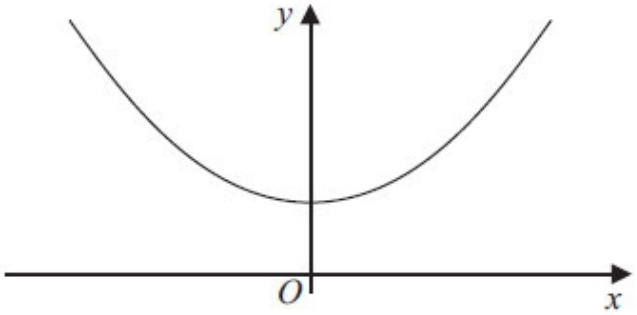
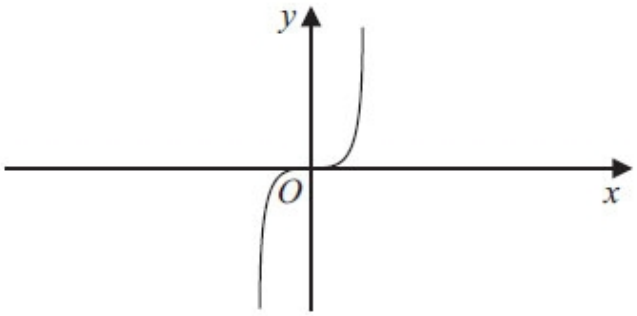
Higher tier unit 6c check in test

Non-calculator

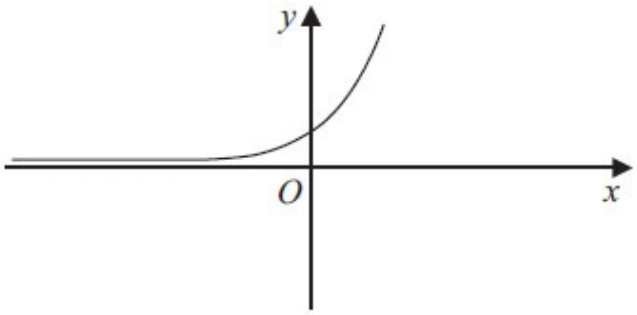
Q1. Here are three graphs.



A



B



C

Here are four equations of graphs.

$y = x^3$ $\quad$ $y = x^2 + 4$ $\quad$ $y = \frac{1}{x}$ $\quad$ $y = 2^x$

Match each graph to the correct equation.

A and $y =$ . . . . . .

B and $y =$ . . . . . .

C and $y =$ . . . . . .

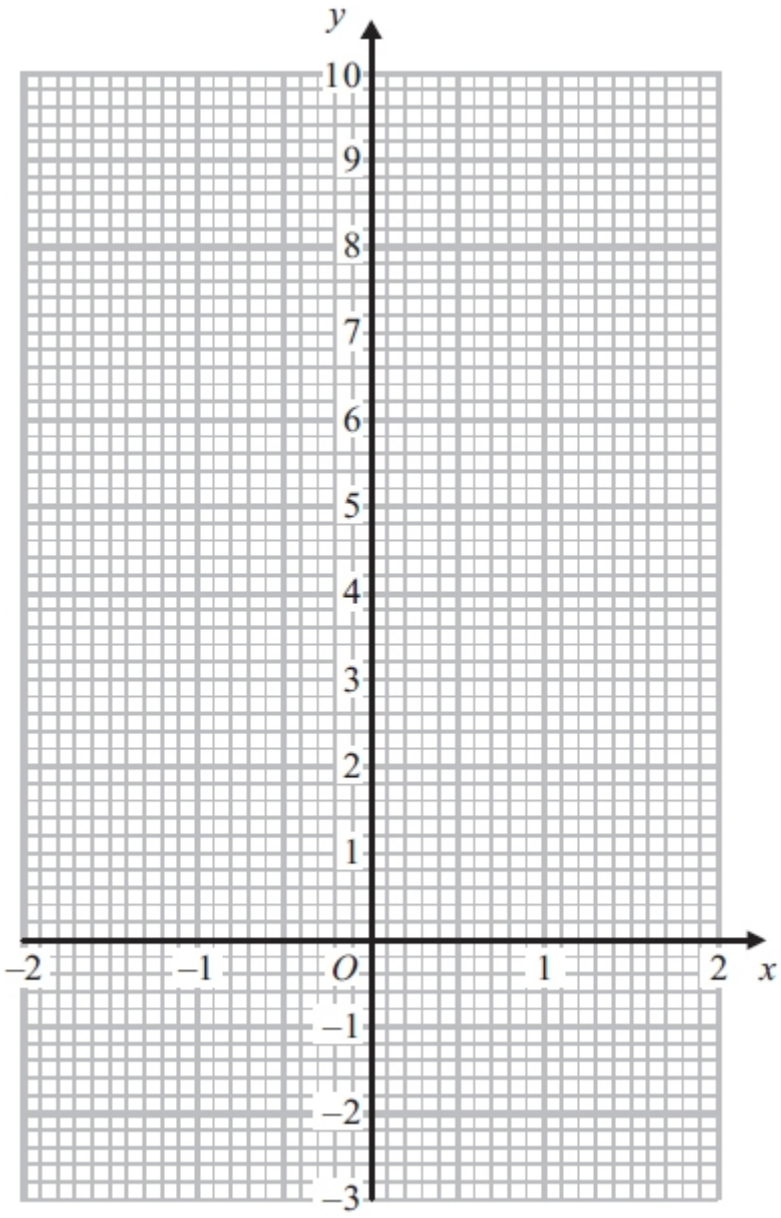
[Q2–3 linked]

Q2. Complete the table of values for $y = 2x^2 - 1$

Find the two missing values

x	–2	–1	0	1	2
y	7		–1	1	

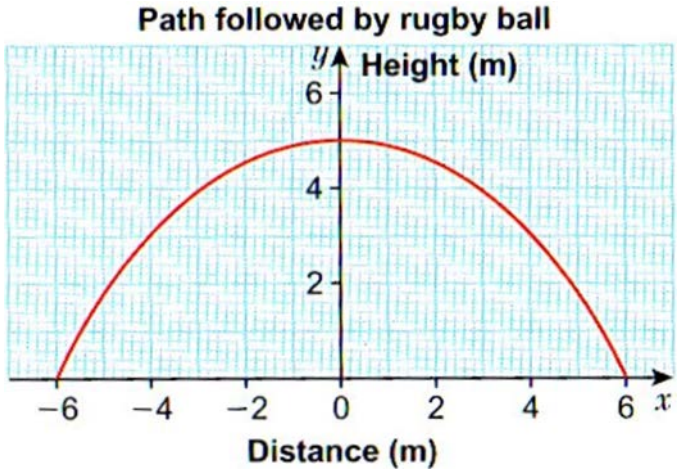
Q3.



On the grid, draw the graph of $y = 2x^2 - 1$ for values of x from $x = -2$ to $x = 2$.

Use your graph to write down estimates of the solutions of the equation $2x^2 - 1 = 0$.

Q4. Frankie kicks a rugby ball for a conversion after a try.
He kicks the ball from 6 m in front of the goal posts.
The graph models the path followed by the rugby ball.



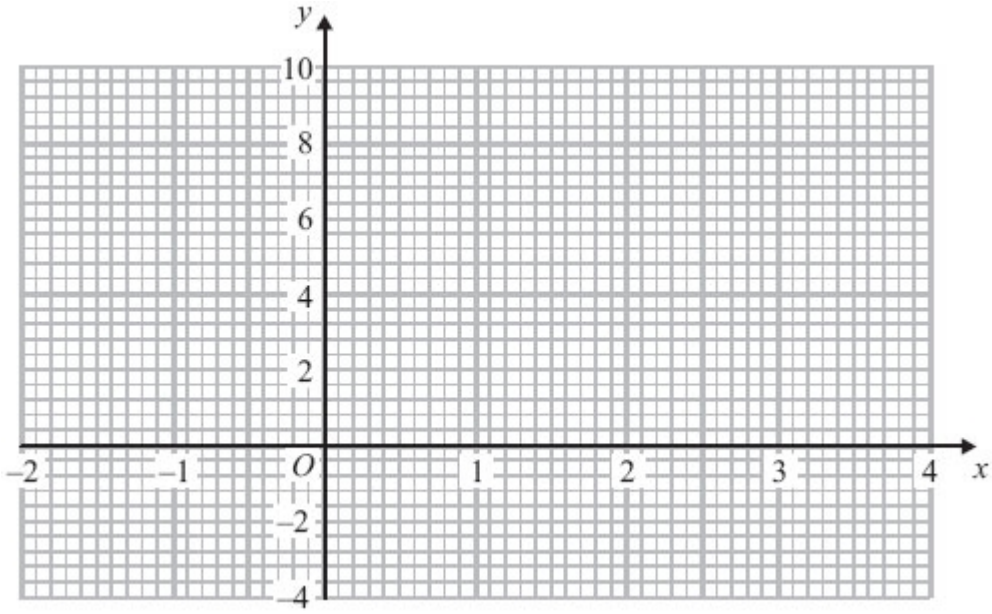
Find the height of the ball as it goes past the posts.

[Q5–6 linked]

Q5. Complete the table of values for $y = x^2 - 2x$

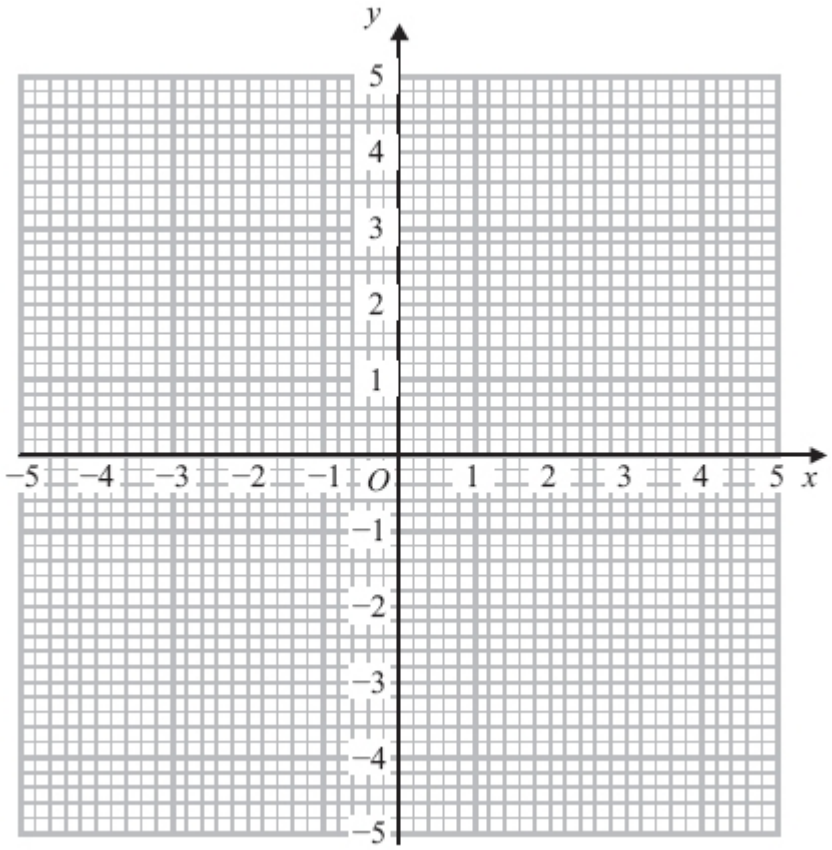
x	–2	–1	0	1	2	3	4
y		3	0			3	

Q6.



On the grid, draw the graph of $y = x^2 - 2x$ for values of x from –2 to 4.
Solve $x^2 - 2x - 2 = 1$

Q7.

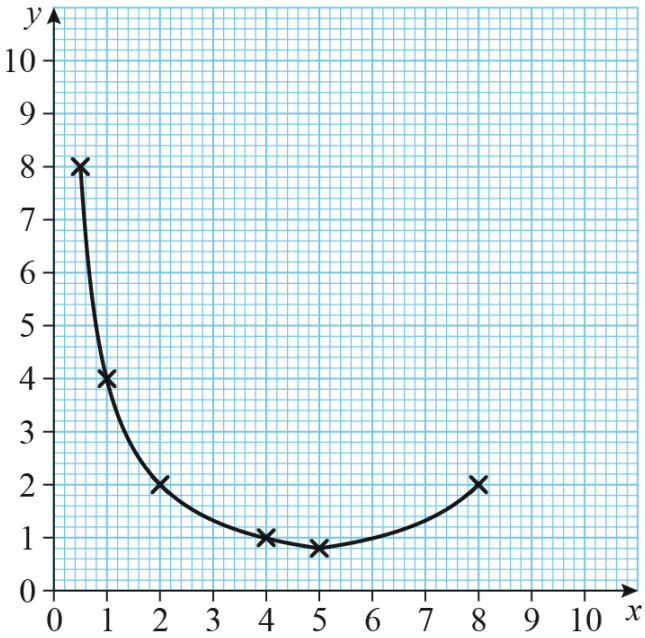


On the grid, draw the graph of $x^2 + y^2 = 4$

Q8. Joy made a table of values for $y = \frac{4}{x}$ and drew the graph for $0.5 \leq x \leq 8$.

She made one mistake.
What was her mistake?

x	0.5	1	2	4	5	8
y	8	4	2	1	0.8	2

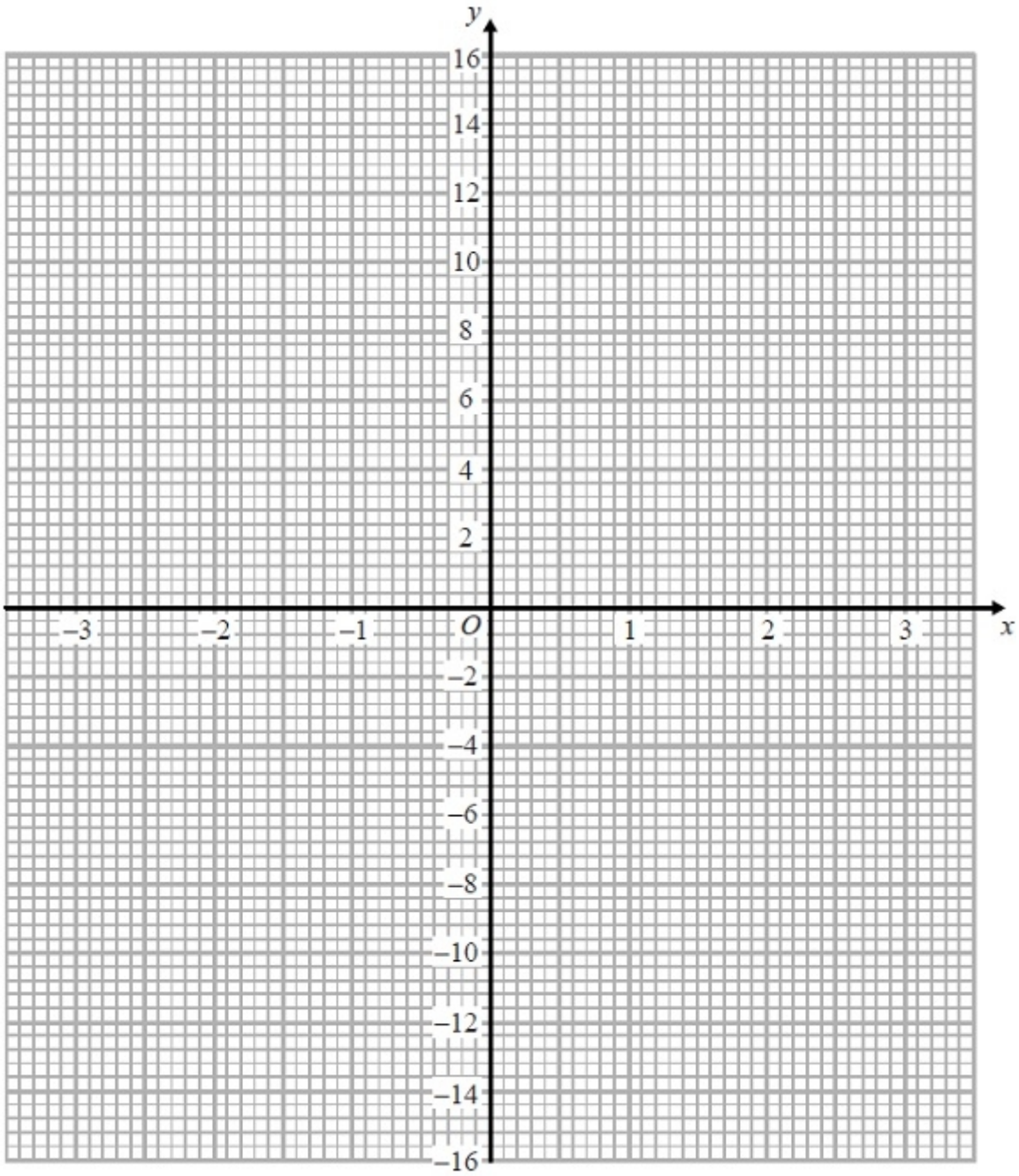


[Q9–10 linked]

Q9. Complete the table of values for $y = x^3 - 4x$

x	−3	−2	−1	0	1	2	3
y			3	0			15

Q10. On the grid, draw the graph of $y = x^3 - 4x$ from $x = -3$ to $x = 3$



Topics listed in objectives

- Recognise a linear, quadratic, cubic, reciprocal and circle graph from its shape;
- Generate points and plot graphs of simple quadratic functions, then more general quadratic functions;
- Find approximate solutions of a quadratic equation from the graph of the corresponding quadratic function;
- Interpret graphs of quadratic functions from real-life problems;
- Draw graphs of simple cubic functions using tables of values;
- Interpret graphs of simple cubic functions, including finding solutions to cubic equations;
- Draw graphs of the reciprocal function $y = \frac{1}{x}$ with $x \neq 0$ using tables of values;
- Draw circles, centre the origin, equation $x^2 + y^2 = r^2$.

Answers

Q1. A and $y = x^2 + 4$, B and $y = x^3$, C and $y = 2^x$
Q2. (–1, 1), (2, 7)
Q3. $x = 0.7$, $x = –0.7$
Q4. 5 m
Q5. (–2, 8), (1, –1), (2, 0), (4, 8)
Q6. $x = 3$, $x = –1$
Q7. circle, centre O, radius 2
Q8. $x = 8$, $y = 0.5$ not 2
Q9. (–3, –15), (–2, 0), (1, –3), (2, 0)]
Q10. correctly drawn graph using table of values from Q9.

Higher tier unit 1b check in test

Non-calculator

Q1. Write down the value of 10^{-2}

Q2. Write down the value of 7^0

Q3. Write down the value of 3^{-1}

Q4. Find the value of $9^{\frac{3}{2}}$

Q5. Estimate the value of $22^2 \mid \sqrt{20}$

Q6. Add brackets ( ) to make this statement correct

$4 + 2 \times 5 - 1 = 12$

Q7. Simplify $4^8 \div 4^2$

Q8. Simplify $(8^3)^2$

Q9. Work out the reciprocal of 2.5

Q10. Find the value of n in $6 \times 2^n = 96$

Topics listed in objectives

- Index notation for integer powers of ten, including negative numbers
- Powers of 2, 3, 4 and 5
- Square, cube and power keys on a calculator, and estimate powers and roots
- Positive, fractional and negative indices (and zero)
- Inverse operation of power n is power $1/n$
- Use index laws: multiplication and division of integer powers, fractional and negative powers, and powers of a power
- Use brackets and hierarchy of operations

Answers

Q1. 0.01
Q2. 1
Q3. 1/3
Q4. 27
Q5. 100
Q6. $4 + 2 \times (5 - 1) = 12$
Q7. 4^6
Q8. 8^6
Q9. 0.4
Q10. $n = 4$

Spare questions

[calc] Q6. Work out the value of $\dfrac{122}{\sqrt{7} \quad 2.1}$

Give your answer correct to 2 decimal places.
[answer: 223.55]

Qx. What is the value of 3^4?
[answer: 81]

Qx. Write down the value of 10^0
[answer: 1]

Qx. Write down the value of $16^{\frac{1}{2}}$
[answer: 4]

Qx. Simplify $6^3 \times 6^6$
[answer: 6^9]

Higher tier unit 1c check in test

Non-calculator

Q1. Write 350 as a product of its prime factors

Q2. Find the lowest common multiple of 6 and 15

Q3. Buses to Dorchester leave a bus station every 12 minutes.
Buses to Bournemouth leave the bus station every 15 minutes
A bus to Dorchester and a bus to Bournemouth both leave the bus station at 10 am.

When will buses to Dorchester and to Bournemouth next leave the bus station at the same time?

Q4. John thinks of two numbers.
He says,

'The Highest Common Factor (HCF) of my two numbers is 5.
The Lowest Common Multiple (LCM) of my two numbers is a multiple of 6.'

Write down two possible numbers that John is thinking of.

Q5. Write 37 000 000 in standard form.

Q6. Here are four numbers.

5.62×10^4 0.0562 562×10^3 56.2×10^{-2}

Which number is the smallest?

Q7. Here are the same four numbers.

5.62×10^4 0.0562 562×10^3 56.2×10^{-2}

Which number is the largest?

Q8. Work out the value of $(6.3 \times 10^3) \times (2.8 \times 10^5)$
Give your answer in standard form.

Q9. An object is travelling at a speed of 380 metres per second.
How many seconds will the object take to travel a distance of 4.12×10^8 metres?
Give your answer in standard form, correct to 2 significant figures.

Q10. Write $\sqrt{80}$ in the form $k\sqrt{5}$, where k is an integer.

Topics listed in objectives

- Identify factors, multiples, primes
- Prime factor decomposition
- Common factors and common multiples
- LCM and HCF
- Ordinary to standard form and vice versa
- Add, subtract, multiply, divide in standard form
- Surd notation
- Simplify surd expressions

Answers

Q1. $2 \times 5 \times 5 \times 7$
Q2. 30
Q3. 11 am
Q4. e.g. 10, 15
Q5. 3.7×10^7
Q6. 0.0562
Q7. 562×10^3
Q8. 1.764×10^9
Q9. 1.1×10^6 seconds
Q10. $4\sqrt{5}$