftrightarrow} x$ thus $f(x)$ is concave up for all $x$.

page 726 **ANSWERS EXERCISE 17B**

**13** $\frac{21}{\sqrt{2}}$ cm$^2$ per radian

page 729 **ANSWERS EXERCISE 18E.1**

**1** **c** $3e^x - \ln|x| + c$ **d** $\frac{2}{5}x^{\frac{5}{2}} - 2\ln|x| + c$

**e** $-2x^{-\frac{1}{2}} + 4\ln|x| + c$ **f** $\frac{1}{8}x^4 - \frac{1}{5}x^5 + \frac{3}{4}x^{\frac{4}{3}} + c$

**g** $\frac{1}{3}x^3 + 3\ln|x| + c$ **h** $\frac{1}{2}\ln|x| + \frac{1}{3}x^3 - e^x + c$

**i** $5e^x + \frac{1}{12}x^4 - 4\ln|x| + c$

page 730 **ANSWERS EXERCISE 18E.1**

**3** **f** $\frac{1}{2}x^2 + x - 3\ln|x| + c$

page 730 **ANSWERS EXERCISE 18G** Question **2**, answers **c** and **d** switched

**2** **c** $\dfrac{1}{8(1-x^2)^4} + c$ **d** $\frac{2}{3}(x^3 + x)^{\frac{3}{2}} + c$

page 732 **ANSWERS EXERCISE 19C.2**

**8** **a** $v(t) = \dfrac{1}{t+1} - 1$ m s$^{-1}$ **b** $s(t) = \ln|t+1| - t$ metres

**c** $s(2) = \ln 3 - 2 \approx -0.901$ m, $v(2) = -\frac{2}{3}$ m s$^{-1}$,
$a(2) = -\frac{1}{9}$ m s$^{-2}$
The object is approximately 0.901 m to the left of the origin,
travelling left at $\frac{2}{3}$ m s$^{-1}$, with acceleration $-\frac{1}{9}$ m s$^{-2}$.

page 736 **ANSWERS REVIEW SET 20B**

**8** **b** positively skewed **c** **i** 0 **ii** 0.873 **iii** 0

page 739 **ANSWERS EXERCISE 21E**

**3** **b** $r \approx -0.868$ **c** $y \approx -12.7x + 116$

**d** gradient $\approx -12.7$. For each extra hour spent on homemade meals, a family spends about \$12.70 less each week on fast food.

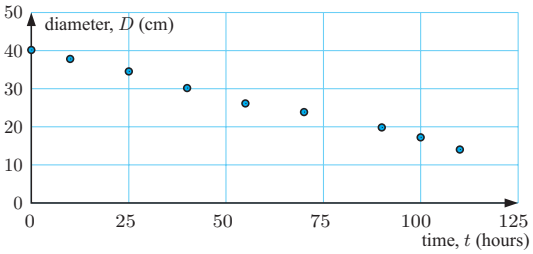
$y$-intercept $\approx 116$ If no time is spent on homemade meals, a family will spend \$116 each week on fast food.

**4** **d** gradient $\approx 5.98$

Every year a child grows about 5.98 cm taller.

**e** 200 cm - This prediction is not very reliable, as it is an extrapolation well beyond the upper pole. Most children have finished growing taller before 20 years.

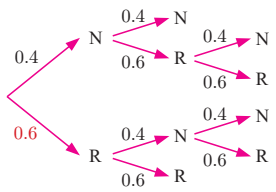
**5** **a**




**7** **f** **i** $\approx 135$ mg **ii** $\approx 76.0$ mg

page 744 **ANSWERS REVIEW SET 22B**

**1**




page 744 **ANSWERS EXERCISE 23A**

**2** **c** **i** $X =$ number of times the switch is turned on/off before it fails

**ii** any integer $\geqslant 1$ **iii** discrete

page 745 **ANSWERS EXERCISE 23A**

**3** **a** $X = 0$, 1, 2, 3, or 4

page 745 **ANSWERS EXERCISE 23B**

**8** **a** $\mathrm{P}(X = 0) = 0.665$ **b** $\mathrm{P}(X \geqslant 1) = 0.335$

page 746 **ANSWERS EXERCISE 23D.3**

**1** **a** **i** $\mu = 3$, $\sigma \approx 1.22$

**b** **i** $\mu = 1.2$, $\sigma \approx 0.980$

**c** **i** $\mu = 4.8$, $\sigma \approx 0.980$

**2** $\mu = 5$, $\sigma^2 = 2.5$

**3** **a** $\mu = 1.2$, $\sigma \approx 1.07$ **b** $\mu = 28.8$, $\sigma \approx 1.07$

page 747 **ANSWERS REVIEW SET 23B**

**1** **a** $k = \frac{8}{5}$ **b** 0.975 **c** 2.55 *Disregard question **d**

page 747 **ANSWERS REVIEW SET 23C**

**2** **b** $\mu = 2$ **c** $\sigma = 1$

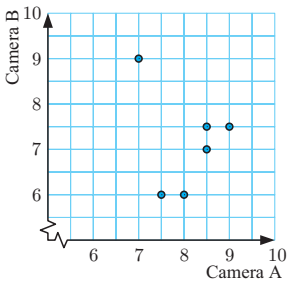
page 748 **ANSWERS REVIEW SET 24C**

**3** 0.207 **4** $\mu \approx 80.0$ cm **5** 0.0708 units$^2$

page 748 **ANSWERS EXERCISE 25A**

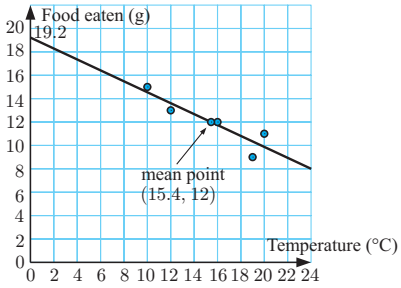
**3** **a** $b^2 x$ **b** $2 \ln b + x$ **c** $x^* = \dfrac{2 \ln b}{b^2 - 1}$

**38** **a**






**77** **a, d**




**89** **a**

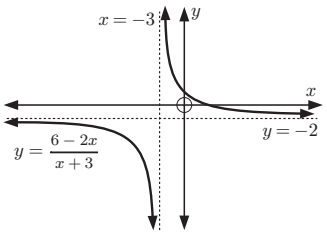
| $x$ | $0$ | $\frac{\pi}{4}$ | $\frac{\pi}{2}$ | $\frac{3\pi}{4}$ | $\pi$ | $\frac{5\pi}{4}$ | $\frac{3\pi}{2}$ | $\frac{7\pi}{4}$ | $2\pi$ |
|---|---|---|---|---|---|---|---|---|---|
| $f(x)$ | $0$ | $\frac{1}{2}$ | $1$ | $\frac{1}{2}$ | $0$ | $\frac{1}{2}$ | $1$ | $\frac{1}{2}$ | $0$ |



**18** **c** $y \approx 1.64x - 0.820$ **d** P(0.903, 0.671)



**48** **a**




**b** as $x \to -3^-$, $y \to -\infty$
as $x \to -3^+$, $y \to \infty$
as $x \to \infty$, $y \to -2^+$
as $x \to -\infty$, $y \to -2^-$
VA is $x = -3$, HA is $y = -2$



**70** **e**