Diagnostic Test

This diagnostic test covers some of the prerequisite material. You should give yourself this test and then check your answers with the solution sheet (pg.5)

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1. Three kinds of apples are all mixed up in a basket. How many apples must you draw (without looking) from basket to be sure of getting two apples of one kind?

2. There are 150 people in a class. If 80% of them are registered, how many are not registered?

3. Express "three-fifths" as a fractions, a decimal, and as a percentage.

4. Evaluate each of the following if a = 4, b = $\frac{2}{5}$, c = - 6:

a(b+c) ab + c$\frac{a}{b}$ - c 5b - 3c^2

5. Evaluate the following expressions on your calculator:

a) (250 / (34 + 56)) x 2 b) $23 \cdot \frac{5}{7}$ + $6.3 \cdot 4^5$ c) $3\sqrt{32}$ - $\sqrt{15}$

6. Simplify:

a) $\frac{x^5 x^2}{x^{-3}}$ b) $(x^{-2} y^3)^2$ c) $(x^{-5} y^4)^2 (x^0 y^{-2})^2$

7. If there are 1.24 US dollars in one Euro, which is smaller, one US dollar, or one Euro?

8. One number is 6 times a second number. Find the numbers if their difference is 102.

9. If you drive at an average speed of 65 miles per hour, how long will it take you to drive 530 miles? If you can bike a distance of 45 miles in three hours and 15 minutes, what is your average biking speed in miles per hour?

10. The length of a rectangle is 14 inches more than its width. If the area is 72 square inches, find the length and width of the rectangle.

11. Suppose that three-quarters of the freshmen live in a dorm. If two-thirds of the freshmen dorm residents are women, what percentage of the freshman class are women who live in the dorm?

12. Solve for x in the following equations:

a) $3x - 5 = 9 + 7x$ b) $x^2 - 5 = 31$ c) $x^2 - x - 12 = 0$

d) $\frac{x-3}{5} = \frac{x}{2}$ e) $|x+3| = 10$

13. Solve for x and y: a) $3x - 2y = 5$ b) $x + y = 7$.

14. Graph the line $5x - 2y = 6$. What is the y-intercept?

15. A warehouse may contain bicycles, tricycles, and cars. Altogether there are 18 wheels in the warehouse. How many bicycles, tricycles, and cars are there? Give as many answers as possible.

16. The playground drawn below is in the shape of a rectangle with a semicircle attached as shown. Suppose that the longer side of the rectangle is twice the length of the shorter side and that the radius of the semicircle is 12 feet. What is the perimeter and the area of the playground?

17. Suppose that the ratio of undergraduate students to graduate students in an institution
is 20:7. What percentage of the student body are graduate students?

18. Suppose that your annual tuition as a freshmen was $5,300. Each year tuition has increased 4%. Now you are in your senior year. What is your annual tuition this year?

19. The company you work for was doing poorly two years ago and as a result everyone took a 10% cut in pay for the last year. The company is doing better now and the CEO has just promised to raise everyones salary 10% for next year. Does this mean that your salary next year will be same as it was two years ago? Explain.
(Hint: Think about $50,000 salary.)

20. Find the slope, x-intercept, and y-intercept: $7y - 2x = 15$. Graph the line.

21. Solve the following equations:

a) $2x^4 = 162$ b) $2x^5 - 6 = 17$ c) $\sqrt{5x-7} = 13$

d) $(4 - 5x)^{1/7} = -13$

22. Determine any errors made in the work shown below. Then explain the mistake made.

a) $\frac{3(-5)+x(3)}{3} = 1 \Rightarrow$ "cancel 3"

$-5 + 3x = 1 \Rightarrow$ "add +5 to both sides"

$3x = 6 \Rightarrow$ "subtract 3 from both sides"

$x = 3$

b) $2\left(\frac{x+3}{5}\right) = x \Rightarrow$ "add -3 to both sides"

$\frac{2(x)}{5} = x + -3 \Rightarrow$ "multiply by 5"

$2x = 5x - 15 \Rightarrow$ "subtract 2"

$x = 5x - 17 \Rightarrow$ "subtract 5x"

$-4x = -17 \Rightarrow$ "subtract - 4"

$x = -21$

c) $5(x^2 y^3) = 5x^2\ 5y^3 = 25x^2 y^3$

23. Solve: a) $y - 0.52y = 1.2$ b) $a + 7(3.5a) - 2 = \frac{3}{5}$

24. If a = 0.35, b = 1.47, c = - 4.76, find: $\frac{b - a\sqrt{1+2b^3 - c} - 1}{(a^2+1)^{-3}}$