Year 11 Mathematics Advanced

Topic: Graph Transformations (1 of 2)

Review Questions

Term 3, 2026

How to use this review set

These are real past-paper questions, grouped by question pattern. The grey label on each question shows where it is from and its marks.

- The questions are grouped by the pattern that keeps coming up in exams, a few of each in a row, running from the plainer patterns into the harder ones near the end. Work through them and you will meet every type an exam can throw at you.
- This set **is your diagnostic**. Working through it shows you exactly which patterns are solid and which need work. Attempt every question properly in your own book, and go back to your notes to help you work through tough questions if needed.
- Every question you get wrong, need help with or struggle with goes in your **Mistakes Log**, which you should be working on daily to get you exam-ready.

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Sketching, describing and identifying transformed graphs

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5. Identify or match a transformed graph
6. Find unknown transformation parameters

Circles

7. Find the centre and radius by completing the square
8. Transform a circle or find its equation

Applying transformations to points and equations

1. Find the image of a point or feature under a transformation

Q1 Presbyterian 2021 Trial Q5 · **1 mark**

The point $P(8, -3)$ lies on the graph of $y = f(x)$. What are the coordinates of the image of P if the function is transformed to $y = -2f(x + 7) + 5$?

(A) $(1, 11)$

(B) $(1, -1)$

(C) $(15, 11)$

(D) $(15, -1)$

Q2 Ascham 2023 Trial Q5 · **1 mark**

The point $P(-2, 3)$ lies on $y = f(x)$. What are the coordinates of the image point P' on the graph of $y = 3f(x - 4) + 1$?

(A) $(2, 10)$

(B) $(-6, 10)$

(C) $(-6, 2)$

(D) $(2, 0)$

Q3 North Sydney Girls 2022 Trial Q9 · **1 mark**

The only stationary point on the graph $y = f(x)$ is the point (a, b). What are the coordinates of the only stationary point on the graph $y = -f(2x)$?

(A) $\left(\frac{1}{2}a, -b\right)$

(B) $(2a, -b)$

(C) $\left(-\frac{1}{2}a, b\right)$

(D) $(-2a, b)$

Q4 Hornsby Girls 2021 Trial Q10 · **1 mark**

The graph of $y = f(x)$ has a vertical asymptote at $x = 1$ and a horizontal asymptote at $y = 2$. The graph of $y = -f(-x)$ has a vertical asymptote and horizontal asymptote respectively:

(A) $x = 2,\ y = 1$

(B) $x = -1,\ y = 2$

(C) $x = -1,\ y = -2$

(D) $x = 1,\ y = -2$

Q5 James Ruse 2023 Trial Q14 · **3 marks**

The point $P(-1, 3)$ lies on the curve with equation $y = f(x)$. State the coordinates of the image of point P (called P') after each of the following transformations has taken place:

(i) $y = f(x + 3) + 3$

(ii) $y = 2f(x) + 3$

(iii) $y = f(2x + 3)$

Q6 Abbotsleigh 2020 Trial Q7 · **1 mark**

The graph of $y = f(x)$ has a stationary point at $(2, -3)$. Consequently, which of the following is a stationary point of $y = -f\left(\frac{x}{2}\right) - 5$?

(A) $(4, 2)$

(B) $(4, -2)$

(C) $(1, 2)$

(D) $(1, -2)$

Q7 Ascham 2022 Trial Q24 · **2 marks**

The function $y = g(x)$ is transformed to the function $y = \frac{1}{2}g\big(3(x - 1)\big) + 4$. Find the point $P(x, y)$ on $y = g(x)$, if its image point on the transformed function is $P'(6, 5)$.

2. Find the equation of a curve after transformations

Q8 Barker 2020 Trial Q5 · **1 mark**

The function $f(x) = x^2 - 5x + 1$ is reflected about the y-axis. What is the equation of the new function?

(A) $f(x) = x^2 + 5x + 1$

(B) $f(x) = x^2 + 5x - 1$

(C) $f(x) = -x^2 + 5x + 1$

(D) $f(x) = -x^2 + 5x - 1$

Q9 Pymble 2022 Trial Q1 · **1 mark**

The function $f(x) = \dfrac{1}{x}$ is translated 3 units up and 2 units right to produce $y = g(x)$. Which of the following is the equation of the translated function $g(x)$?

(A) $g(x) = \dfrac{1}{x+2} - 3$

(B) $g(x) = \dfrac{1}{x+2} + 3$

(C) $g(x) = \dfrac{1}{x-2} + 3$

(D) $g(x) = \dfrac{1}{x-2} - 3$

Q10 Trinity Grammar 2022 Trial Q24 · **2 marks**

The function $f(x) = (x-2)^3 - 2$ is translated 5 units to the right and 4 units up. Find the equation of the transformed function.

Q11 Barker 2022 Trial Q4 · **1 mark**

Which of the following equations is the reflection of the curve $y = 3^x + 2$ in the x-axis, then translated 2 units downwards?

(A) $y = 3^{-x}$

(B) $y = 3^{-x} - 4$

(C) $y = -3^x$

(D) $y = -3^x - 4$

Q12 Killara 2020 Trial Q2 · **1 mark**

The function $y = \ln x$ is dilated vertically by a scale factor of 3 and then translated 4 units to the left. Which of the following is the equation of the transformed function?

(A) $y = 3\ln x^4$

(B) $y = 4\ln x^3$

(C) $y = 3\ln(x-4)$

(D) $y = 3\ln(x+4)$

Q13 Glenwood 2021 Trial Q28 · **2 marks**

The graph of $y = \sqrt{x}$ undergoes the following transformations:

- Translation 3 units right
- Dilation horizontally by a factor of $\frac{1}{2}$
- Translation 1 unit down
- Dilation vertically by a factor of 4

Find the rule of the resulting graph.

Q14 Shore 2023 Trial Q25 · **2 marks**

The graph $y = f(x)$ of $f(x) = x^3$ is translated 3 units right and 5 units up, then horizontally dilated by a scale factor of $\frac{1}{2}$ to produce $y = g(x)$. Find the equation of the transformed function $g(x)$.

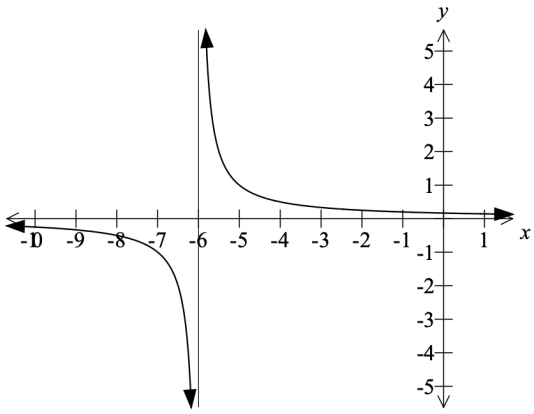
Q15 Girraween 2025 Trial Q19 · **3 marks**

Find the equation of the new function if $f(x) = x^3$ is transformed in the following order:

1. Horizontal dilation by a factor of 3
2. Reflection across the y-axis
3. Translated to the left by 1 unit

Q16 Shore 2024 Trial Q19(a) · **2 marks**

The graph of the function $y = \dfrac{1}{x+6}$ is dilated horizontally by a factor of $\frac{1}{3}$ and then translated 2 units to the right. What is the equation of the transformed function $y = g(x)$?

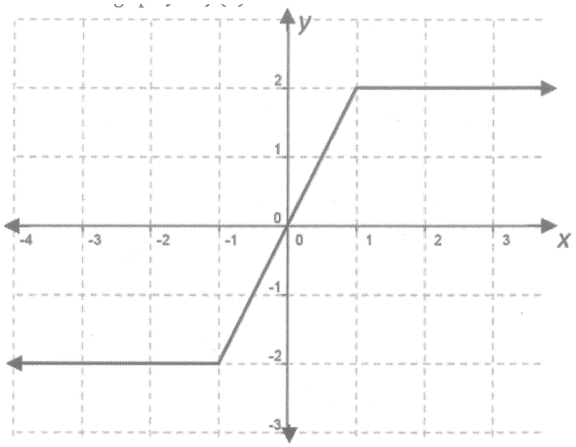


Sketching, describing and identifying transformed graphs

3. Sketch the graph after transformations

Q17 Sydney Tech 2024 Trial Q14 · **2 marks**

Consider the graph of $y = f(x)$ shown below.

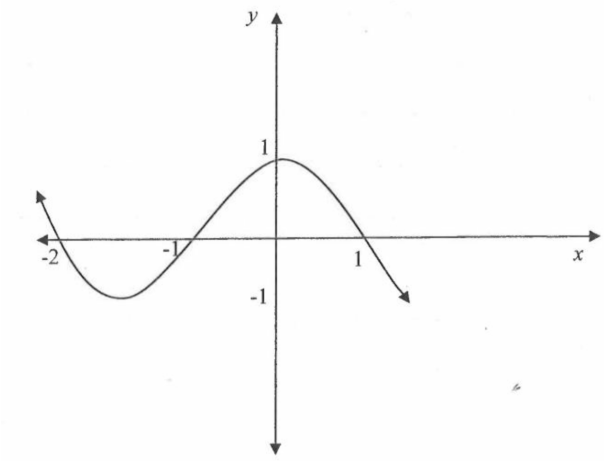


(a) Sketch the graph of $y = -f(x)$.

(b) Sketch the graph of $y = f(-x)$.

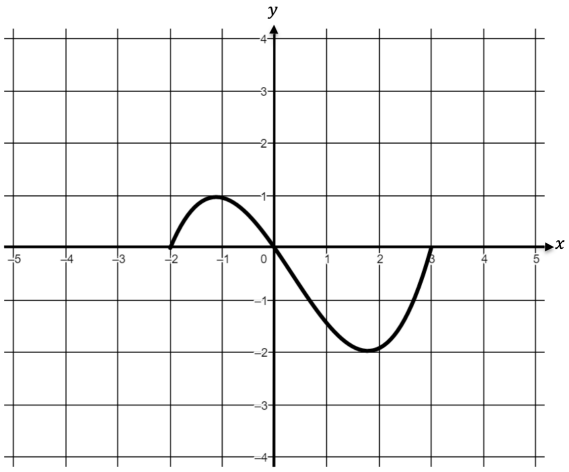
Q18 Riverview 2022 Trial Q29 · **2 marks**

The graph of $y = f(x)$ is shown. On the same axes draw the curve $y = f(x-1)+1$, showing all important features.



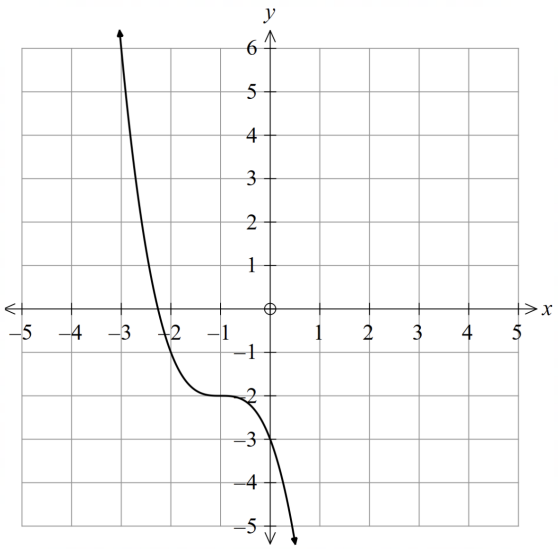
Q19 St George Girls 2020 Trial Q21 · **2 marks**

The graph below shows $y = f(x)$. On the same graph sketch $y = -2f(x-1)$.



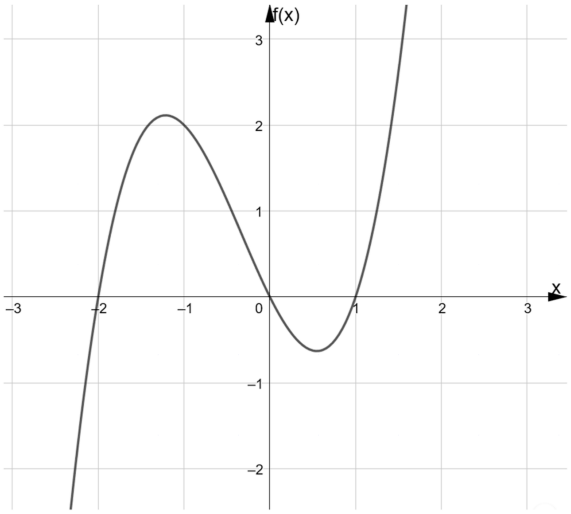
Q20 Barker 2023 Trial Q26 · **2 marks**

Consider the graph of $y = f(x)$ as shown. On the same number plane, draw a sketch of the function $y = 2f(x) + 6$, showing the x- and y-intercepts and the coordinates of the point of inflection.



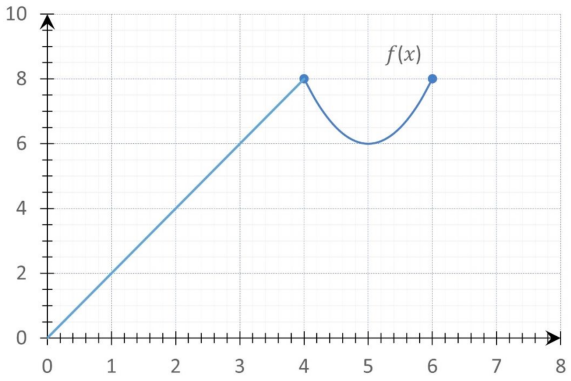
Q21 Cherrybrook Tech 2021 Trial Q20 · **2 marks**

The graph below shows $y = f(x)$. On the same graph, sketch $y = 2 - f(x)$.



Q22 James Ruse 2023 Trial Q16 · **3 marks**

Given the graph of $f(x)$ as shown below, sketch on the same axes $g(x)$ and $h(x)$. Label your graphs clearly.

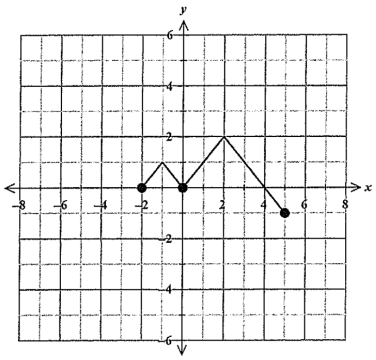


(i) $g(x) = f(2x)$

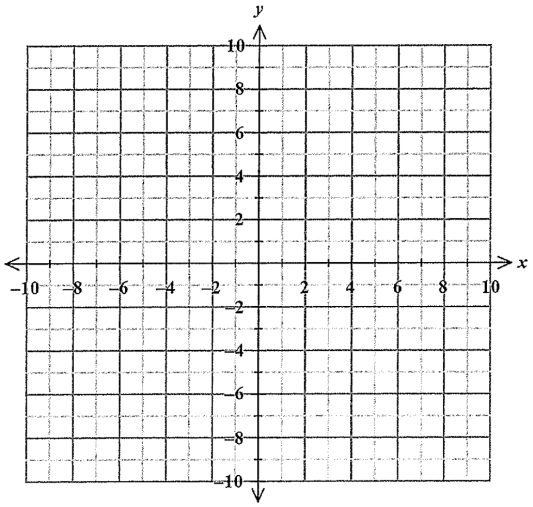
(ii) $h(x) = 0.5\, f(x)$

Q23 Killara 2024 Trial Q29 · **2 marks**

Given the following function $f(x)$, sketch $y = 2f\left(-\frac{x}{2}\right)$ on the axes below.

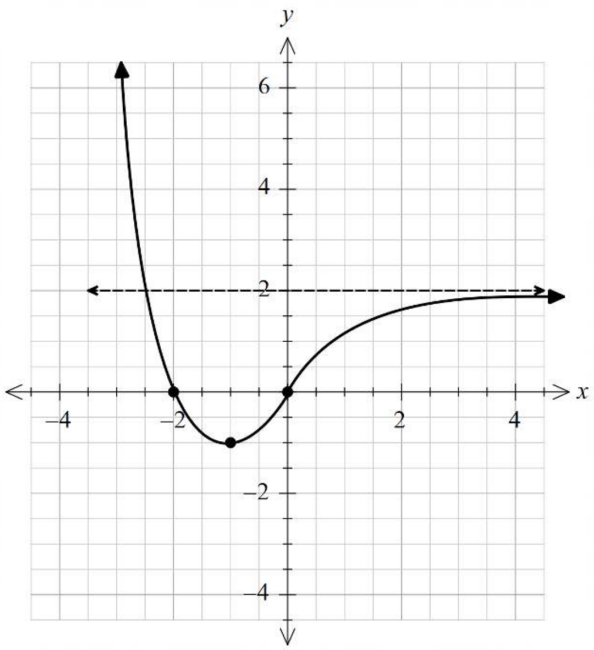


Sketch $2f\left(-\frac{1}{2}x\right)$ on the axis below.



Q24 Pymble 2022 Trial Q16 · **3 marks**

The curve of $y = f(x)$ is given below. Sketch $y = -2f(-2x)$ on the same set of axes, indicating all key features including intercepts, turning points and any asymptotes. The dashed line represents an asymptote and there is a turning point at $(-1, -1)$.



4. Describe or state the transformations

Q25 2020 HSC Q2 · **1 mark**

The function $f(x) = x^3$ is transformed to $g(x) = (x-2)^3 + 5$ by a horizontal translation of 2 units followed by a vertical translation of 5 units. Which row of the table shows the directions of the translations?

	Horizontal translation of 2 units	**Vertical translation of 5 units**
A.	Left	Up
B.	Right	Up
C.	Left	Down
D.	Right	Down

Q26 Gosford 2023 Trial Q3 · 1 mark

If $f(x) = x^2$ and $g(x) = -1 - (x+3)^2$, which transformations map the graph of $f(x)$ to $g(x)$?

(A) Horizontally translated 3 units to the left, vertically translated 1 unit up and reflected across the x-axis

(B) Horizontally translated 3 units to the right, vertically translated 1 unit up and reflected across the x-axis

(C) Horizontally translated 3 units to the left, vertically translated 1 unit up and reflected across the y-axis

(D) Horizontally translated 3 units to the right, vertically translated 1 unit down and reflected across the x-axis

Q27 Baulkham Hills 2022 Trial Q9 · 1 mark

The function $y = \log_{10} x$ is transformed to $y = 3\log_{10}\left[2(x+5)\right] - 4$ using only four steps. Which of the following is **not** one of the correct steps to transform $y = \log_{10} x$ to the new graph?

(A) Translate down by 4 units

(B) Translate to the left by 5 units

(C) Vertical dilation by a factor of 3

(D) Horizontal dilation by a factor of 2

Q28 Hunters Hill 2020 Trial Q13 · 2 marks

Describe the transformations applied to $y = x^2$ in order to give the transformed function $y = (4x+2)^2$.

Q29 Penrith 2020 Trial Q14 · 2 marks

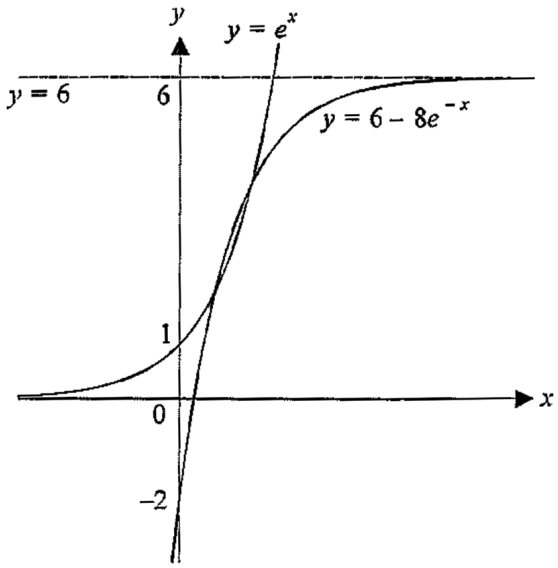
Describe a suitable sequence of transformations that turns $f(x) = \dfrac{1}{x^2}$ into $g(x) = -\dfrac{1}{(x-1)^2} + 3$.

Q30 Abbotsleigh 2021 Trial Q12(f) · 3 marks

Describe the three transformations which, when applied in succession, change the graph of $y = \sqrt{x}$ to the graph with the equation $y = 4\sqrt{x-1} + 3$.

Q31 Caringbah 2022 Trial Q10 · **1 mark**

Let $f(x) = e^x$ and $g(x) = 6 - 8e^{-x}$. The sequence of dilations, reflections and translations that would transform the graph of $y = f(x)$ into the graph of $y = g(x)$ is:



(A) Vertical dilation factor 8, reflect in x-axis, reflect in y-axis, translate up 6 units

(B) Vertical dilation factor $\frac{1}{8}$, reflect in x-axis, reflect in y-axis, translate up 6 units

(C) Translate up 6 units, reflect in x-axis, reflect in y-axis, vertical dilation factor 8

(D) Translate up 6 units, reflect in x-axis, reflect in y-axis, vertical dilation factor $\frac{1}{8}$

Q32 Glenwood 2023 Trial Q13 · **3 marks**

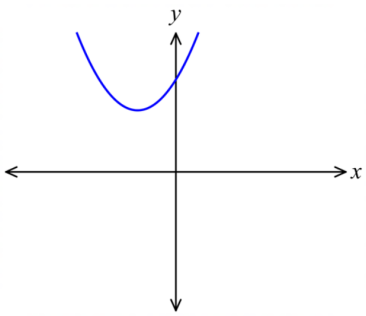
Describe three transformations which, when applied in succession, change the graph of $y = x^2 + 5$ to the graph with equation $y = \left(\frac{x+1}{2}\right)^2$.

5. Identify or match a transformed graph

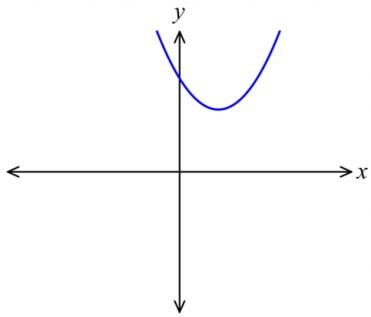
Q33 Hornsby Girls 2020 Trial Q5 · **1 mark**

Which diagram best shows the graph of the parabola $y = 2 - (x + 1)^2$?

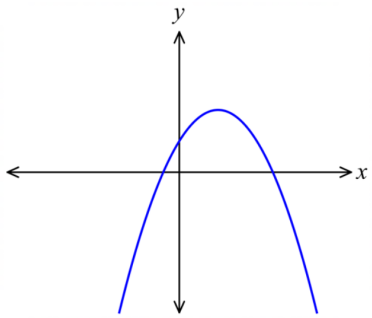
(A)



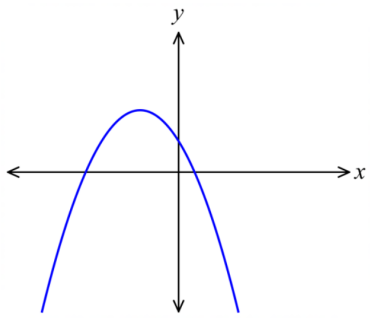
(B)



(C)

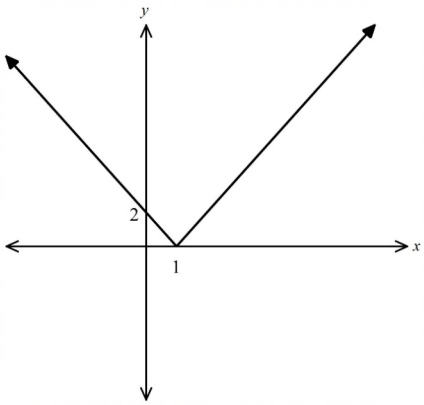


(D)



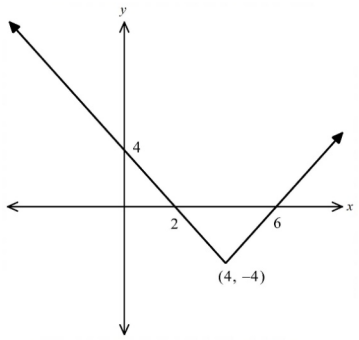
Q34 Fort St 2022 Trial Q3 · **1 mark**

The graph of $y = f(x)$ is shown below. Which of the graphs below represents $y = f(x + 3) + 4$?

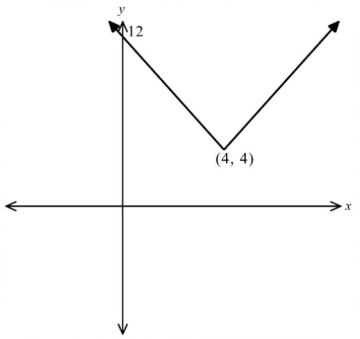


Which of the graphs below represents $y = f(x + 3) + 4$?

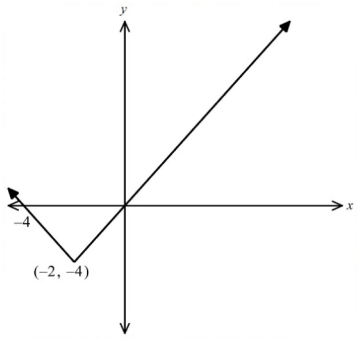
A.



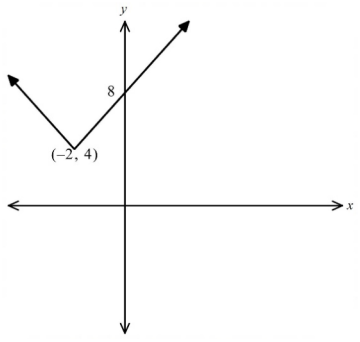
B.



C.

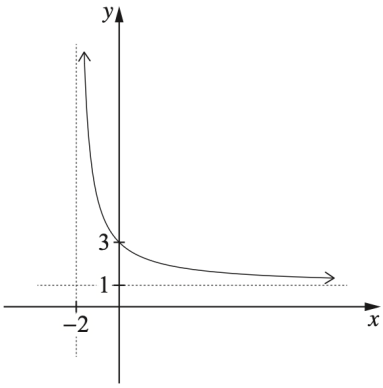


D.



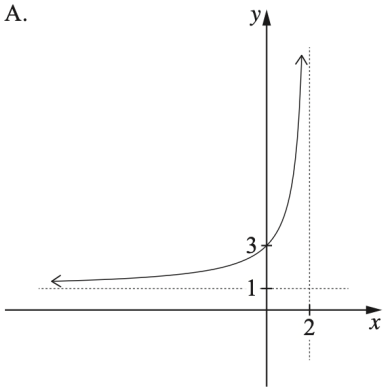
Q35 2025 HSC Q6 · **1 mark**

The graph of $y = f(x)$ is shown. Which of the following is the graph of $y = -f(-x)$?

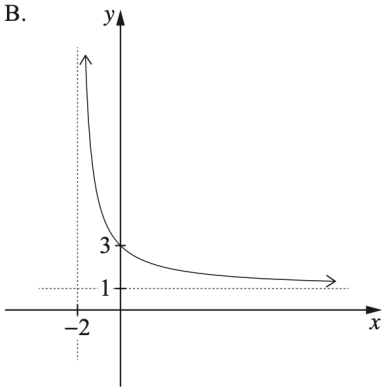


Which of the following is the graph of $y = -f(-x)$?

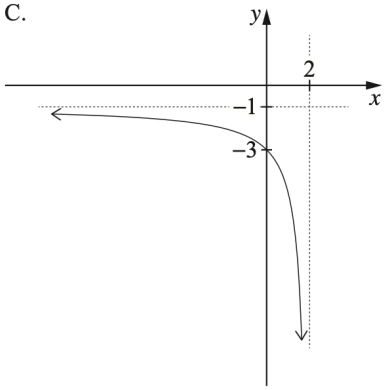
A.



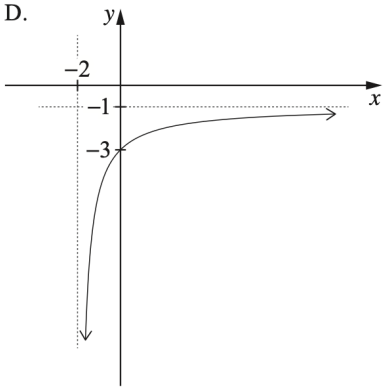
B.



C.

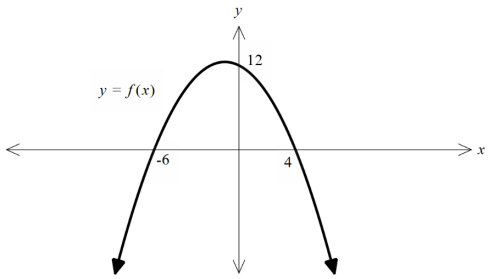


D.

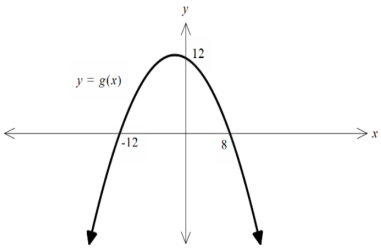


Q36 Roseville 2022 Trial Q9 · **1 mark**

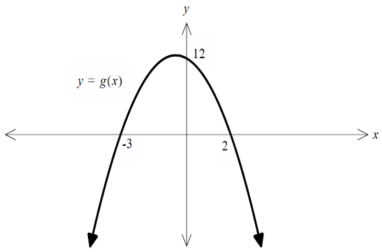
The figure below shows the graph of $y = f(x)$. If $g(x) = f\left(\frac{x}{2}\right)$, which of the following may represent the graph of $y = g(x)$?



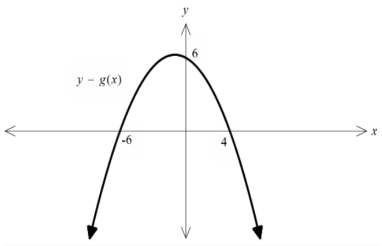
(A)



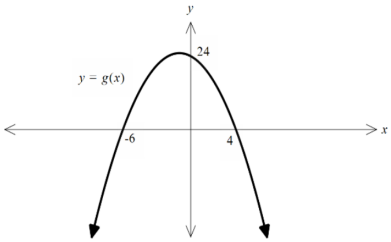
(B)



(C)

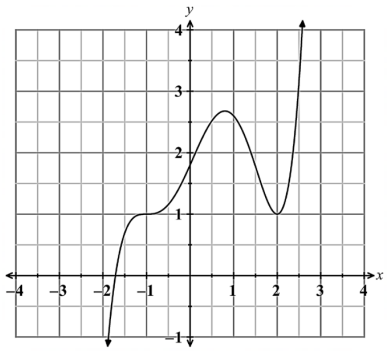


(D)



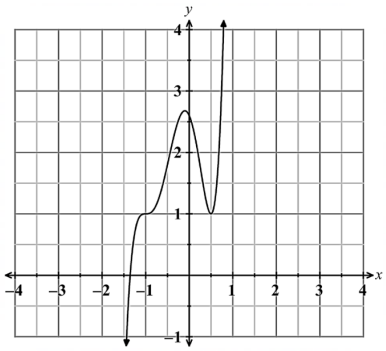
Q37 Killara 2025 Trial Q10 · **1 mark**

The graph of $y = f(x)$ is shown below. Which of the following options best represents the graph of $y = f(2x + 1)$?

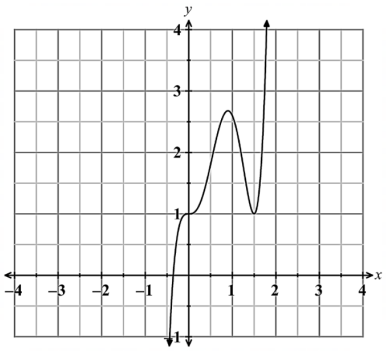


Which of the following options best represent the graph of $y = f(2x + 1)$?

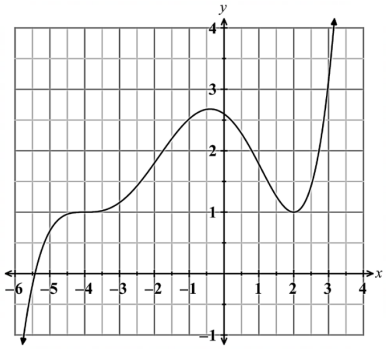
A.



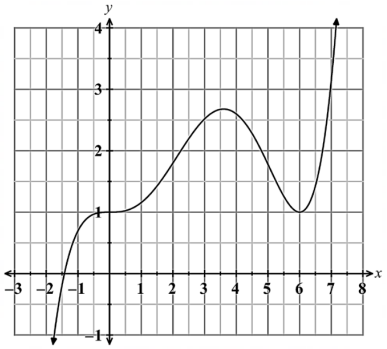
B.



C.

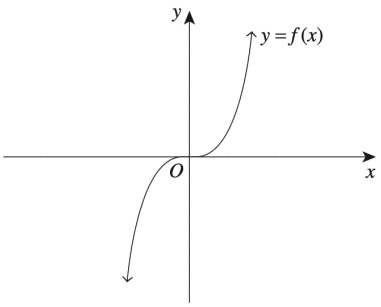


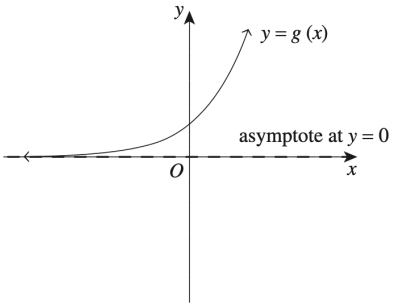
D.



Q38 Sydney Boys 2023 Trial Q10 · **1 mark**

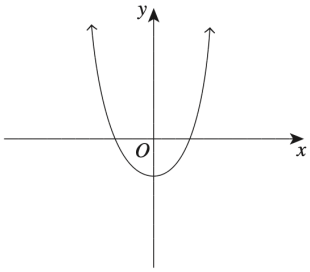
The graphs of $f(x)$ and $g(x)$ are shown (with $g(x)$ having a horizontal asymptote at $y = 0$). Which of the following best represents the graph of $y = f(g(-x))$?



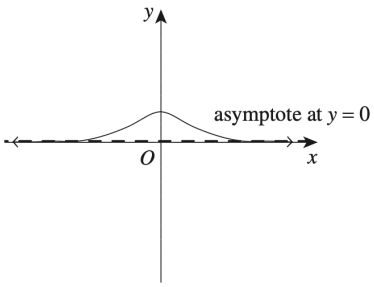


Which of the following best represents the graph of $y = f\big(g(-x)\big)$?

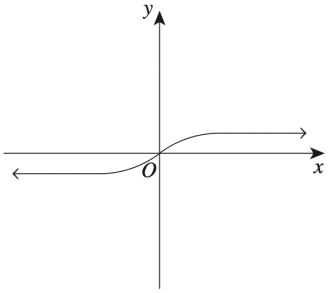
A.



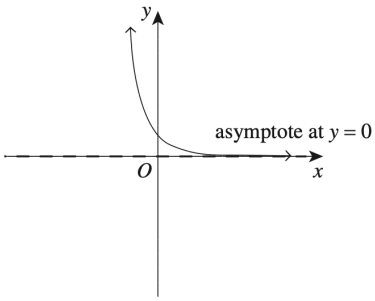
B.



C.



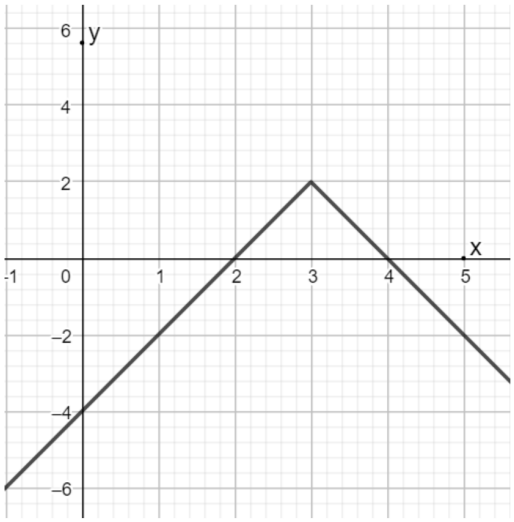
D.



6. Find unknown transformation parameters

Q39 Girraween 2020 Trial Q27 · **2 marks**

The function $f(x) = |x|$ is transformed and the equation of the new function is of the form $y = kf(x+b)+c$, where k, b and c are constants. The graph of the new function is shown.



What are the values of k, b and c?

Q40 Blacktown Boys 2023 Trial Q27 · **2 marks**

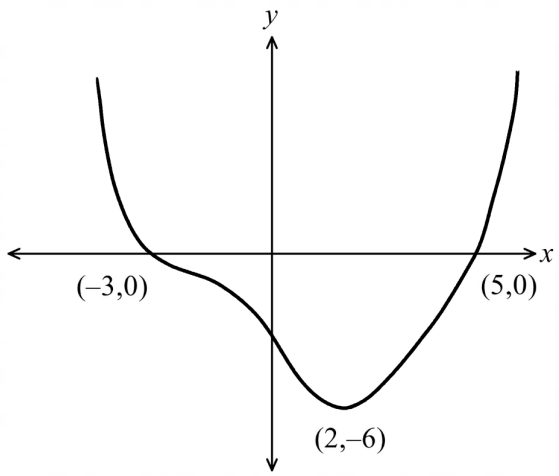
The graph of $y = x^2$ is transformed into the graph of $y = 3x^2 + 24x + 33$ by the transformations:

- A vertical stretch with scale factor k, followed by
- A horizontal translation of p units, followed by
- A vertical translation of q units.

Write down the values of k, p and q.

Q41 North Sydney Girls 2020 Trial Q27 · 3 marks

The diagram shows a sketch of the graph of $y = f(x)$. The graph passes through the points $(-3, 0)$ and $(5, 0)$, and has a minimum turning point at $(2, -6)$.

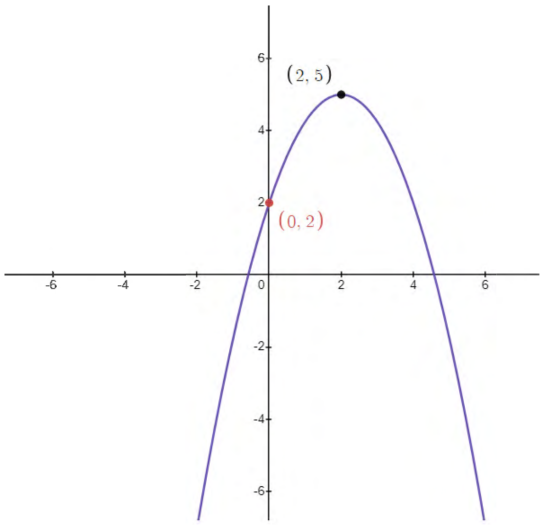


(a) The graph of $y = 4f(x + a)$ passes through the origin. Write down the possible values of a. **(2 marks)**

(b) The curve $y = f(x)$ is now transformed so that the y-coordinate of the stationary point on the graph of $y = bf(x + 2)$ is 4. Write down the value of b. **(1 mark)**

Q42 Sydney Tech 2023 Trial Q20 · 2 marks

The function $f(x) = x^2$ is transformed into a new function whose graph is shown below.



Find the equation of the new function in the form $g(x) = k(x + b)^2 + c$ for some constants k, b and c.

Q43 Barker 2023 Trial Q23 · **3 marks**

The graph of the function $f(x) = x^2$ is translated a units to the left, dilated vertically by a factor of b and then translated 3 units up. The equation of the transformed function is now $g(x) = 2x^2 + 16x + 35$.

Find the values of a and b.

Q44 2022 HSC Q19 · **3 marks**

The graph of the function $f(x) = x^2$ is translated m units to the right, dilated vertically by a scale factor of k and then translated 5 units down. The equation of the transformed function is $g(x) = 3x^2 - 12x + 7$.

Find the values of m and k.

Circles

7. Find the centre and radius by completing the square

Q45 Killara 2020 Trial Q4 · **1 mark**

The radius and centre of the circle with equation $x^2 - 6x + y^2 + 10y + 18 = 0$ is:

(A) Radius $= 3\sqrt{2}$, Centre $(-3, 5)$

(B) Radius $= 3\sqrt{2}$, Centre $(3, -5)$

(C) Radius $= 4$, Centre $(-3, 5)$

(D) Radius $= 4$, Centre $(3, -5)$

Q46 Cherrybrook Tech 2022 Prelim Q2 · **1 mark**

What is the centre and radius of the circle with equation $(x + 3)^2 + (y - 1)^2 = 25$?

(A) Centre $(-3, 1)$ and radius 25

(B) Centre $(-3, 1)$ and radius 5

(C) Centre $(3, -1)$ and radius 25

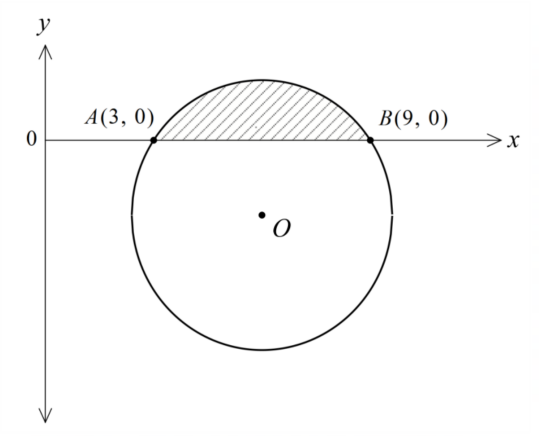
(D) Centre $(3, -1)$ and radius 5

Q47 Shore 2023 Trial Q11 · **2 marks**

Find the centre and radius of the circle with the equation $x^2 - 4x + y^2 - 8y - 5 = 0$.

Q48 Killara 2022 Prelim Q29(a) · 1 mark

The equation $x^2 - 12x + y^2 + 4y + 27 = 0$ represents a circle. Show that the radius of the circle is $\sqrt{13}$ units.



Q49 Loreto Kirribilli 2022 Prelim Q4 · 1 mark

What is the radius of the circle $x(x-4) + y(y-2) = 4$?

(A) 1

(B) 2

(C) 3

(D) 4

Q50 International Grammar 2021 Prelim Q17 · 2 marks

Draw a sketch of the circle with equation $x^2 - 2x + y^2 + 6y + 6 = 0$.

Q51 Sydney Grammar 2021 Prelim Q8 · 1 mark

A point lies on the circle with equation $x^2 + y^2 - 24x - 10y + 48 = 0$. What is the furthest distance, in units, the point could be from the origin?

(A) 29

(B) 24

(C) 13

(D) 11

8. Transform a circle or find its equation

Q52 Hornsby Girls 2021 Trial Q7 · **1 mark**

The relation $(x-1)^2+y^2=4$ is transformed to $(x-3)^2+(y+1)^2=4$ by a horizontal translation followed by a vertical translation.

Which row of the table shows the correct direction and distance of the translation?

	Horizontal Translation	**Vertical Translation**
(A)	Shift right 2 units	Shift down 1 unit
(B)	Shift left 2 units	Shift down 1 unit
(C)	Shift right 2 units	Shift up 1 unit
(D)	Shift left 2 units	Shift up 1 unit

Q53 Hornsby Girls 2022 Trial Q2 · **1 mark**

The circle $(x-2)^2+(y+4)^2=9$ is enlarged by a factor of 2 with centre the origin. What is its resulting equation?

(A) $(x-1)^2+(y+2)^2=\dfrac{9}{4}$

(B) $(x-2)^2+(y+4)^2=18$

(C) $(x-4)^2+(y+8)^2=36$

(D) $(x-2)^2+(y+4)^2=36$

Q54 Kings 2022 Trial Q20 · **2 marks**

The circle $x^2-4x+y^2+2y-5=0$ is reflected in the y-axis. Determine the coordinates of the centre and radius of the reflected circle.

Q55 St George Girls 2023 Trial Q19 · **3 marks**

The circle $x^2+y^2-6x+8y-11=0$ is translated to the left by 4 units and up by 3 units. What is the centre and radius of the new circle?

Q56 Caringbah 2022 Trial Q12 · **2 marks**

A circle has the equation $x^2-6x+y^2+4y+k=0$ for some constant k. Find the set of possible values for k.

Q57 2020 HSC Q24 · **3 marks**

The circle $x^2 - 6x + y^2 + 4y - 3 = 0$ is reflected in the x-axis. Sketch the reflected circle, showing the coordinates of the centre and the radius.