

**QUESTION 1**1.1 Solve, for  $x \in \mathbb{R}$ :

- (a)
- $2e^x - 7 + 6e^{-x} = 0$
- , expressing your answers in exact form using logs

$$\therefore 2e^{2x} - 7e^x + 6 = 0$$

$$\therefore (2e^x - 3)(e^x - 2) = 0$$

$$\therefore e^x = \frac{3}{2} \text{ or } e^x = 2$$

$$\therefore x = \ln \frac{3}{2} \text{ or } x = \ln 2$$

- (b)
- $|2x + 3| = 5x - 2$

$$|2x + 3| = 5x - 2$$

$$2x + 3 = 5x - 2 \text{ or } 2x + 3 = -(5x - 2)$$

$$\therefore 5 = 3x \text{ or } 7x = -1$$

$$\therefore x = \frac{5}{3} \text{ or } x = -\frac{1}{7}$$

a check reveals that  $x = \frac{5}{3}$  only

- (c) Solve
- $\frac{(-x^2 - 5)(x^2 - 16)}{|x + 3|(x + 2)} \geq 0$

$$\frac{(-x^2 - 5)(x^2 - 16)}{|x + 3|(x + 2)} \geq 0$$

$$\therefore \frac{(-x^2 - 5)(x^2 - 16)}{(x + 2)} \geq 0$$

$$\therefore \frac{(x^2 - 16)}{(x + 2)} \leq 0$$

$$\therefore \frac{(x - 4)(x + 4)}{(x + 2)} \leq 0$$

$$\therefore x \leq -4 \text{ or } -2 < x \leq 4$$



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**Michael Rajnik**



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