Problem 1 *Let* $f(x) = \begin{cases} x^2 - 2x + 4 & , \quad x \leq 1 \\ -x + 3 & , \quad 1 < x \leq 3 \\ (x+2)^2 - 25 & , \quad x > 3 \end{cases}$.

Find the numbers at which f is discontinuous: $x =$?
(If no such numbers exist, enter "None")

At which of these points of discontinuity is f continuous from the right?
$x =$? *(If no such numbers exist, enter "None")*

At which of these points of discontinuity is f continuous from the left?
$x =$? *(If no such numbers exist, enter "None")*

Problem 2 *Let* $f(x) = \begin{cases} (x-1)^2 - 5 & , \quad x \leq -2 \\ -x + 1 & , \quad -2 < x \leq 2 \\ x^2 - x - 3 & , \quad x > 2 \end{cases}$.

Find the numbers at which f is discontinuous: $x =$?
(If no such numbers exist, enter "None")

At which of these points of discontinuity is f continuous from the right?
$x =$? *(If no such numbers exist, enter "None")*

At which of these points of discontinuity is f continuous from the left?
$x =$? *(If no such numbers exist, enter "None")*

Problem 3 *Let* $f(x) = \begin{cases} x^2 - 1 & , \quad x \leq 2 \\ -x + 4 & , \quad 2 < x \leq 4 \\ x^2 - 16 & , \quad x > 4 \end{cases}$.

Find the numbers at which f is discontinuous: $x =$?
(If no such numbers exist, enter "None")

At which of these points of discontinuity is f continuous from the right?
$x =$? *(If no such numbers exist, enter "None")*

At which of these points of discontinuity is f continuous from the left?
$x =$? *(If no such numbers exist, enter "None")*

Problem 4 *Let* $f(x) = \begin{cases} x + 6 & , \quad x < 1 \\ e^x & , \quad 1 \leq x \leq 6 \\ (x+6)^2 & , \quad x > 6 \end{cases}$.

Find the numbers at which f is discontinuous: $x =$?
(If no such numbers exist, enter "None")

At which of these points of discontinuity is f continuous from the right?
$x =$? *(If no such numbers exist, enter "None")*

At which of these points of discontinuity is f continuous from the left?
$x =$? *(If no such numbers exist, enter "None")*

Problem 5 *Let* $f(x) = \begin{cases} -x+2 & , \quad x < 3 \\ \cos(x) & , \quad 3 \le x \le 8 \\ x-2 & , \quad x > 8 \end{cases}$.

Find the numbers at which f is discontinuous: $x =$?
(If no such numbers exist, enter "None")

At which of these points of discontinuity is f continuous from the right?
$x =$? *(If no such numbers exist, enter "None")*

At which of these points of discontinuity is f continuous from the left?
$x =$? *(If no such numbers exist, enter "None")*

Problem 6 *Determine if the limit approaches a finite number, infinity, or does not exist. (If the limit does not exist, write DNE)*

$$\lim_{x \to 3} -5\left(x^3 + 2\,x^2 - 13\,x + 10\right)\sin\left(\frac{2}{3}\,\pi x\right) = \boxed{?}$$

Problem 7 *Determine if the limit approaches a finite number, infinity, or does not exist. (If the limit does not exist, write DNE)*

$$\lim_{x \to -3} -2\,(x+2)(x-1)\cos(\pi x) = \boxed{?}$$

Problem 8 *Determine if the limit approaches a finite number, infinity, or does not exist. (If the limit does not exist, write DNE)*

$$\lim_{x \to -3} 3\left(x^3 - x^2 - 5\,x - 3\right)\tan(-\pi x) = \boxed{?}$$

Problem 9 *Let* $f(x) = \begin{cases} x^2 - x + 3 & , \quad x \le -1 \\ (x+3)^2 & , \quad -1 < x \le 2 \\ x^2 + x + 19 & , \quad x > 2 \end{cases}$.

Find the numbers at which f is discontinuous: $x =$?
(If no such numbers exist, enter "None")

At which of these points of discontinuity is f continuous from the right?
$x =$? *(If no such numbers exist, enter "None")*

At which of these points of discontinuity is f continuous from the left?
$x =$? *(If no such numbers exist, enter "None")*

Problem 10 *Let* $f(x) = \begin{cases} x - 6 & , \quad x < 1 \\ \cos(x) & , \quad 1 \le x \le 6 \\ (x-6)^2 & , \quad x > 6 \end{cases}$.

Find the numbers at which f is discontinuous: $x =$?
(If no such numbers exist, enter "None")

At which of these points of discontinuity is f continuous from the right?
$x =$? *(If no such numbers exist, enter "None")*

At which of these points of discontinuity is f continuous from the left?
$x =$? *(If no such numbers exist, enter "None")*

Problem 11 *Determine if the limit approaches a finite number, $\pm\infty$, or does not exist. (If the limit does not exist, write DNE)*

$$\lim_{x \to -5} \frac{x^2 - 25}{x + 5} = \boxed{?}$$

Problem 12 *Determine if the limit approaches a finite number, infinity, or does not exist. (If the limit does not exist, write DNE)*

$$\lim_{x \to +\infty} \frac{x^3 + 3\,x^2 - 6\,x - 8}{x^2 + 2\,x - 8} = \boxed{?}$$

Problem 13 *Determine if the limit approaches a finite number, infinity, or does not exist. (If the limit does not exist, write DNE)*

$$\lim_{x \to -\infty} \frac{x^3 - 9\,x^2 + 15\,x + 25}{x^2 + 7\,x + 12} = \boxed{?}$$

Problem 14 *Determine if the limit approaches a finite number, $\pm\infty$, or does not exist. (If the limit does not exist, write DNE)*

$$\lim_{x \to -8^+} -\frac{15}{(x+8)^2} = \boxed{?}$$

Problem 15 *Determine if the limit approaches a finite number, $\pm\infty$, or does not exist. (If the limit does not exist, write DNE)*

$$\lim_{x \to \infty} -\frac{\sqrt{x^6 - 4} + 1}{2\,x^3 - 1} = \boxed{?}$$
