



8. Which is a factor of  $4x^2 - 324$ ?
- |            |             |
|------------|-------------|
| a) $x - 3$ | c) $x + 3$  |
| b) $x - 9$ | d) $x - 18$ |
9. Which is a factor of  $x^3 + 729$ ?
- |            |            |
|------------|------------|
| a) $x - 3$ | c) $x + 3$ |
| b) $x - 9$ | d) $x + 9$ |
10. Which is a factor of  $4x^3 - 24x^2 - x + 6$ ?
- |             |             |
|-------------|-------------|
| a) $4x - 1$ | c) $x + 6$  |
| b) $x - 2$  | d) $2x + 1$ |
11. Solve:  $x^2 = 49x$ .
- |       |                          |
|-------|--------------------------|
| a) 49 | c) 0, 49                 |
| b) 7  | d) $-\sqrt{7}, \sqrt{7}$ |
12. Rationalize the denominator:  $\frac{6}{2 + \sqrt{3}}$ .
- |                     |                               |
|---------------------|-------------------------------|
| a) $12 + 6\sqrt{3}$ | c) $-12 + 6\sqrt{3}$          |
| b) $12 - 6\sqrt{3}$ | d) $\frac{12 - 6\sqrt{3}}{7}$ |
13. Convert to radical notation:  $x^{5/6}$ .
- |                    |                    |
|--------------------|--------------------|
| a) $\sqrt[5]{x^6}$ | c) $\sqrt[6]{x^5}$ |
| b) $x\sqrt[5]{x}$  | d) $6x^5$          |
14. Solve:  $3x - 6 = 5$ .
- |           |           |
|-----------|-----------|
| a) $11/3$ | c) 33     |
| b) $-1/3$ | d) $3/11$ |
15. Which of the following equals  $-16^{3/4}$ ? Be careful.
- |       |                       |
|-------|-----------------------|
| a) 8  | c) 12                 |
| b) -8 | d) It does not exist. |
16. Solve:  $3w^2 - 15 = 0$ .
- |               |                          |
|---------------|--------------------------|
| a) 5, -5      | c) 25, -25               |
| b) $\sqrt{5}$ | d) $\sqrt{5}, -\sqrt{5}$ |
17. Subtract and simplify:  $\frac{x}{x^2 + 5x + 6} - \frac{2}{x^2 + 3x + 2}$ .
- |  |   |
|--|---|
| a) $\frac{x - 3}{(x + 1)(x + 3)}$        | c) $\frac{x^2 + 3x + 6}{(x + 1)(x + 2)(x + 3)}$ |
| b) $\frac{x - 2}{(x + 1)(x + 2)(x + 3)}$ | d) $\frac{x^2 - x + 6}{(x + 1)(x + 2)(x + 3)}$  |

18. Solve:  $2x^2 + 9x - 18 = 0$ .  
 a)  $-6, \frac{2}{3}$  c)  $-6, \frac{3}{2}$   
 b)  $-\frac{3}{2}, 6$  d)  $-\frac{2}{3}, 6$
19.  $\sqrt{180}$  is expressed in simplest radical form.  
 T) True F) False
20.  $-\frac{2\sqrt[3]{64}}{\sqrt{16}}$  is an integer.  
 T) True F) False
21.  $-\frac{2\sqrt[3]{64}}{\sqrt{16}}$  is a rational number.  
 T) True F) False
22.  $\frac{1}{x^{-1} + y^{-1}}$  is equal to  $x + y$ .  
 T) True F) False
23. When evaluated at  $x = -2$ , the value of  $x^2$  is  $-4$ .  
 T) True F) False

**SHORT ANSWER SECTION.** Be careful; there is no partial credit for these questions. (3 pts each)

24. Solve for  $x$ :  $x(3x + 2)(5x - 3)(x + 2) = 0$   
 [There are four (4) solutions.]
25. Expand:  $(3x - 4)^2$
26. Expand:  $(x - 2)(7x + 1)$
27. Subtract:  $(10x^5y^4 - 6x^2y + 3x - 1) - (7x^5y^4 + 6x^2y - 2y - 1)$ .
28. Subtract and write the answer in simplest radical form:  
 $3\sqrt{160} - 2\sqrt{360}$ .
29. Simplify (be careful):  
 $-|-3|$ .

**LONG ANSWER SECTION.** Solve the problems. You must show all work in order to receive any credit.

30. Simplify and write with positive exponents:  $\frac{(-3ab^7)^3 a^{-4} b^2}{b^{-5}}$  (10 pts)

31. A wire 18 feet long is extended from the top of a pole to a place on the ground 12 feet from the base of the pole. How long is the pole in feet?

- a) Draw a picture of this situation. Label the pole, the wire, and the ground as “pole”, “wire”, and “ground” and indicate the given measurements with appropriate units. Please follow these directions carefully. (3 pts)
- b) Express your answer in simplest radical form. NO DECIMALS here. (6 pts)
- c) Write your answer to the nearest *tenth* of a foot. (1 pts)

32. Divide and simplify:  $\frac{x^2 - 2x - 15}{x^2 + x - 6} \div \frac{x^2 - 25}{x^2 - 4x - 21}$  (8 pts)

33. Suppose that \$6,400 is invested at 0.5% interest, compounded monthly. How much, to the nearest penny, is in the account after 7 years? (Refer to Example 10 on page 13 in Section R.2.) (8 pts)