That is a comprehensive request! Here is a set of 30 practice problems covering the major topics in Year 7 Queensland Mathematics **Number and Algebra** strand.

🔢 Year 7 Number and Algebra Practice

1. Integers (5 Problems)

1. What is the result of the calculation: $-12 + 5$?
2. The temperature was 4°C in the morning, but dropped by 10°C by midnight. What was the temperature at midnight?
3. Which integer is the **farthest** from zero on the number line: $-9, 0, 7, -5$?
4. Calculate the difference between a debt of $\$50$ and a credit of $\$30$? (i.e., $30 - (-50)$).
5. If you start at -3 and subtract a further 6, what position do you land on?

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2. Rational Numbers (5 Problems)

1. Convert the fraction $\frac{3}{5}$ to a decimal and a percentage.
2. Calculate: $0.75 + \frac{1}{2}$. Give your answer as a decimal.
3. You buy a shirt that is $\$20$ off the original price of $\$60$. How much is the discount in dollars?
4. Multiply the following: $2\frac{1}{3} \times 6$.
5. A recipe requires 0.8 kg of flour. If you have $\frac{4}{5}$ kg of flour, do you have enough? (Yes or No).

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3. Prime Factors and Indices (5 Problems)

1. Write the number 48 as a product of its prime factors using index notation.
2. Calculate the value of 5^3.
3. Write the number $304,500$ in expanded notation using powers of 10 for the hundreds place only (i.e., how many hundreds are there?).
4. Find the **largest prime number** that is a factor of 35.
5. Simplify the expression: $2^4 \times 2^2$. Give your answer in index form.

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4. Rates, Ratios, and Financial Maths (5 Problems)

1. Simplify the ratio $15 : 25$ to its simplest form.
2. If a car travels 180 kilometres in 3 hours, what is its average rate of speed in kilometres per hour?

3. The ratio of blue paint to yellow paint is $2:5$. If you use 10 litres of yellow paint, how many litres of blue paint do you need?
4. A jacket costs $\$80$. If the price increases by 10, what is the new price of the jacket?
5. Share $\$90$ between two friends in the ratio $4:5$.

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5. Algebraic Expressions (5 Problems)

1. Write an algebraic expression for: "**Four times a number, x, plus seven**."
2. If $a = 3$ and $b = 4$, calculate the value of the expression $2a + b$.
3. A car rental costs $\$50$ plus $\$0.50$ per kilometre (k). Write a formula for the total cost (C).
4. If the side length of a square is s centimetres, write an expression for its perimeter.
5. Simplify the expression: $7x + 3y - 2x$.

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6. Linear Equations (5 Problems)

1. Solve for x: $x + 9 = 15$.
2. Solve for y: $4y = 28$.
3. Solve for m: $\frac{m}{2} = 11$.
4. Solve for k: $3k - 5 = 10$.
5. A number, p, is multiplied by 5 and then 2 is added. The result is 27. Write the equation and solve for p.

✅ Answers

1. Integers

1. -7 ($-12 + 5 = -7$)
2. $-6^\circ\mathrm{C}$ ($4 - 10 = -6$)
3. -9 (It is 9 units away from zero, which is the farthest.)
4. $\$80$ ($30 - (-50) = 30 + 50 = 80$)
5. -9 ($-3 - 6 = -9$)

2. Rational Numbers

1. 0.6 and 60 ($3 \div 5 = 0.6$; $0.6 \times 100 = 60\%$)
2. 1.25 ($0.75 + 0.5 = 1.25$ or $\frac{3}{4} + \frac{2}{4} = \frac{5}{4}$)
3. $\$12$ ($20\% \text{ of } 60 = 0.20 \times 60 = 12$)
4. \$ 14 ($\frac{7}{3} \times 6 = \frac{42}{3} = 14$)
5. **Yes** ($\frac{4}{5} = 0.8$, so you have exactly enough).

3. Prime Factors and Indices

1. $2^4 \times 3$ ($48 = 16 \times 3 = 2^4 \times 3$)
2. 125 ($5 \times 5 \times 5 = 125$)
3. $3 \times 10^5 + 0 \times 10^4 + 4 \times 10^3 + 5 \times 10^2 + 0 \times 10^1 + 0 \times 10^0$ (The hundreds place is 5×10^2 or 5 hundreds)
4. 7 (Prime factors of 35 are 5 and 7)
5. 2^6 (Index Law: $a^m \times a^n = a^{m+n}$; $4 + 2 = 6$)

4. Rates, Ratios, and Financial Maths

1. $3 : 5$ (Divide both sides by the common factor of 5)
2. 60 km/h ($180 \div 3 = 60$)
3. 4 litres (The ratio $2{:}5$ means 5 parts equals 10 litres, so 1 part equals 2 litres. Therefore, 2 parts for blue paint equals $2 \times 2 = 4$ litres).
4. $\$88$ ($10\% \text{ of } 80 = 8$; $80 + 8 = 88$)
5. $\$40$ and $\$50$ (Total parts: $4 + 5 = 9$. Value of 1 part: $90 \div 9 = 10$. Friend 1: $4 \times 10 = 40$. Friend 2: $5 \times 10 = 50$).

5. Algebraic Expressions

1. $4x + 7$
2. 10 ($2(3) + 4 = 6 + 4 = 10$)
3. $C = 50 + 0.50k$
4. $4s$
5. $5x + 3y$ (Only the terms with the same variable, x, can be combined: $7\text{x} - 2\text{x} = 5\text{x}$)

6. Linear Equations

1. $x = 6$$ (Subtract 9 from both sides)
2. $y = 7$ (Divide both sides by 4)
3. $m = 22$ (Multiply both sides by 2)
4. $k = 5$ (Add 5 to both sides: $3\text{k} = 15$; then divide by 3: $\text{k} = 5$)
5. Equation: $5p + 2 = 27$. Solution: $p = 5$. ($5\text{p} = 25$, so $\text{p} = 5$).

These questions cover all the main introductory topics for high school math in Year 7. Let me know if you'd like practice problems for **Measurement and Geometry** or **Statistics and Probability** next!