Part 1. Math Practice Test - Algebra

This practice test is based off the Alexander College Math Placement Test Study Guide, but is not comprehensive of that study guide. The study guide can be found at https://alexandercollege.ca/admissions-and-registration/placement-testing/. It is highly encouraged you read through the study guide in addition to this test.

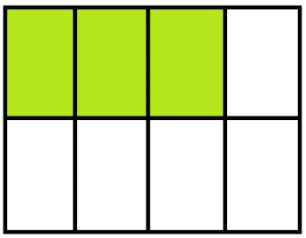
Do not use a calculator

1) Identify the property used in the following expressions (associative, commutative, distributive)
   a. $18x + 2 = x * 18 + 2$
   b. $3 + (2 - x) = (3 + 2) - x$
   c. $-(7x - 1) = -7x + 1$

2) Perform the indicated operation:
   a. $\frac{1}{3} + \frac{3}{4}$
   b. $1.5 - 0.75$
   c. $0.7 * \frac{1}{8} + 1$
   d. $0.82 + \frac{5}{7}$

3) Solve the following problems:
   a. Convert 82% into a fraction with the smallest possible denominator

b. What percentage of the shape below is shaded?



4) Simplify the following expressions:

a. $\sqrt[3]{x} + \sqrt[3]{x}$

b. $\frac{\sqrt[3]{x}}{x}$

c. $\sqrt{2x}\sqrt{x}$

d. $\sqrt{4x^4}$

5) Rationalize the following expressions:

a. $\frac{2}{\sqrt{3x}}$

b. $\frac{1}{\sqrt{x}+\sqrt{3x^3}}$

c. $\frac{x+\sqrt{x}}{\sqrt{x}}$

6) Solve the following problems:

a. Find the lowest common denominator of $\frac{1}{3}$ and $\frac{1}{5}$

b. Find the lowest common denominator of $\frac{1}{2}$ and $\frac{1}{8}$

c. Put $\frac{30}{3\times2}$ into simplest terms

7) Simplify the following expressions:

a. x^2x^3

b. $\frac{x}{x^2}$

c. $2x^2+\frac{x^4}{x^2}$

d. $\frac{(2x-2x^2)^2}{4(x-x^2)}$

8) Solve the following problems:

a. To encourage customers to buy in bulk, a grocery store offers the following prices: 1 bag of potatoes for $10, or 3 bags of potatoes for $20. Assuming the price increases linearly, how much does it cost for 5 bags of potatoes?

b. A farmer can only see the legs of their cows and chickens beneath a fence. They count a total of 50 legs and have a total of 16 animals. How many of the animals are cows, and how many are chickens?

c. A customer forgot how much they paid for food at a restaurant, but they remember that they tipped 10% and the total amount of the tip was $3.50. How much was the food?

9) Perform the following operations and simplify:

a. $\left(4x^2 + \frac{1}{2}x\right) + \left(-x^2 + \frac{1}{2}x\right)$

b. $(x-1)(x+1)$

c. $(x-1)(x+1)^2$

d. $\frac{4x^2+x}{-x+1}$ (for help: https://www.purplemath.com/modules/polydiv2.htm)

e. $\frac{(2x+2)^2}{4(x-2)+4(x-1)}$

10) Factor the following polynomials

a. $x^2 + 5x + 4$

b. $9x^2 + 39x + 12$

c. $2x^2 + 9x + 5$

11) Perform the following operations and simplify

a. $\frac{\sqrt{(x+1)(x+1)}}{5(x+1)}$

b. $\frac{x\sqrt{x}}{2} + \frac{2}{\sqrt{x}}$

c. $\frac{2x^2+3x-5}{x-1}$

d. $\frac{2x^2-x-3}{x+1} * \frac{x^2+8}{2x-3}$