Mathematics 5 SN

Name : ___________________________________

MATHEMATICS 5 SN – ABSOLUTE VALUE

Question Booklet

1 Solve the following inequalities in $\Re$.

a) $|x - 5| \leq 12$

b) $|3x + 1| \leq -1$

c) $|7x - 3| \leq 3$

d) $|x + 1| - |-2| \leq |3|$

a) ___________________________

b) ___________________________

c) ___________________________

d) ___________________________

2 Solve the following inequation and plot the solution set on the real number line.

$$|2x + 3| \leq 1$$

Show your work.

Work

Result :

3

At the beginning of a laboratory experiment, the temperature of a substance is 29 °C. Throughout the experiment, the deviation in temperature must follow the formula :

$$|2x - 59| \leq 3$$

where x represents the temperature of the substance.

Between which values can the temperature vary?

Show your work.

Work

Result : ________________

4 Solve the following equation in $\Re$: $|6 - 3x| > 12$.

A) -∞, -2[

B) -∞, -2[∪]6, +∞

C)]6, +∞

D)]-2, 6[

5 Solve the inequality and express your answer in interval notation.

$$|2x - 1| - 2 \geq 0$$

A) $\left[\frac{-1}{2}, \frac{3}{2}\right]$

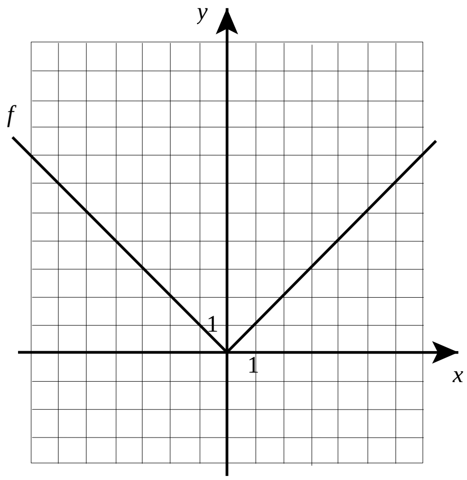
B) $\left[\frac{-3}{2}, \frac{1}{2}\right]$

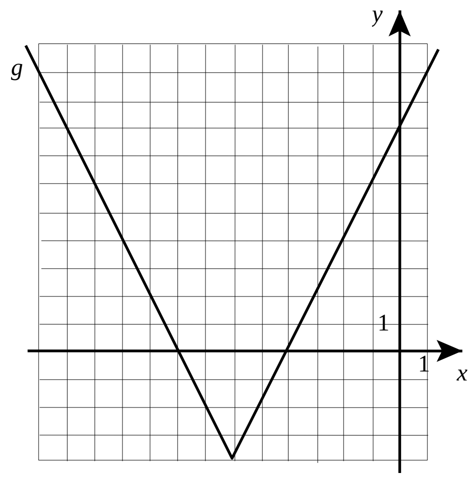
C) $-\infty, \frac{-1}{2}] \cup [\frac{3}{2}, +\infty$

D) $-\infty, \frac{-3}{2}] \cup [\frac{1}{2}, +\infty$

6

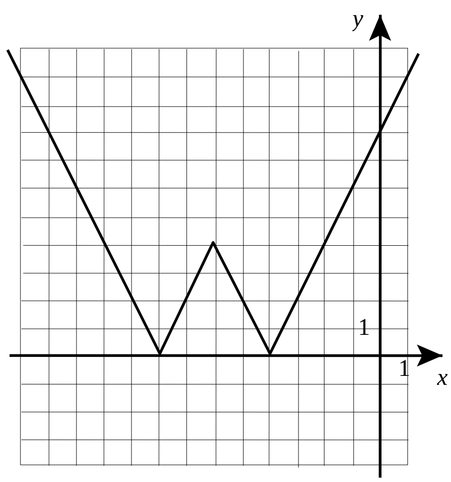
Functions *f* and *g* are represented below.



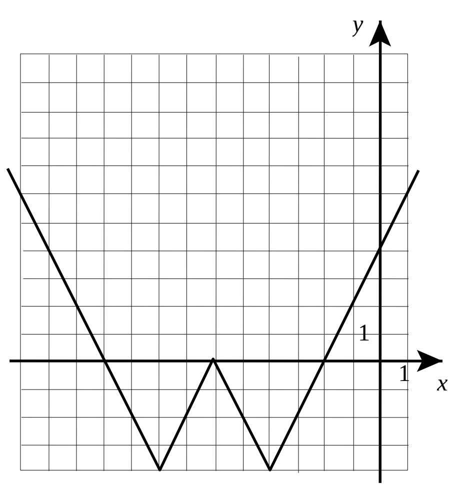


Which of the following is the graph of $f \circ g$?

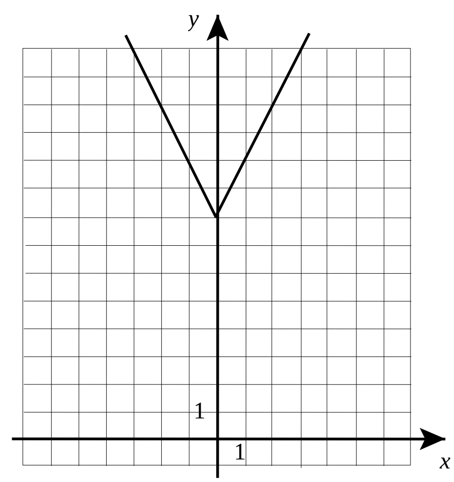
A)



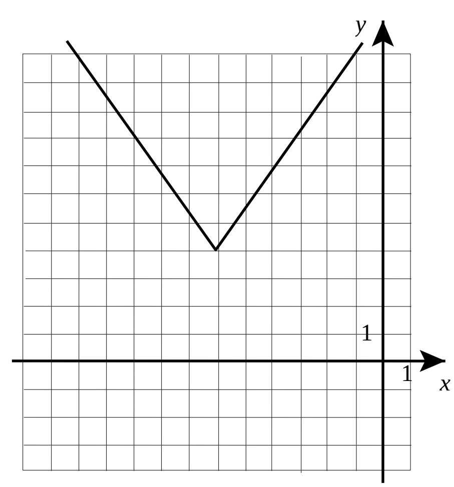
B)



C)



D)



7 Given $E(t) = (g \circ f)(t)$, where $f(t) = -2t + 7$ and $g(t) = 2|t - 1| + 6$.

What is the rule of correspondence of $E(t)$?

The rule of correspondence is $E(t)$ = ______________________________________.

8 A car's speed is a function of time, which can be represented by an absolute value function graph.

Dean's car goes from rest to a maximum speed of 150 km/h in 12 seconds and slows down at the same rate when he brakes.

For how many seconds is the speed of Dean's car at least 50 km/h but no more than 120 km/h?

Show all your work.

Show your work.

Answer The car's speed will be at least 50 km/h but no more than 120 km/h for ________ seconds.

9 Given the function $f(x) = 3x - 2$ and the function $g(x) = -4[-2x + 6] - 1$.

What is the rule of the composition $g \circ f$?

$(g \circ f) =$ ________________________________

10 Tom is competing on a Drag-Race track. Starting from rest, his car speeds up at a constant rate, reaching a maximum speed of 150 km/h in 12 seconds. Tom brakes and the car slows down at the same rate.

This situation is described by an absolute value function whose rule is

$$S(t) = -\frac{150}{12} \mid t - 12 \mid + 150$$

where S represents the speed of his car (km/h) as a function of the time t (sec.).

For how long is his car's speed at least 50 km/h?

A) 8 sec.

B) 10 sec.

C) 16 sec.

D) 18 sec.

2- Correction key

$\boxed{1}$ a) [-7, 17]   b) $\left[\frac{-2}{3}, 0\right]$ c) $\left]0, \frac{6}{7}\right[$ d) $\varnothing$

$\boxed{2}$ Work : (example)

$|2x + 3| \leq 1$

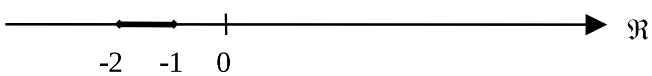
$-1 \leq 2x + 3 \leq 1$

$-1 - 3$ # $2x \leq 1 - 3$

$-4 \leq 2x \leq -2$

$-2 \leq x \leq -1$

Résultat :



3 Work : (example)

Known | Unknown

Range = $|2x - 59| \leq 3$ x = Temperature

$|2x - 59| \leq 3$

$|2x - 59| \leq 3$

$-3 \leq 2x - 59 \leq 3$

$56 \leq 2x \leq 62$

$28 \leq x \leq 31$

Result : $28 \leq x \leq 31$

4 B

5 C

6 A

7 The rule of correspondence is $E(t) = 4|t - 3| + 6$.

Accept any equivalent equation.

8 Example of an acceptable solution

Equation with the vertex

$y = a|x - h| + k$

$y = a|x - 12| + 150$

Passing through (0,0)

$0 = a|0 - 12| + 150$

$a = -12.5$

$y = -12.5|x - 12| + 150$

Time at 50 km/h

$50 = -12.5|x - 12| + 150$

$8 = |x - 12|$

$(x - 12) = 8$ or $-(x - 12) = 8$

$x = 20$ sec $x = 4$ sec

Time at 120 km/h

$120 = -12.5|x - 12| + 150$

$2.4 = |x - 12|$

$(x - 12) = 2.4$ or $-(x - 12) = 2.4$

$x = 14.4$ sec $x = 9.6$ sec

Time between 50 km/h and 120 km/h

9.6 sec – 4 sec = 5.6 seconds

20 sec – 14.4 sec = 5.6 seconds

Answer: The car's speed will be at least 50 km/h but no more than 120 km/h for 11.2 seconds.

9 $(g \circ f) = -4[-6x + 10] - 1$ or $(g \circ f) = -4\left[-6\left(x - \frac{5}{3}\right)\right] - 1$

10 C