Simplifying Fractions

Directions: Write each of the fractions in simplest form.

1. $\frac{36}{45}$

$\frac{36}{}$
1·36
2·18
3·12
4·9
6·6

$\frac{45}{}$
1·45
3·15
5·9

$\frac{36 \div 9}{45 \div 9} = \boxed{\frac{4}{5}}$

OR

36
2 18
2 9
3 3

45
5 9
3 3

$\frac{36}{45} = \frac{2 \cdot 2 \cdot \cancel{3} \cdot \cancel{3}}{\cancel{3} \cdot \cancel{3} \cdot 5} = \boxed{\frac{4}{5}}$

2. $\frac{18}{48}$

$\frac{18}{}$
1·18
2·9
3·6

$\frac{48}{}$
1·48
2·24
3·16
4·12
6·8

$\frac{18 \div 6}{48 \div 6} = \boxed{\frac{3}{8}}$

OR

18
2 9
3 3

48
2 24
2 12
2 6
2 3

$\frac{18}{48} = \frac{\cancel{2} \cdot \cancel{3} \cdot 3}{\cancel{2} \cdot 2 \cdot 2 \cdot 2 \cdot \cancel{3}} = \boxed{\frac{3}{8}}$

3. $\frac{58}{112}$

58

$1 \cdot 58$

$2 \cdot 29$

112

$1 \cdot 112$

$2 \cdot 56$

$4 \cdot 28$

$7 \cdot 16$

$8 \cdot 14$

$$\frac{58 \div 2}{112 \div 2} = \boxed{\frac{29}{56}}$$

OR

58

$2 \quad 29$

112

$2 \quad 56$

$7 \quad 8$

$2 \quad 4$

$2 \quad 2$

$$\frac{58}{112} = \frac{\cancel{2} \cdot 29}{\cancel{2} \cdot 2 \cdot 2 \cdot 2 \cdot 7} = \boxed{\frac{29}{56}}$$

4. $-\frac{49}{63}$

49

$1 \cdot 49$

$7 \cdot 7$

63

$1 \cdot 63$

$3 \cdot 21$

$7 \quad 9$

$$-\frac{49 \div 7}{63 \div 7} = \boxed{\frac{-7}{9}}$$

OR

49

$7 \quad 7$

63

$7 \quad 9$

$3 \quad 3$

$$-\frac{49}{63} = -\frac{\cancel{7} \cdot 7}{\cancel{7} \cdot 3 \cdot 3} = \boxed{-\frac{7}{9}}$$

5. $\frac{3x^5}{27x^7}$

$\frac{3}{1 \cdot 3}$ $\quad$ $\frac{27}{1 \cdot 27}$, $3 \cdot 9$

$$\frac{3x^5 \div 3}{27x^7 \div 3} = \frac{1\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}}{9\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot x\cdot x} = \boxed{\frac{1}{9x^2}}$$

OR

3

27

3 9

3 3

$$\frac{3x^5}{27x^7} = \frac{\cancel{3}\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}}{\cancel{3}\cdot 3\cdot 3\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot x\cdot x} = \boxed{\frac{1}{9x^2}}$$

6. $\frac{36m^2}{30m}$

$\frac{36}{1 \cdot 36}$, $2 \cdot 18$, $3 \cdot 12$, $4 \cdot 9$, $6 \cdot 6$

$\frac{30}{1 \cdot 30}$, $2 \cdot 15$, $3 \cdot 10$, $5 \cdot 6$

$$\frac{36m^2 \div 6}{30m \div 6} = \frac{6m\cdot\cancel{m}}{5\cancel{m}} = \boxed{\frac{6m}{5}}$$

OR

36

2 18

2 9

3 3

30

5 6

2 3

$$\frac{36m^2}{30m} = \frac{\cancel{2}\cdot 2\cdot\cancel{3}\cdot 3\cdot\cancel{m}\cdot m}{\cancel{2}\cdot\cancel{3}\cdot 5\cdot\cancel{m}} = \boxed{\frac{6m}{5}}$$

7. $-\frac{8a^3b^2c}{28ab^2c^3}$

$\frac{8}{1\cdot 8}$ $\quad 2\cdot 4$

$\frac{28}{1\cdot 28}$ $\quad 2\cdot 14$ $\quad 4\cdot 7$

$$-\frac{8a^3b^2c}{28ab^2c^3}\begin{matrix}\div 4\\ \div 4\end{matrix} = -\frac{2\cdot\cancel{a}\cdot a\cdot a\cdot\cancel{b}\cdot\cancel{b}\cdot\cancel{c}}{7\cdot\cancel{a}\cdot\cancel{b}\cdot\cancel{b}\cdot\cancel{c}\cdot c\cdot c} = \boxed{-\frac{2a^2}{7c^2}}$$

OR

$8 \to 2,\ 4 \to 2,\ 2$

$28 \to 2,\ 14 \to 2,\ 7$

$$-\frac{8a^3b^2c}{28ab^2c^3} = -\frac{\cancel{2}\cdot\cancel{2}\cdot 2\cdot\cancel{a}\cdot a\cdot a\cdot\cancel{b}\cdot\cancel{b}\cdot\cancel{c}}{\cancel{2}\cdot\cancel{2}\cdot 7\cdot\cancel{a}\cdot\cancel{b}\cdot\cancel{b}\cdot\cancel{c}\cdot c\cdot c}$$

$$= \boxed{-\frac{2a^2}{7c^2}}$$

Directions: Determine if the fractions are equivalent.

8. $\frac{18}{20}, \frac{90}{100}$

$\frac{9\cancel{0}}{10\cancel{0}} = \frac{9}{10}$

$\frac{18}{20}\begin{matrix}\div 2\\ \div 2\end{matrix} = \frac{9}{10}$

Yes, the fractions are equivalent

9. $-\frac{2}{5}, \frac{6}{-15}, \frac{-24}{60}$

$-\frac{2}{5}$

$\frac{6}{-15}\begin{matrix}\div 3\\ \div 3\end{matrix} = \frac{2}{-5}$

$\frac{-24}{60}\begin{matrix}\div 12\\ \div 12\end{matrix} = \frac{-2}{5}$

Yes, the fractions are equivalent

Directions: Find two equivalent fractions.

10. $\frac{18}{20}$

$$\frac{18 \div 2}{20 \div 2} = \boxed{\frac{9}{10}}$$

$$\frac{18 \times 2}{20 \times 2} = \boxed{\frac{36}{40}}$$