Class Test ⟨ 1 ⟩

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Answer all questions. Show your working clearly.

1. Simplify the following fractions.

    (a) $\dfrac{(84pq^2 + 84q^3)(p - q)^2}{32p^3q - 32pq^3}$ [2]

    (b) $\dfrac{162a^2 - 2b^2}{36a^2 - 4ab}$ [2]

2. Given the formula $s = \dfrac{5pqr}{p - r} + 3$,

    (a) find s when $p = 7$, $q = -\dfrac{1}{2}$ and $r = 2$,   [1]

    (b) make p the subject of the formula,   [1]

    (c) find p when $q = 6$, $r = \dfrac{1}{3}$ and $s = 15$.   [1]

3. The volume of a pyramid is given by the formula $v = \dfrac{1}{6}lh\sqrt{\dfrac{9}{4}l^2}$, where v is the volume in cm^3, l is the length of the base in cm, and h is the height of the pyramid in cm.

    (a) Find the volume when the length of the base is 7 cm and the height is 12 cm.   [1]

    (b) Find an expression for the height of the pyramid, in terms of v and l.   [1]

    (c) Find the height of the pyramid if the length of the base is 4 cm and the volume is 121 cm^3.   [1]

4. Simplify the following fractions.

    (a) $\dfrac{-2a - 2b}{4} + \dfrac{ab}{2a - b}$ [2]

    (b) $\dfrac{2m + 5}{3m^2 + 14m - 5} - \dfrac{2}{m + 5}$ [2]

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5. Simplify the following fractions.

    (a) $\dfrac{5x^2(x-y)}{(6x^2y)^2} \div \dfrac{30x^2 - 30y^2}{64x^3}$ [2]

    (b) $\dfrac{\sqrt{25a^2b^2}}{35a^3} \times \dfrac{49ab^3}{\sqrt{100b^2}}$ [2]

6. Simplify the following fraction.

    $\dfrac{9x^2 - 25}{8x + 2} \div \left[\dfrac{3x}{4x + 1} - \dfrac{-5 - x}{(4x + 1)(x - 3)}\right]$ [2]

7. Given that $m = \dfrac{2x}{x + y}$ and $n = \dfrac{y^2 + xy}{(x + y)^2}$, find $\dfrac{2m - n}{m + 3}$ in terms of x and y.   [3]

8. In the following equations, make a the subject of the formula.

    (a) $3b(b - 5a) = 2a$ [1]

    (b) $c = \dfrac{5ab^2 - b}{a + c}$ [1]