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VCE Specialist Mathematics ½

Modulus & Partial Fractions [1.1]

Test Solutions

Results:

Test	_____ / 18

Section A: Test Questions (18 Marks)

INSTRUCTION: 18 Marks. 18 Minutes Writing.

Question 1 (3 marks)

Tick whether the following statements are **true** or **false.**

	True	False
a. The modulus function simply finds the size of a number inside.	✓	
b. $\lvert x\rvert = \left(\sqrt{x}\right)^2$		✓
c. $\lvert a+b\rvert$ can be interpreted as a distance between a and b.		✓
d. Graph of $y = \lvert x-2\rvert + 4$ has a range of $[4, \infty)$.	✓	
e. Graph of $y = f(-\lvert x\rvert)$ has a domain of $x \in (-\infty, 0]$.		✓
f. For $b < 0$, $\frac{1}{x(x^2-b)}$ is split into $\frac{A}{x} + \frac{Bx+C}{x^2-b}$.	✓	

Space for Personal Notes

Question 2 (2 marks)

Find all values of x for which $|2x + 1| = 2$.

```
Solve[Abs[2 x + 1] == 2, x]
```

풀이 함수 절대 값

Solve: Inverse functions are being u

$$\left\{\left\{x \to -\frac{3}{2}\right\}, \left\{x \to \frac{1}{2}\right\}\right\}$$

Question 3 (2 marks)

Find all values of x for which $|5 - 2x| < 2$.

```
Reduce[Abs[5 - 2 x] < 2, x, Reals]
```

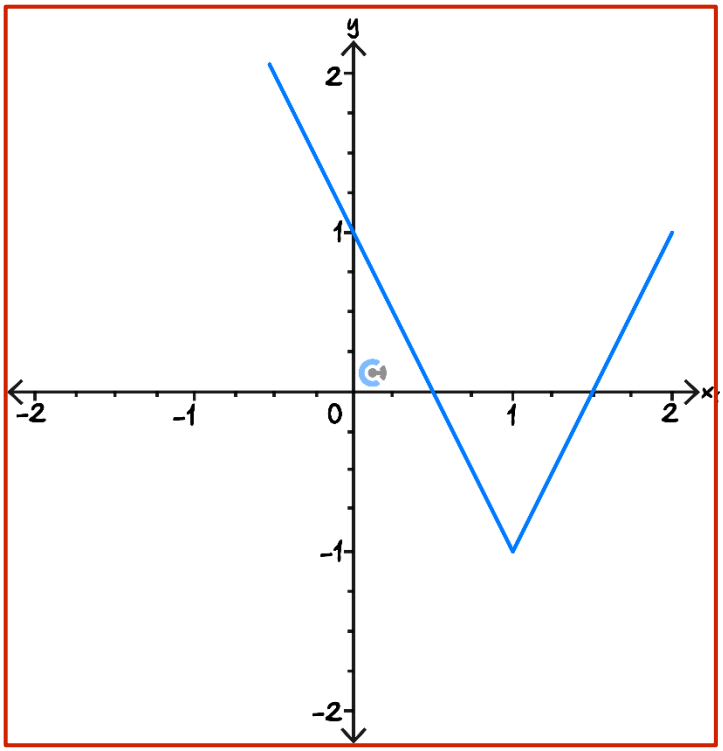
간략 절대 값 실수 영역

$$\frac{3}{2} < x < \frac{7}{2}$$

Question 4 (3 marks)

Consider the function given by $f(x) = 2|x - 1| - 1$.

Sketch the graph of $y = f(x)$ on the axes below. Label the vertex and all axis intercepts.




```
Solve[2 Abs[x - 1] - 1 == 0, x]
```
풀이 함수 절대 값

Solve: Inverse functions are being used by Solve, so some solutions may not be fo

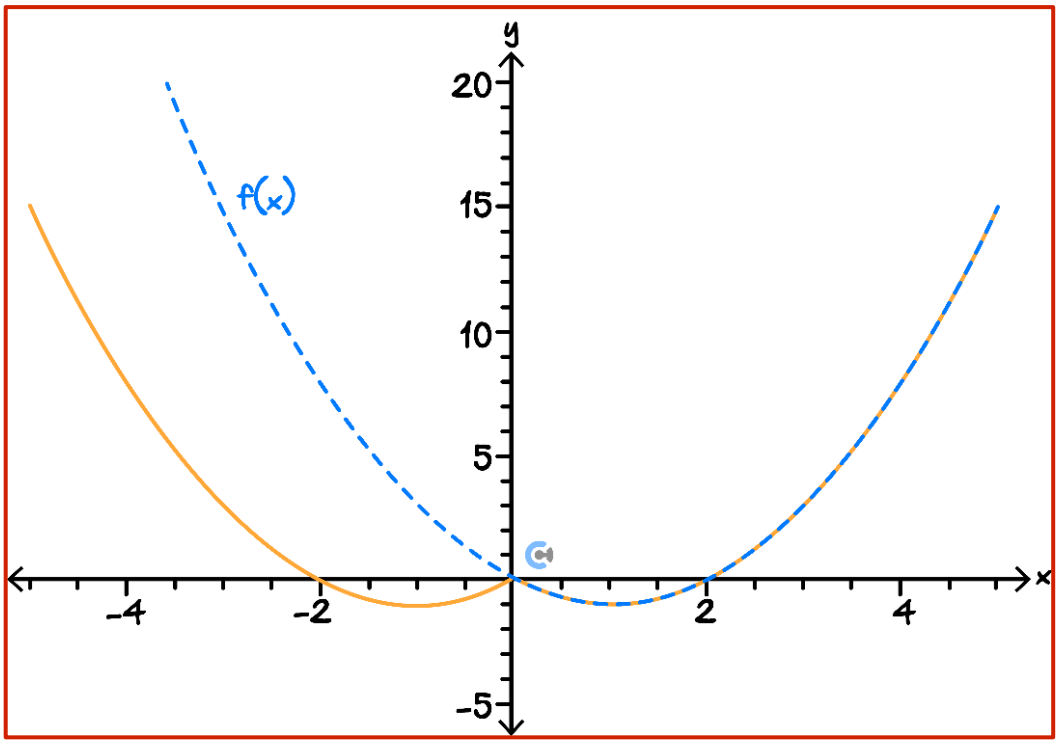
$$\left\{\left\{x \to \frac{1}{2}\right\}, \left\{x \to \frac{3}{2}\right\}\right\}$$

```
Plot[2 Abs[x - 1] - 1, {x, -10, 10}, PlotRange → {-10, 10}]
```
플롯 절대 값 플롯 범위

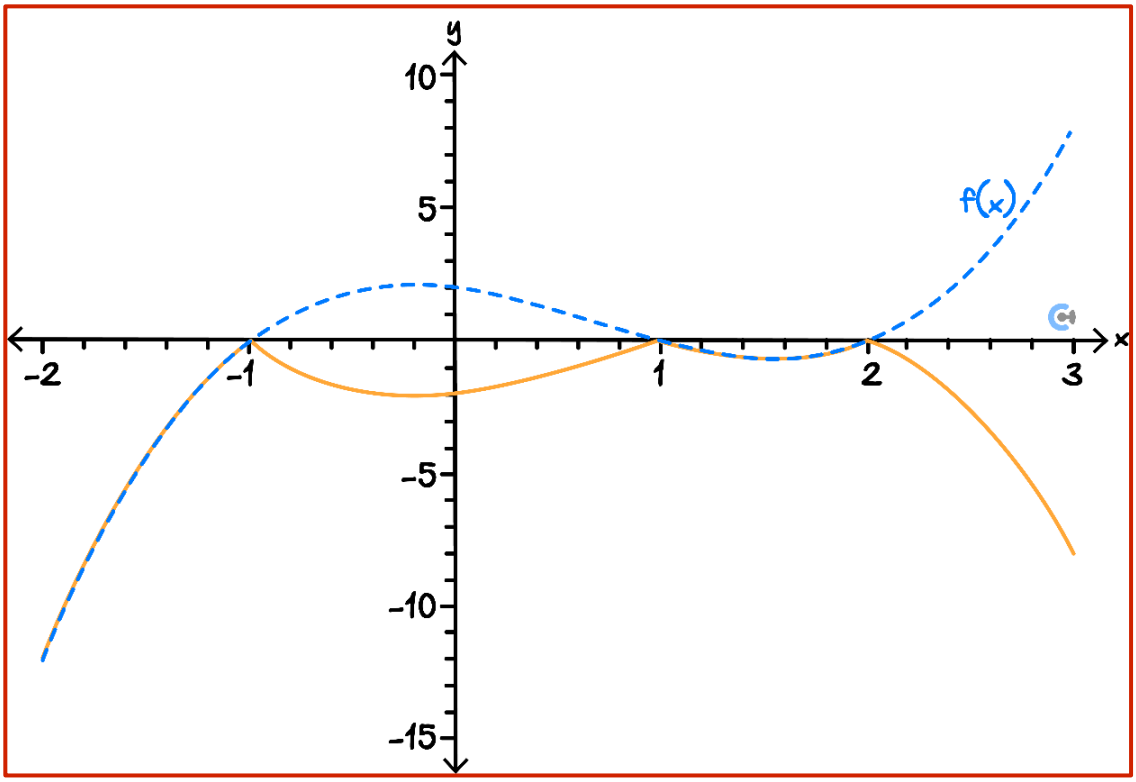
Space for Personal Notes

Question 5 (4 marks)

a. Consider the graph of $y = f(x)$ shown on the axes below. Sketch the graph of $y = f(|x|)$ on the same axes. (2 marks)



b. Consider the graph of $y = f(x)$ shown on the axes below. Sketch the graph of $y = -|f(x)|$ on the same axes. (2 marks)



Question 6 (4 marks)

Perform partial fraction decomposition to the following fractions.

a. $\frac{5x+1}{(x-1)(x+2)}$ (2 marks)

$$\frac{5x+1}{(x-1)(x+2)}$$

$$\frac{2}{-1+x}+\frac{3}{2+x}$$

b. $\frac{x^2-2}{x(x^2+2)}$ (2 marks)

$$-\frac{1}{x}+\frac{2x}{2+x^2}$$

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