PRE-REQUISITE SKILLS FOR MATH 117

The following problems reflect the skills and understandings needed prior to beginning Math 117. You should be able to complete each of these problems easily without referring to a textbook. All problems should be completed without a calculator except those with an asterisk indicating a calculator can be used.

The answer is provided after the problem statement.

If you have questions, you may want to consult an Intermediate Algebra textbook as the concepts and procedures associated with the problems are covered in an intermediate algebra course.

Part I: Arithmetic Skills

Please carefully work through the following arithmetic problems. Students must be able to perform addition, subtraction, multiplication and division with fractions *without a calculator!*

1. Simplify $\dfrac{7}{12} - \dfrac{5}{18}$

   Answer: $\dfrac{11}{36}$

2. Combine: $4\dfrac{7}{12} - 1\dfrac{5}{6}$

   Answer: $2\dfrac{3}{4}$

3. Divide: $10 \div \dfrac{5}{7}$

   Answer: 14

4. Divide: $4\dfrac{1}{2} \div 1\dfrac{5}{7}$

   Answer: $2\dfrac{5}{8}$

5. Simplify: $\dfrac{\dfrac{3}{4}}{\dfrac{1}{8}}$

   Answer: 6

6. Evaluate: $\dfrac{\dfrac{7}{8}}{-21}$

   Answer: $\dfrac{-1}{24}$

7. Evaluate: 3^{-2}

   Answer: $\dfrac{1}{9}$

8. Evaluate: -3^2 Answer: -9

9. A rectangle has a length 6 more than half the width. The perimeter is 24 meters. Find its length.   Answer: 8 meters.

10.* Find area of a circular sign whose radius is 7.00 ft. Round to nearest tenth.

                                             Answer: 153.9 sq. ft.

11. A box has a volume of 1320 cubic meters. If the height is 11 and the width is 10 meters, find the length.

                                             Answer: 12 meters

12. *   Find the diameter of a circle whose circumference is 25.12 meters
             (use $\pi \approx 3.14$)

                                             Answer: 8 m

Part II: Intermediate Algebra Problems

1.   Solve: $9x^2 + 6x = 1$ Answer: $x = \dfrac{-1 \pm \sqrt{2}}{3}$

2.   Solve: $(x-3)(x+5) = 2$ Answer: $x = -1 \pm 3\sqrt{2}$

3.   Simplify: $\dfrac{\dfrac{1}{a} - \dfrac{1}{b}}{\dfrac{a}{b} - \dfrac{b}{a}}$ Answer: $\dfrac{-1}{a + b}$

4.   Rationalize the denominator: $\dfrac{4}{\sqrt{6} - \sqrt{5}}$ Answer: $4\left(\sqrt{6} + \sqrt{5}\right)$

5.   Find the distance between the points: $(-4, 4)$ and $(-2, 9)$ Answer: $\sqrt{29}$

6.   Solve: $\dfrac{x-2}{5} - \dfrac{x-4}{2} = 2 + \dfrac{x+4}{10}$ Answer: $x = -2$

7.   Solve for y: $5x - 7y = 15$ Answer: $y = \dfrac{5}{7}x - \dfrac{15}{7}$

8.   Solve for P; $A = P + Prt$ Answer: $P = \dfrac{A}{1 + rt}$

9.   Factor completely: $u^2(u-v) - v^2(u-v)$ Answer: $(u-v)^2(u+v)$

10.   Subtract: $\dfrac{2}{3x-5} - 8$ Answer: $\dfrac{6(7-4x)}{3x-5}$

11.   Subtract: $\dfrac{3t-2}{t^2+4t-12} - \dfrac{5}{2t+12}$ Answer: $\dfrac{1}{2(t-2)}$

12.   Simplify: $\dfrac{6-x}{x-6}$ Answer: -1

13*.   A circle is inscribed in a square of side 14 cm. Determine the area outside the circle but inside the square. Approximate to nearest tenth.

                                      Answer: 42.06 sq. cm.

14.   Solve: $3 - 2x \geq 8$ Answer: $x \leq {}^{-5}\!/_2$

15.   Determine the equation of a line parallel to $x + 5y = 8$ and through

       $(-8, -1)$ Answer: $y = \dfrac{1}{5}x - \dfrac{13}{5}$

16.   Determine the equation of a vertical line through $(-8, -1)$
                                      Answer: $x = -8$

17.   Solve: $|x| > 4$ Answer: $x > 4$ or $x < -4$

18.   A fruit punch that contains 25 % fruit juice is combined with a fruit drink that contains 10 % fruit juice. How many ounces of each should be used to make 48 oz. of a mixture that is 15 % fruit juice?

         Answer: 16 oz. of 25 % juice, 32 oz. of 10 % fruit juice

19.   Nick and Tod rollerblade in opposite directions. Tod averages 2 mph faster than Nick. If they began at the same place and ended up 20 miles apart after 2 hours, how fast did Nick travel?

         Answer: 4 mph

20. If $f(x) = 2 - x^2$, determine $f(-3)$ Answer: -7

21. Solve: $\dfrac{x}{2x-1} = \dfrac{1}{x-2}$ Answer: $x = 2 \pm \sqrt{3}$

22. Let $f(x) = -2x^2 + 80x - 600$. Determine the vertex of this quadratic function.

         Answer: $(20,\ 200)$

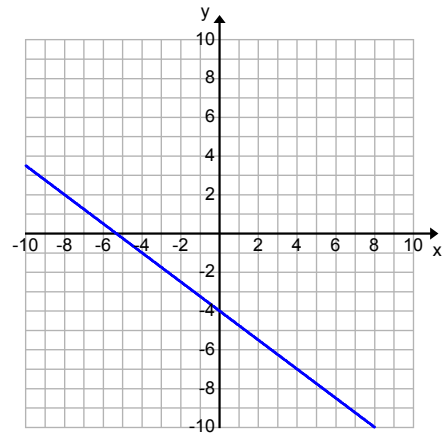23. Let $f(x) = -2x^2 + 80x - 600$. Determine the $x-$intercepts.

         Answer: $(10,\ 0)$ and $(30,\ 0)$

24. Evaluate: $-16^{\frac{1}{4}}$ Answer: -2

25. Evaluate: $16^{-\frac{1}{4}}$ Answer: $\dfrac{1}{2}$

26. Graph $3x + 4y = -16$

         Answer:

27. Factor: $x^3 - 27$ Answer: $(x-3)(x^2 + 3x + 9)$

28. Find the leg of a right triangle whose hypotenuse is 7 cm and whose other leg is 3 cm.   Answer: $2\sqrt{10}$ cm.