

m B

**Evaluate the expression without using a calculator.**

1.  $\sqrt[3]{-8}$   
-2

2.  $25^{1/2}$   
5

3.  $27^{2/3}$   
9

4.  $8^{-1/3}$   
 $\frac{1}{2}$

1.  $\sqrt[3]{-64}$   
-4

2.  $81^{1/2}$   
9

3.  $(-27)^{2/3}$   
9

4.  $125^{-1/3}$   
 $\frac{1}{5}$

**Simplify the expression. Assume all variables are positive.**

5.  $(2^{1/3} \cdot 3^{1/3})^3$   
 $2 \cdot 3$   
 $\boxed{6}$

6.  $\sqrt[3]{8x^3y^6z^3}$   
 $2xy^2z$

7.  $\frac{x^3y^3}{(xy)^{-3}}$   
 $x^6y^6$

8.  $\sqrt{50} + \sqrt{8}$   
 $5\sqrt{2} + 2\sqrt{2}$   
 $\boxed{7\sqrt{2}}$

5.  $(3^{1/3} \cdot 4^{1/3})^3$   
 $3 \cdot 4$   
 $\boxed{12}$

6.  $\sqrt[3]{-8x^3y^3z^3}$   
 $-2xyz$

7.  $\left(\frac{4xy^{-1}}{16xy^2}\right)$   
 $\frac{4x}{16xy^3}$   
 $\frac{1}{4y^3}$

8.  $\sqrt{98} + \sqrt{2}$   
 $7\sqrt{2} + \sqrt{2}$   
 $\boxed{8\sqrt{2}}$

 $f(x) = x - 1$  and  $g(x) = 2x$ .

9.  $f(x) + g(x)$   
 $x - 1 + 2x$   
 $\boxed{3x - 1}$

10.  $f(x) - g(x)$   
 $x - 1 - 2x$   
 $\boxed{-x - 1}$

11.  $f(x) \cdot g(x)$   
 $(x - 1)(2x)$   
 $\boxed{2x^2 - 2x}$

$$12. \frac{f(x)}{g(x)} \\ \frac{x-1}{2x}$$

$$13. f(g(x)) \\ 2x-1$$

$$f(x) = 3x \text{ and } g(x) = x - 5.$$

$$9. f(x) + g(x)$$

$$3x + x - 5 \\ \boxed{4x - 5}$$

$$10. f(x) - g(x)$$

$$3x - x + 5 \\ \boxed{2x + 5}$$

$$11. f(x) \cdot g(x)$$

$$3x(x-5) \\ \boxed{3x^2 - 15x}$$

$$12. \frac{f(x)}{g(x)}$$

$$\frac{3x}{x-5}$$

$$13. f(g(x))$$

$$3(x-5) \\ \boxed{3x - 15}$$

Find the inverse function.

$$14. f(x) = x + 9$$

$$y = x + 9$$

$$x = y + 9$$

$$x - 9 = y$$

$$\boxed{f^{-1}(x) = x - 9}$$

$$15. f(x) = \frac{1}{2}x + 2$$

$$y = \frac{1}{2}x + 2$$

$$x = \frac{1}{2}y + 2$$

$$(x - 2) = \frac{1}{2}y$$

$$2x - 4 = y$$

$$\boxed{f^{-1}(x) = 2x - 4}$$

$$16. f(x) = 3x + 6$$

$$y = 3x + 6$$

$$x = \frac{y}{3} + 2$$

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

$$y = \frac{1}{3}x - 2 \\ \boxed{f^{-1}(x) = \frac{1}{3}x - 2}$$

14.  $f(x) = 2x - 4$

$y = 2x - 4$

$x = \frac{y+4}{2}$

$\frac{x+4}{2} = \frac{2y}{2}$

$\frac{1}{2}x + 2 = y$

$y = \frac{1}{2}x + 2$

15.  $f(x) = -\frac{2}{3}x + 4$

$y = -\frac{2}{3}x + 4$

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

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

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

$f^{-1}(x) = -\frac{3}{2}x + 6$

16.  $f(x) = x^2, x \neq 0$

$y = x^2$

$\sqrt{x} = \sqrt{y^2}$

~~$\sqrt{x} = y$~~

$f^{-1}(x) = \sqrt{x}$

Solve the equation. Check for extraneous solutions.

1.  $x^{4/3} - 5 = 11$

$(x^{4/3})^{3/4} = (16)^{3/4}$

$x = 2^3$

$x = 8$

2.  $2x^{3/4} + 7 = 23$

$2x^{3/4} = 16$

$(x^{3/4})^{4/3} = (8)^{4/3}$

$x = 16$

3.  $(2x)^{3/4} = (8)^{4/3}$

$2x = 16$

$x = 8$

10.  $\sqrt[4]{3x} + 5 = 6$

$(\sqrt[4]{3x})^4 = (1)^4$

$3x = 1$

$x = \frac{1}{3}$

11.  $3\sqrt{x+6} + 5 = 14$

$\frac{-5 - 5}{3} = \frac{-10}{3}$

$3\sqrt{x+6} = 9$

$(\sqrt{x+6})^2 = (3)^2$

$x+6 = 9$

$x = 3$

12.  $\sqrt{5x-1} + 8 = 2$

$\frac{-8 - 8}{1} = \frac{-16}{1}$

$(\sqrt{5x-1})^2 = (-6)^2$

$5x-1 = 36$

$5x = 37$

$x = \frac{37}{5}$

$\sqrt{5(\frac{37}{5})-1} + 8 = 2$

16.  $\sqrt[5]{3-x} + 4 = 3$

$(\sqrt[5]{3-x})^5 = (-1)^5$

$3-x = -1$

$8 = x$

$\emptyset$

17.  $2\sqrt[3]{1-3x} + 4 = 6$

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

$2\sqrt[3]{1-3x} = 2$

$(\sqrt[3]{1-3x})^3 = (1)^3$

$1-3x = 1$

$x = \frac{1}{3}$

18.  $5 - \sqrt{2x+1} = 3$

$5-3 = \sqrt{2x+1}$

$2 = \sqrt{2x+1}$

$4 = 2x+1$

$3 = 2x$

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

