PHYS 1022 Math Quiz Fall 2025

Please complete both sides of this sheet.

(1) Express 96/8 as single integer.

(2) Express $1/2 + 1/3$ as single fraction.

(3) Express 54 as the product of prime numbers.

(4) Identify the coefficient of t^2 in the expression $3t^3 - 2t^2 + 5t - 8$.

(5) Solve the equation $3x + 4 = 10$ for x.

(6) Solve the equation $4x^2 - 4x - 8 = 0$ for x.

(7) Express $(t + 1)(2t - 3)$ as a quadratic polynomial in t by multiplying it out.

(8) Simplify the expression $(z^2 - 1)/(z - 1)$.

(9) What is the first derivative with respect to t of the expression $x_0 + v_0 t + at^2/2$?

(10) In the following "proof" that $2 = 1$, mark the step in which the error is made:

- ☐ $a = b$
- ☐ $a^2 = ab$
- ☐ $a^2 - b^2 = ab - b^2$
- ☐ $(a - b)(a + b) = (a - b)b$
- ☐ $a + b = b$
- ☐ $2 = 1$

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Answers

(1) Express 96/8 as single integer. Answer: 12

(2) Express $1/2 + 1/3$ as single fraction. Answer: 5/6

(3) Express 54 as the product of prime numbers.

$$54 = 9 \times 6 = (3 \times 3) \times (3 \times 2) = 3^3 \times 2$$

(4) Identify the coefficient of t^2 in the expression $3t^3 - 2t^2 + 5t - 8$. Answer: -2

(5) Solve the equation $3x + 4 = 10$ for x. Answer: $x = 2$

(6) Solve the equation $4x^2 - 4x - 8 = 0$ for x. Answer: $x = 2, -1$

(7) Express $(t + 1)(2t - 3)$ as a quadratic polynomial in t by multiplying it out.

$$(t + 1)(2t - 3) = 2t^2 - 3t + 2t - 3 = 2t^2 - t - 3$$

(8) Simplify the expression $(z^2 - 1)/(z - 1)$.

$$\frac{z^2 - 1}{z - 1)} = \frac{(z - 1)(z + 1)}{z - 1)} = z + 1$$

(9) What is the first derivative with respect to t of the expression $x_0 + v_0 t + at^2/2$?

The answer is $v_0 + at$. Even if you're not familiar with calculus, you might have recognized that the given expression is the position as a function of time for something moving with constant acceleration a, so its velocity is $v_0 + at$.

(10) In the following "proof" that $2 = 1$, mark the step in which the error is made:

☐	$a = b$
☐	$a^2 = ab$
☐	$a^2 - b^2 = ab - b^2$
☐	$(a - b)(a + b) = (a - b)b$
✓	$a + b = b$
☐	$2 = 1$

I divided by zero in the checked step.