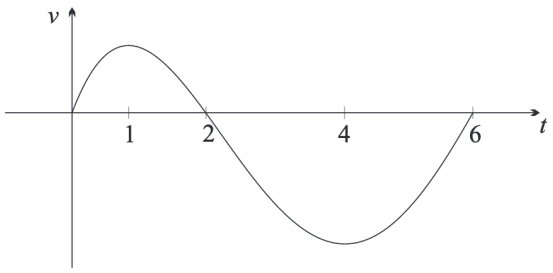
## Maths Test
## Question 1

A ball moves in a straight line along a horizontal track. The graph below shows the ball's velocity $v$ at time $t$.




For what values of $t$ is the speed of the particle decreasing?

(A) $0 < t < 1$ and $2 < t < 4$

(B) $1 < t < 2$ and $4 < t < 6$

(C) $1 < t < 4$

(D) $2 < t < 6$

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## Question 2

What is the solution to the inequation $x^2 + 4x + 3 \geq 0$ ?

A. $x \leq -1$ or $x \leq -3$

B. $x \leq -1$ or $x \geq -3$

C. $x \geq -1$ or $x \geq -3$

D. $x \geq -1$ or $x \leq -3$

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## Question 3

The integral

$$\int_0^6 |x - 2|\, dx$$

evaluates to which of the following?

A. 10

B. 20

C. 30

D. None of the above.

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## Question 4

Let $h(x) = f(g(x))$ where the function $f(x)$ is an odd function and the function $g(x)$ is an even function.

The tangent to $y = h(x)$ at $x = k$, where $k > 0$, has the equation $y = mx + c$.

What is the equation of the tangent to $y = h(x)$ at $x = -k$?

A. $y = mx + c$

B. $y = -mx + c$

C. $y = mx - c$

D. $y = -mx - c$

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## Question 5

Which of the following is not equivalent to $\sqrt{(x-1)^2}$?

A. $|1 - x|$

B. Distance from $x$ to 1 on the number line?

C. $\begin{cases} x - 1 & when\ x \geq 1 \\ 1 - x & when\ x < 1 \end{cases}$

D. $x - 1$

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## Question 6

What is the $x$ coordinate of the point on the curve $y = e^{2x}$ where the tangent is parallel to the line $y = 4x - 1$?

A. $x = \frac{1}{2}\ln 2$

B. $x = \ln 2$

C. $x = -\frac{1}{2}\ln 2$

D. $x = 2$

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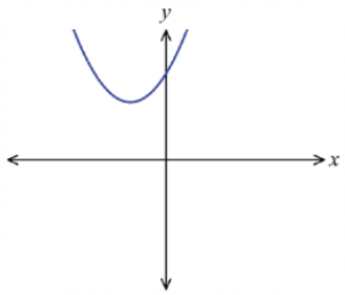
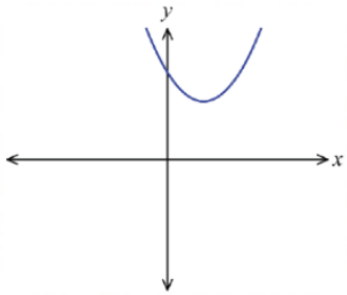
## Question 7

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

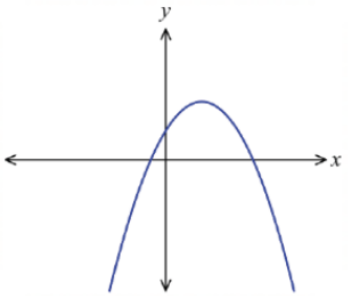
(A)



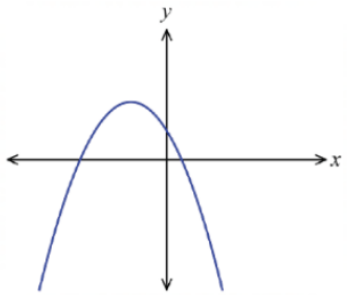

(B)




(C)




(D)

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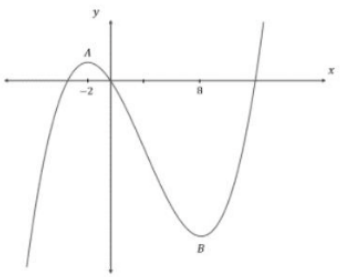
## Question 8

The following diagram of $y = f(x)$, has a local maximum at $A$, where $x = -2$, and a local minimum at $B$, where $x = 8$.




What is the order of $f(-2)$, $f'(8)$, $f''(-2)$ in ascending order?

A. $f(-2), f'(8), f''(-2)$
B. $f''(-2), f'(8), f(-2)$
C. $f(-2), f''(-2), f'(8)$
D. $f'(8), f''(-2), f(-2)$

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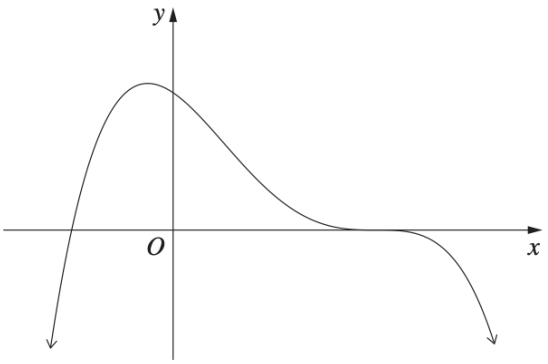
**Question 9**

The graph of $y = f(x)$ is shown.




Which of the following could be the equation of this graph?

A. $y = (1 - x)(2 + x)^3$

B. $y = (x + 1)(x - 2)^3$

C. $y = (x + 1)(2 - x)^3$

D. $y = (x - 1)(2 + x)^3$

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**Question 10**

Let $a = e^x$. Which expression is equal to $log_e(a^2)$?

(A) $e^{2x}$

(B) $e^{x^2}$

(C) $2x$

(D) $x^2$

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# Multiple Choice Answers

1: B
2: D
3: A
4: B
5: D
6: A
7: D
8: B
9: C
10: C