

Entrance test Mathematics Quarter 1

- Duration 30 minutes
- No calculator allowed

Problem 1: Fraction

Calculate and simplify as far as possible.

a. $\frac{3}{8} - \frac{1}{5} = \frac{15}{40} - \frac{8}{40} = \frac{7}{40}$ **1 point**

b. $\frac{10}{\frac{1}{2} \cdot \frac{1}{5}} = \frac{10}{\frac{1}{10}} = \frac{10}{\frac{1}{10}} = 10 \cdot \frac{10}{1} = \frac{100}{1} = 100$ **1 point**

Problem 2: Manipulation of variables

Process and simplify as far as possible, without broken or negative exponents.

a. $\frac{(ab^2)^3}{\sqrt{a^2b^{10}}} = \frac{a^3b^6}{ab^5} = \frac{a^3b^6}{ab^5} = a^2b$ **2 points**

Expand brackets and simplify as far as possible

a. $(x + 1)^2(x - 2) = (x^2 + 2x + 1)(x - 2)$
 $= x^3 + 2x^2 + x - 2x^2 - 4x - 2$
 $= x^3 - 3x - 2$ **4 points**

Problem 3: functions

Line l intersects the points A(2,5) and B(5,-1). Write the formula for line l .

$$y = ax + b$$

$$RC = \frac{y_a - y_b}{x_a - x_b} = \frac{5 - -1}{2 - 5} = \frac{6}{-3} = -2$$

$$y = -2x + b$$

$$A(2,5) \text{ fill in } \rightarrow 5 = -2 \cdot 2 + b \Leftrightarrow b = 9$$

$$y = -2x + 9$$

4 points

Problem 4: equation

Solve the following equations

a. $x^2 + 3x - 2 = 4x - 1$

$$x^2 - x - 1 = 0$$

$$D = (-1)^2 - 4 \cdot 1 \cdot -1 = 5$$

$$x = \frac{1 \pm \sqrt{5}}{2}$$

$$x = \frac{1}{2} - \frac{1}{2}\sqrt{5} \vee x = \frac{1}{2} + \frac{1}{2}\sqrt{5}$$

4 points

b. $x^3 - 7x^2 + 12x = 0$

$$x(x^2 - 7x + 12) = 0$$

$$x = 0 \vee x^2 - 7x + 12 = 0$$

$$x = 0 \vee (x - 3)(x - 4) = 0$$

$$x = 0 \vee x = 3 \vee x = 4$$

4 points

Maximum number of points: 20

Mark = Number of points / 2