

## Section 7.1

Simplify each expression.

$$1) \frac{90a}{50a^2} = \boxed{\frac{9}{5a}}$$

$$2) \frac{36n^5}{54n^4} = \boxed{\frac{2n}{3}}$$

$$3) \frac{132x^2y^3}{66x^3y} = \boxed{\frac{2y^2}{x}}$$

$$4) \frac{30m^2n}{70m^3n^2} = \boxed{\frac{3}{7mn}}$$

$$5) \frac{18a^3b^3c^2}{9a^2bc^4} = \boxed{\frac{2ab^2}{c^2}}$$

$$6) \frac{16x^3y^2z^5}{24x^3y^4} = \boxed{\frac{2z^5}{3y^2}}$$

$$7) \frac{1}{2m} \cdot \frac{m^2 - 10m + 24}{m - 6} = \frac{1}{2m} \cdot \frac{(m-6)(m-4)}{(m-6)} = \boxed{\frac{(m-4)}{2m}}$$

$$8) \frac{1}{b+5} \cdot \frac{6b+30}{b-5} = \frac{1}{(b+5)} \cdot \frac{6(b+5)}{(b-5)} = \boxed{\frac{6}{(b-5)}}$$

$$9) \frac{a^2 - 9a + 20}{a - 5} \cdot \frac{5}{a - 4} = \frac{(a-4)(a-5)}{(a-5)} \cdot \frac{5}{(a-4)} = \boxed{5}$$

$$10) \frac{r+6}{r^2+14r+48} \cdot \frac{r^2+15r+56}{6} = \frac{(r+6)}{(r+6)(r+8)} \cdot \frac{(r+7)(r+8)}{6} = \boxed{\frac{(r+7)}{6}}$$

$$11) \frac{1}{72b^2 - 8b^3} \cdot \frac{b^2 - 5b - 36}{b + 4} = \frac{1}{8b^2(-9b)} \cdot \frac{(b-9)(b+4)}{(b+4)} = \boxed{\frac{1}{-8b^2}}$$

$$12) \frac{x^2 - 3x - 18}{x^2 - 2x - 15} \cdot \frac{x - 5}{9} = \frac{(x-6)(x+3)}{(x-5)(x+3)} \cdot \frac{(x-5)}{9} = \boxed{\frac{(x-6)}{9}}$$

$$13) \frac{n^2 - 4n + 3}{n^2 - 6n + 5} \cdot \frac{n^2 + 2n - 35}{n^2 + 2n - 15}$$

$$14) \frac{x^2 - x - 6}{x^2 - 9} \cdot \frac{x^2 - x - 12}{2x + 4}$$

$$= \frac{(n-3)(n-1)}{(n-5)(n-1)} \cdot \frac{(n+7)(n-5)}{(n+5)(n-5)} = \boxed{\frac{(n+7)}{(n+5)}}$$

$$= \frac{(x-3)(x+2)}{(x-3)(x+3)} \cdot \frac{(x-4)(x-3)}{2(x+2)} = \boxed{\frac{(x-4)}{2}}$$

$$15) \frac{b^2 - 3b - 70}{b^2 + 17b + 70} \cdot \frac{9b + 90}{b - 10}$$

$$\frac{(b-10)(b+7)}{(b+10)(b+7)} \cdot \frac{9(b+10)}{(b-10)} = \boxed{9}$$

$$16) \frac{9x - 36}{x^2 + 5x - 24} \cdot \frac{x^2 + 5x - 24}{x - 4}$$

$$\frac{9(x-4)}{(x+8)(x-3)} \cdot \frac{(x+8)(x-3)}{(x-4)} = \boxed{9}$$

$$17) \frac{1}{n-1} \div \frac{n+2}{n^2 + 7n + 10}$$

$$\frac{1}{(n-1)} \cdot \frac{(n+2)(n+5)}{(n+2)} = \boxed{\frac{(n+5)}{(n-1)}}$$

$$18) \frac{1}{2a-18} \div \frac{a+3}{a^2 - 18a + 81}$$

$$\frac{1}{2(a-9)} \cdot \frac{(a-9)(a-9)}{(a+3)} = \boxed{\frac{a-9}{2(a+3)}}$$

$$19) \frac{8n^2 - 8n}{8n} \div \frac{n^2 - 2n + 1}{n - 4}$$

$$\frac{8n(n-1)}{8n} \cdot \frac{(n-4)}{(n-1)(n-1)} = \boxed{\frac{(n-4)}{(n-1)}}$$

$$20) \frac{-v^2 - 15v + 54}{6v - 54} \div \frac{v+9}{6}$$

$$\frac{(v-6)(v-9)}{6(v-9)} \cdot \frac{6}{(v+9)} = \boxed{\frac{(v-6)}{(v+9)}}$$

$$21) \frac{2n+16}{n^2 - n - 72} \div \frac{2}{n^2 - 14n + 45}$$

$$\frac{2(n+8)}{(n-9)(n+8)} \cdot \frac{(n-9)(n-5)}{2} = \boxed{n-5}$$

$$22) \frac{6x+42}{2} \div \frac{30x+54}{35x^2+63x}$$

$$\frac{6(x+7)}{2} \cdot \frac{7x(5x+9)}{6(5x+9)} = \boxed{\frac{7x(x+7)}{2}}$$

$$23) \frac{2x-8}{x-9} \div \frac{2x+14}{x^2 - 2x - 63}$$

$$\frac{2(x-4)}{(x-9)} \cdot \frac{(x-9)(x+7)}{2(x+7)} = \boxed{(x-4)}$$

$$24) \frac{n+8}{6n^2 + 48n} \div \frac{4n-32}{n^2 - 10n + 16}$$

$$\frac{(n+8)}{6n(n+8)} \cdot \frac{(n-8)(n-2)}{4(n-8)} = \boxed{\frac{(n-2)}{24n}}$$

$$25) \frac{p-6}{9p^2 + 9p} \div \frac{p^2 - 14p + 48}{80 - 10p(-1)}$$

$$\frac{(p-6)}{9p(p+1)} \cdot \frac{10(8-p)}{(p-8)(p-6)} = \boxed{\frac{-10}{9p(p+1)}}$$

$$26) \frac{5n+5}{45n^2} \div \frac{n^2 + 5n + 4}{n+4}$$

$$\frac{5(n+1)}{45n^2} \cdot \frac{(n+4)}{(n+1)(n+1)} = \boxed{\frac{1}{9n^2}}$$

$$27) \frac{\frac{x+2}{12x-4}}{\frac{x+2}{16}} = \frac{x+2}{12x-4} \div \frac{x+2}{16}$$

$$\frac{(x+2)}{4(3x-1)} \cdot \frac{16}{(x+2)} = \boxed{\frac{4}{(3x-1)}}$$

$$28) \frac{\frac{x}{x+4}}{\frac{x^2}{x+4}} = \frac{x}{x+4} \div \frac{x^2}{x+4} = \frac{x}{(x+4)} \cdot \frac{(x+4)}{x^2}$$

$$= \boxed{\frac{1}{x}}$$

$$29) \frac{\frac{x+3}{35}}{\frac{x+3}{25}} = \frac{x+3}{35} \div \frac{x+3}{25}$$

$$= \frac{(x+3)}{35} \cdot \frac{25}{(x+3)} = \boxed{\frac{5}{7}}$$

$$30) \frac{\frac{3u+6}{u-2}}{\frac{u+2}{9}} = \frac{3u+6}{u-2} \div \frac{u+2}{9}$$

$$\frac{3(u+2)}{(u-2)} \cdot \frac{9}{(u+2)} = \boxed{\frac{27}{(u-2)}}$$