

Part I. Simplify the following using the order of operations.

$$\begin{aligned} 1. & 4^2 - (2 \cdot 3^3 \cdot 1) \div 2 \\ & 16 - (2 \cdot 27 \cdot 1) \div 2 \\ & 16 - 54 \div 2 \\ & 16 - 27 = \boxed{-11} \end{aligned}$$

$$\begin{aligned} 3. & [(-2)^2 - 6 \cdot 7] \\ & 4 - 42 = \boxed{-38} \end{aligned}$$

$$\begin{aligned} 5. & 3 \div 1 \cdot 2^3 - 5 \\ & 3 \div 1 \cdot 8 - 5 \\ & 3 \cdot 8 - 5 \\ & 24 - 5 = \boxed{19} \end{aligned}$$

$$\begin{aligned} 7. & (-2)^3 + (2 - 1 - 1) \\ & -8 + 0 = \boxed{-8} \end{aligned}$$

$$\begin{aligned} 9. & 5 - 2(7 \cdot 2 - 6) \\ & 5 - 2(14 - 6) \\ & 5 - 2(8) \\ & 5 - 16 = \boxed{-11} \end{aligned}$$

$$11. \frac{3 \cdot 2 - 6}{7 - 5}$$

$$\frac{6 - 6}{7 - 5} = \frac{0}{2} = \boxed{0}$$

$$\begin{aligned} 2. & (6 \cdot 2) + 2 \\ & 12 + 2 = \boxed{14} \end{aligned}$$

$$\begin{aligned} 4. & 9^2 + [(-1)^3 + 3] \cdot 9 \\ & 81 + [-1 + 3] \cdot 9 \\ & 81 + [2] \cdot 9 \\ & 81 + 18 = \boxed{99} \end{aligned}$$

$$\begin{aligned} 6. & 2 \cdot 2 \cdot 2 \cdot 2 - 2 \\ & 16 - 2 = \boxed{14} \end{aligned}$$

$$\begin{aligned} 8. & 2 + 5(2 \cdot 5 - 3) \\ & 2 + 5(10 - 3) \\ & 2 + 5(7) \\ & 2 + 35 = \boxed{37} \end{aligned}$$

$$\begin{aligned} 10. & -3 \cdot 4 - 5 \cdot 6 \\ & -12 - 30 = \boxed{-42} \end{aligned}$$

$$12. \frac{2^3 - 2^2}{2^2 - 2}$$

$$\frac{8 - 4}{4 - 2} = \frac{4}{2} = \boxed{2}$$

Part II. Multiply each of the following. Make sure to simplify your answers.

$$1. \frac{10}{12} \cdot \frac{4}{10} = \frac{1}{3}$$

$$2. \frac{12}{13} \cdot \frac{1}{4} = \frac{3}{13}$$

$$3. \frac{6}{10} \cdot \frac{5}{12} = \frac{1}{4}$$

$$4. \frac{3}{8} \cdot \frac{1}{2} = \frac{1}{4}$$

$$5. \frac{1}{3} \cdot 9 = \frac{1}{3} \cdot \frac{9}{1} = 3$$

$$6. 3 \cdot \frac{10}{12} = \frac{3}{1} \cdot \frac{10}{12} = \frac{5}{2} = 2\frac{1}{2}$$

$$7. \frac{14}{15} \cdot 5 = \frac{14}{15} \cdot \frac{5}{1} = \frac{14}{3} = 4\frac{2}{3}$$

$$8. 1\frac{3}{7} \cdot \frac{2}{6} = \frac{10}{7} \cdot \frac{2}{6} = \frac{10}{21}$$

$$9. 1\frac{1}{5} \cdot \frac{4}{5} = \frac{6}{5} \cdot \frac{4}{5} = \frac{24}{25}$$

$$10. 2\frac{5}{6} \cdot \frac{1}{6} = \frac{17}{6} \cdot \frac{1}{6} = \frac{17}{36}$$

$$11. \frac{1}{2} \cdot 4\frac{5}{7} = \frac{1}{2} \cdot \frac{33}{7} = \frac{33}{14} = 2\frac{5}{14}$$

$$12. 2\frac{2}{3} \cdot 9\frac{2}{3} = \frac{8}{3} \cdot \frac{29}{3} = \frac{232}{9} = 25\frac{7}{9}$$

$$13. 5\frac{2}{3} \cdot 1\frac{4}{7} = \frac{17}{3} \cdot \frac{11}{7} = \frac{187}{21} = 8\frac{19}{21}$$

$$14. 2\frac{1}{6} \cdot 5\frac{1}{4} = \frac{13}{6} \cdot \frac{21}{4} = \frac{91}{8} = 11\frac{3}{8}$$

Part III. Divide each of the following. Make sure to simplify your answers.

$$1. \frac{1}{6} \div \frac{9}{12} = \frac{1}{\cancel{6}_1} \cdot \frac{\cancel{12}^2}{9} = \left(\frac{2}{9} \right)$$

$$2. \frac{3}{6} \div \frac{4}{6} = \frac{\cancel{3}}{\cancel{6}_1} \cdot \frac{\cancel{4}^1}{4} = \left(\frac{3}{4} \right)$$

$$3. \frac{2}{7} \div \frac{2}{5} = \frac{\cancel{2}^1}{7} \cdot \frac{5}{\cancel{2}_1} = \left(\frac{5}{7} \right)$$

$$4. \frac{8}{9} \div \frac{3}{10} = \frac{8}{9} \cdot \frac{10}{3} = \frac{80}{27} = \left(2 \frac{26}{27} \right)$$

$$5. 3 \frac{1}{6} \div \frac{5}{6} = \frac{19}{\cancel{6}_1} \cdot \frac{\cancel{6}^1}{5} = \frac{19}{5} = \left(3 \frac{4}{5} \right)$$

$$6. \frac{4}{9} \div 2 \frac{1}{2} = \frac{4}{9} \div \frac{5}{2} = \frac{4}{9} \cdot \frac{2}{5} = \left(\frac{8}{45} \right)$$

$$7. 1 \frac{1}{2} \div \frac{5}{8} = \frac{\cancel{3}^1}{\cancel{2}_1} \cdot \frac{\cancel{8}^4}{5} = \frac{12}{5} = \left(2 \frac{2}{5} \right)$$

$$8. \frac{1}{2} \div 5 = \frac{1}{2} \cdot \frac{1}{5} = \left(\frac{1}{10} \right)$$

$$9. 8 \div \frac{2}{5} = \frac{\cancel{8}^4}{1} \cdot \frac{5}{\cancel{2}_1} = \left(20 \right)$$

$$10. \frac{4}{9} \div 6 = \frac{\cancel{4}^2}{9} \cdot \frac{1}{\cancel{6}_3} = \left(\frac{2}{27} \right)$$

$$11. 1 \frac{5}{6} \div 2 \frac{3}{7} = \frac{11}{6} \div \frac{17}{7} =$$

$$\frac{11}{6} \cdot \frac{7}{17} = \left(\frac{77}{102} \right)$$

$$12. 3 \frac{1}{5} \div 1 \frac{2}{3} = \frac{14}{5} \div \frac{5}{3} =$$

$$\frac{14}{5} \cdot \frac{3}{5} = \frac{48}{25} = \left(1 \frac{23}{25} \right)$$

Part V. Complete the following table.

	Fraction (in simplest form)	Decimal	Percent
1	$\frac{16}{100} = \frac{4}{25}$	.16	16%
2	$\frac{3}{5}$	.6	60%
3	$\frac{7}{8}$	.875	87.5% or $87\frac{1}{2}\%$
4	$\frac{5}{6}$	$.8\bar{3}$	$83.\bar{3}\%$ or $83\frac{1}{3}\%$
5	$2\frac{1}{4}$	2.25	225%
6	$\frac{45}{100} = \frac{9}{20}$	0.45	45%
7	$\frac{2}{1000} = \frac{1}{500}$	0.002	0.2% or $\frac{1}{5}\%$
8	$\frac{175}{100} = \frac{7}{4} = 1\frac{3}{4}$	1.75	175%
9	$\frac{75}{1000} = \frac{3}{40}$	0.075	7.5% or $7\frac{1}{2}\%$
10	$\frac{10025}{10000} = \frac{401}{400} = 1\frac{1}{400}$	1.0025	100.25% or $100\frac{1}{4}\%$
11	$\frac{7}{10}$	.7	70%
12	$\frac{725}{10000} = \frac{29}{400}$	.0725	7.25% or $7\frac{1}{4}\%$
13	$\frac{11}{10} = 1\frac{1}{10}$	1.1	110%
14	$\frac{225}{10000} = \frac{9}{400}$	.0225	$2\frac{1}{4}\%$ or 2.25%
15	$\frac{5}{1000} = \frac{1}{200}$	.005	$\frac{1}{2}\%$ or 0.5%

Part V Perform the indicated operation.

1. $-3(8) = -24$

2. $5 - 21 = -16$

3. $\frac{-3}{6} = -\frac{1}{2}$

4. $1(-1)(1)(-1)(-1) = -1$

5. $-6 + (-9) = -15$

6. $18 / (-3) = -6$

7. $-5 - 21 = -26$

8. $\frac{-10}{-12} = \frac{5}{6}$

9. $7 - 8 = -1$

10. $7(-8) = -56$

11. $5 - 4 - 3 - 2 - 1 = -5$

12. $-6(-1) = 6$

13. $(8) - 3 = 5$
 $8 - 3 = 5$

14. $-8 - 2 = -10$

15. $4(-2)(-3) = 24$

16. $4 + (-3) - 6 = -5$

17. $-8 - 6 = -14$

18. $(-1)(-2)(-3)(-4) = 24$

19. $3 - 7 = -4$

20. $3 + (-12) = -9$

Part VII. Solve each equation for the variable.

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

$3 = x$

2. $\frac{-7a}{-7} = \frac{-14}{-7}$

$a = 2$

3. $\frac{7y}{7} = \frac{0}{7}$

$y = 0$

4. $\frac{3n}{3} = \frac{-186}{3}$

$n = -62$

5. $3b + 2b = -10$

$\frac{5b}{5} = \frac{-10}{5}$

$b = -2$

6. $35 = x + 6x$

$\frac{35}{7} = \frac{7x}{7}$

$5 = x$

7. $3a - 4a = 4$

$\frac{-1a}{-1} = \frac{4}{-1}$

$a = -4$

8. $8x - 2x = 30$

$\frac{6x}{6} = \frac{30}{6}$

$x = 5$

9. $9x - 12x = -15$

$\frac{-3x}{-3} = \frac{-15}{-3}$

$x = 5$

10. $5 = 2p - 7$

$\frac{+7}{+7} \frac{+7}{+7}$
 $\frac{12}{2} = \frac{2p}{2}$

$6 = p$

11. $-8 = 3y + 2$

$\frac{-2}{-2} \frac{-2}{-2}$
 $\frac{-10}{3} = \frac{3y}{3}$

$-3\frac{1}{3} = y$

12. $-5x = 3x$

$\frac{+5x}{+5x} \frac{+5x}{+5x}$
 $\frac{0}{8} = \frac{8x}{8}$

$0 = x$

13. $6 - 2x = -10$

$\frac{-6}{-6} \frac{-6}{-6}$
 $\frac{-2x}{-2} = \frac{-16}{-2}$

$x = 8$

14. $5 = 2 - 3x$

$\frac{-2}{-2} \frac{-2}{-2}$
 $\frac{3}{-3} = \frac{-3x}{-3}$

$-1 = x$

15. $\cancel{2}y + 5 = 5y + 2$

$$\begin{array}{r} \cancel{-2y} \quad -2y \\ \hline 5 = 3y + \cancel{2} \\ -2 \quad -2 \\ \hline \frac{3}{3} = \frac{3y}{3} \end{array}$$

$1 = y$

17. $8 - 2y = 1 + y$

$$\begin{array}{r} \cancel{+2y} \quad +2y \\ \hline 8 = \cancel{y} + 3y \\ -1 \quad -1 \\ \hline \frac{7}{3} = \frac{3y}{3} \end{array}$$

$\frac{7}{3} = y$

19. $7(2a + 3) = 21$

$$\begin{array}{r} 14a + \cancel{21} = 21 \\ -21 \quad -21 \\ \hline \end{array}$$

$$\begin{array}{r} 14a = 0 \\ \frac{14}{14} \quad \frac{0}{14} \end{array}$$

$a = 0$

16. $3x - 4 = \cancel{2}x - 24$

$$\begin{array}{r} \cancel{-2x} \quad -2x \\ \hline x - \cancel{4} = -24 \\ +4 \quad +4 \\ \hline \end{array}$$

$x = -20$

18. $12 - 2a = 4 + a$

$$\begin{array}{r} \cancel{+2a} \quad +2a \\ \hline 12 = \cancel{a} + 3a \\ -4 \quad -4 \\ \hline \frac{8}{3} = \frac{3a}{3} \end{array}$$

$\frac{8}{3} = a$

20. $3(x + 6) = -2$

$$\begin{array}{r} 3x + \cancel{18} = -2 \\ -18 \quad -18 \\ \hline \end{array}$$

$$\begin{array}{r} 3x = -20 \\ \frac{3}{3} \quad \frac{-20}{3} \end{array}$$

$x = -6\frac{2}{3}$