Instructions

• Use black ink or ball-point pen.
• Answer all questions.
• Answer the questions in the spaces provided
  – there may be more space than you need.
• Diagrams are NOT accurately drawn, unless otherwise indicated.
• You must show all your working out.

Information

• The marks for each question are shown in brackets
  – use this as a guide as to how much time to spend on each question.

Advice

• Read each question carefully before you start to answer it.
• Keep an eye on the time.
• Try to answer every question.
• Check your answers if you have time at the end
1. Simplify fully \( \frac{x^2 + 5x}{x^2 + 7x + 10} \)

2. Simplify fully \( \frac{x^2 - x - 12}{x^2 - 9x + 20} \)

3. Simplify fully \( \frac{3x^2 + 9x}{x^2 - 9} \)

4. Simplify fully \( \frac{x + 4}{x^2 - 16} \)
5 Write \( \frac{3x^2 + 11x - 4}{x^2 + 3x - 4} \) in the form \( \frac{ax + b}{x + c} \) where \( a, b, \) and \( c \) are integers.

(Total for question 5 is 3 marks)

6 Write \( \frac{x^2 + 7x - 18}{2x^2 - x - 6} \) in the form \( \frac{x + a}{b + c} \) where \( a, b, \) and \( c \) are integers.

(Total for question 6 is 3 marks)
7  Simplify fully \( \frac{3x + 6}{x - 4} \div \frac{2x^2 + 9x + 10}{x^2 - 4x} \)

8  Simplify fully \( \frac{2x - 2}{x + 5} \div \frac{x^2 - 4x + 3}{2x^2 + 13x + 15} \)
9  Solve \( \frac{8}{x + 3} + \frac{3}{x + 8} = 1 \)

10  Solve \( \frac{8}{3x - 2} + \frac{6}{x + 1} = 2 \)
11 Solve \( \frac{2}{5-x} + \frac{3}{x+7} = 1 \)

12 Solve \( \frac{7}{x+1} - \frac{4}{3x-2} = 1 \)
13 Given that
\[ 2x + 1 : x + 2 = x + 8 : 3x - 4 \]

Find the possible values of \( x \).

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(Total for question 13 is 4 marks)

14 Given that
\[ x - 1 : 2x - 3 = x + 2 : 3x - 2 \]

Find the possible values of \( x \).

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(Total for question 14 is 4 marks)
15 Given that 
\[ \frac{x + 9}{5x - 1} = \frac{x + 7}{2x - 3} \]
Find the possible values of \( x \).

16 Given that 
\[ \frac{5 - 3x}{9 - x} = \frac{3x + 7}{4 - x} \]
Find the possible values of \( x \).