MATH 01 - Arithmetic, Sec. B

Third test. Time allowed: one hour. Professor Luis Fernández

NAME: SOLUTION

INSTRUCTIONS: Solve the following 22 exercises. Each is worth 5 points. **You must show all your work** in order to receive any credit. This includes all **sums, long divisions,** etc.

1. How much is 31% of 54?

$$\frac{31 \cdot 54}{100} = \boxed{16.74}$$

$$\begin{array}{r} 54 \\ \times\ 31 \\ \hline 54 \\ 162 \\ \hline 1674 \end{array}$$

2. How much is 131% of 20?

$$\frac{131 \cdot 20}{100} = \boxed{26.2}$$

$$\begin{array}{r} 131 \\ \times\ 20 \\ \hline 2620 \end{array}$$

3. What percent of 12 is 3?

$$\frac{3}{12} = \frac{P}{100}$$

$$12P = 300$$

$$P = \frac{300}{12} = \boxed{25\%}$$

$$12\overline{)300}\quad 25,\ 24,\ 60,\ 60,\ 0$$

4. What percent of 25 is 52?

$$\frac{52}{25} = \frac{P}{100}$$

$$25P = 5200$$

$$P = \frac{5200}{25} = \boxed{208\%}$$

$$25\overline{)5200}\quad 208,\ 50,\ 200,\ 200,\ 0$$

5. 20% of what number is 20?

$$\frac{20}{B} = \frac{20}{100}$$

$$20B = 2000$$

$$B = \frac{2000}{20} = \boxed{100}$$

6. 12% of what number is 18?

$$\frac{18}{B} = \frac{12}{100}$$

$$12B = 1800$$

$$B = \boxed{150}$$

$$12\overline{)1800}\quad 150,\ 12,\ 60,\ 60,\ 00$$

7. How much is $\frac{3}{4}$ of 36?

$$\frac{3}{4} \cdot 36 = \frac{3 \cdot 36^{9}}{4_{1}} = \boxed{27}$$

8. Peter bought 6 toy cars for \$33. How much do 13 cars cost?

$$\begin{array}{rr} 6 & 33 \\ \downarrow & \downarrow \\ 13 & x \end{array}$$

$$x = \frac{13 \cdot 33^{11}}{6_{2}} = \frac{143}{2} = \boxed{71.5}$$

$$\begin{array}{r} 13 \\ \times\ 11 \\ \hline 13 \\ 13 \\ \hline 143 \end{array}$$

They cost \$71.50

9. An ice cream factory makes 72 quarts of ice cream in 2 hours. How many quarts could be made in 15 hours?

72 quarts — 2 hours
x quarts — 15 hours

$2x = 15 \cdot 72_{36}$

$x = \frac{15 \cdot 72}{2_1} = 15 \cdot 36$

$= 540.$

$\times 36$
15
180
36
540

Answer: 540 quarts

10. The dosage of a certain medication is 5 ounces for every 60 pounds of body weight. How many ounces of the medication are required for a person who weighs 192 pounds?

5 oz — 60 lb
x oz — 192 lb

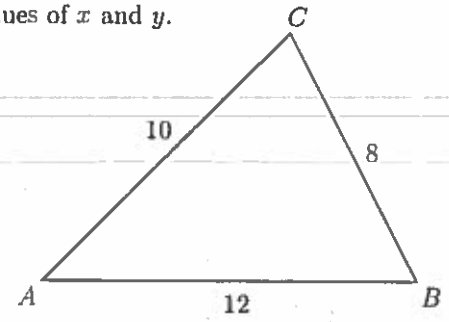
$60x = 5 \cdot 192$

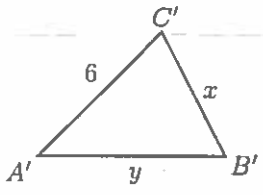
$x = \frac{5 \cdot 192}{60_{12}} = 16.$

$12\overline{)192}$ → 16
12
72
72
0

16 ounces

11. In the following triangles, $\angle A = \angle A'$, $\angle B = \angle B'$, and $\angle C = \angle C'$. Given the lengths in the picture, find the values of x and y.





$\frac{10}{6} = \frac{8}{x} = \frac{12}{y}$

$\frac{10}{6} = \frac{8}{x} \Rightarrow 10x = 48$

$x = 4.8$

$\frac{10}{6} = \frac{12}{y} \Rightarrow 10y = 72$

$y = 7.2$

12. Evaluate $3x + 5$ when $x = 7$

$3 \cdot 7 + 5 = 21 + 5 = \boxed{26}$

13. Evaluate $\frac{x+3y}{2xy}$ when $x = 3$ and $y = -2$.

$\frac{3+3\cdot(-2)}{2\cdot 3\cdot(-2)} = \frac{3+(-6)}{-12} = \frac{-3}{+12} = \boxed{\frac{1}{4}}$

14. Given the formula $P = nRT$,
find P when $n = 10$, $R = 3$, $T = 5$.

$P = 10 \cdot 3 \cdot 5$

$= 30 \cdot 5$

$\boxed{P = 150}$

15. Given the formula $F = \frac{9}{5}C + 32$,
find F when $C = 40$.

$F = \frac{9}{5} \cdot \frac{40}{1} + 32 = \frac{9 \cdot 40}{5} + 32$

$= 72 + 32$

$= \boxed{104}$

16. Suppose that $f(x) = 2x + 4$. Find $f(3)$.

$f(3) = 2 \cdot 3 + 4$

$= 6 + 4 = \boxed{10}$

17. Suppose that $f(x) = x^2 + 2$. Find $f(-2)$.

$f(-2) = (-2)^2 + 2$

$= 4 + 2$

$= \boxed{6}$

18. Solve the equation $2x + 7 = 13$.

Subtract -7 in both sides:

$2x + 7 - 7 = 13 - 7$

$2x = 8$

Divide by 2 in both sides

$\frac{2x}{2} = \frac{6}{2}$

$\boxed{x = 3}$

19. Solve the equation $5x + 2 = 2x + 11$.

Subtract 2 from both sides

$5x + 2 - 2 = 2x + 11 - 2$

$5x = 2x + 9$

Subtract $2x$ from both sides

$5x - 2x = 2x + 9 - 2x$

$3x = 9$

Divide both sides by 3

$\frac{3x}{3} = \frac{9}{3} \Rightarrow \boxed{x = 3}$

20. Solve the equation $-6x + 4 = 6 - 2x$.

Subtract 4 from both sides:

$-6x + 4 - 4 = 6 - 2x - 4$

$-6x = 2 - 2x$

Add $2x$ to both sides

$-6x + 2x = 2 - 2x + 2x$

$-4x = 2$

Divide by (-4) both sides:

$\frac{-4x}{-4} = \frac{2}{-4} \rightarrow \boxed{x = -\frac{1}{2}}$

21. Solve the equation $\frac{5x}{3} = 25$.

Multiply both sides by 3:

$\frac{3}{1} \cdot \frac{5x}{3} = 3 \cdot 25$

$\Rightarrow 5x = 75$

Divide both sides by 5

$\frac{5x}{5} = \frac{75}{5}$

$\boxed{x = 15}$

22. The formula $P = D(1+r)^t$ gives the amount of money in an investment after t years when the initial invested amount is D dollars and the interest rate is r (r written as a decimal). Find P after 2 years when the initial investment was \$1000, at an interest rate of 10%. $r = 0.1$, $D = 1000$, $t = 2$

$P = 1000(1 + 0.1)^2$

$= 1000(1.1)^2$

$= 1000 \cdot 1.21$

$= \boxed{1,210}$

$\boxed{\$1,210}$

$1.1^2 = 1.21$

$\begin{array}{r} 11 \\ \times\ 11 \\ \hline 11 \\ 11 \\ \hline 121 \end{array}$