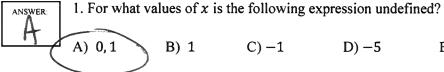
- Unless otherwise stated, all variables belong to the real number set
- All restrictions must be stated

B) 1

Calculators are permitted

Part A - Multiple Choice (1 mark each)



- C) -1
- D) -5



2. How many of the following rational expressions do not have any restrictions on the variable?



- A) 0

- F) 5
- G) 6



3. Simplify completely

- A) $1, x \neq \frac{3}{4}$ B) $-1, x \neq \frac{3}{4}$ C) $-1, x \neq \frac{4}{3}$ D) $1, x \neq \frac{4}{3}$ E) $0, x \neq \frac{4}{3}$



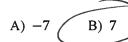
4. Which of the following is equivalent to $\frac{20xy-8y^2+4y}{4y}$?

A) 5x-2y+1B) 5xy-2y+1C) 5xy-2yD) $10xy-4y^2$ E) 5xy+1F) $5xy-2y^2$



5. When simplified, $\frac{3x^2-5x-12}{x-3} = Ax + B$. What is the value of A + B?

A) -7B) 7C) -1D) -6E) 6F) None of the above





6. Simplify completely $\frac{15a^6}{7b^4} \cdot \frac{28b^6}{3a^8}$



- B) $\frac{20}{a^2b^2}$ C) $\frac{a^2}{20b^2}$ D) $\frac{45a^{14}}{196b^{10}}$





7. For what values of x is the following expression equal to zero?

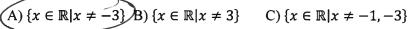
- A) 2
- B) 3, 2, -1

- F) None of the above

8 marks



8. What is the domain for the following rational function? $f(x) = \frac{x^2 + 4x + 3}{x^2 + 6x + 9}$



- D) $\{x \in \mathbb{R} | x \neq 1, 3\}$ E) $\{x \in \mathbb{R} | x \neq 6, -9\}$ F) $\{x \in \mathbb{R}\}$

Part B - Full Solutions

1. Simplify and state all restrictions:

a)
$$\frac{-4(x-7)(2x+1)(x+3)}{20(2x+1)(x-7)}$$



 $=\frac{-(\chi+3)}{5}, \chi \neq \frac{1}{2}, 7$

 $=-\frac{\chi+2}{\chi^2+4}$, $\chi \neq 5$

c)
$$\frac{x^4 - x^2 - 12}{2x^2 + x - 10}$$

$$=\frac{(\chi^{2}-4)(\chi^{2}+3)}{(2\chi+5)(\chi-2)}, \chi \neq -\frac{5}{2}, 2$$

$$= \frac{(x-2)(x+2)(x^2+3)}{(2x+5)(x-2)}$$

$$= \frac{(\chi+2)(\chi^2+3)}{2\chi+5}, \ \chi \neq \frac{-5}{2}, 2$$

d)
$$\frac{2x^3+12x^2+16x}{6x+24} \cdot \frac{x-1}{8x^3+16x^2}$$

$$=\frac{2\times\left(\chi^{2}+6\chi+8\right)}{6\left(\chi+4\right)}\cdot\frac{\chi-1}{8\chi^{2}\left(\chi+2\right)}$$

=
$$\frac{3x(x+2)(x+4)}{6(x+4)} \cdot \frac{x-1}{8x^2(x+2)}$$
, $x \neq -4,0,-2$

$$=\frac{\chi-1}{24\chi}, \chi\neq-4,-2,0$$

e)
$$\frac{100x^2-9}{3x^2-30x+75} \cdot \frac{x^2-15x+50}{-30x+9}$$

$$=\frac{(10x-3)(10x+3)}{3(x^2-10x+25)}\cdot\frac{(x-5)(x-10)}{-3(10x-3)}$$

$$=\frac{(10x-3)(10x+3)}{3(x-5)^{2}}\cdot\frac{(3-5)(x-10)}{-3(10x-3)}, x \neq 5, \frac{3}{10}$$

$$=-\frac{(10x+3)(x-10)}{9(x-5)}, x \neq \frac{3}{10}, 5$$