

MANIPULATING EQUATIONS

i. $x + 6 = 9$
 $x =$

ii. $33 = 11(4x - 4)$
 $x =$

iii. $\frac{1}{2}x + \frac{1}{4}x + \frac{1}{8}x = 49$
 $x =$

1. If $\frac{24}{x} = \frac{3}{4}$, then $x =$

- (A) 16
- (B) 18
- (C) 30
- (D) 32
- (E) 36

2. If $(a + 3) + b = 0$, then $a + b =$

- (A) -3
- (B) $-\frac{3}{2}$
- (C) 0
- (D) $\frac{3}{2}$
- (E) 3

4. If the sum of $q - 6$, $q - 3$, and q is 0, what is the value of q ?

- (A) 5
- (B) 4
- (C) 3
- (D) 2
- (E) 0

5. If $\frac{x+4}{7} = \frac{4}{9}$, then x equals

- (A) $-\frac{8}{9}$
- (B) $-\frac{1}{4}$
- (C) $\frac{1}{4}$
- (D) $\frac{24}{9}$
- (E) $\frac{36}{7}$

14. If $\frac{4}{x} = \frac{6}{7}$ and $\frac{3x}{a} = \frac{7}{2}$, then a equals

- (A) $2\frac{1}{3}$
- (B) 3
- (C) $3\frac{1}{2}$
- (D) 4
- (E) $4\frac{2}{3}$

4. If $4x + 6 = 30$ then $2x$ equals

- (A) 2
- (B) 4
- (C) 6
- (D) 8
- (E) 12

4. If $\frac{400}{100(x+3)} = 4$, then what does x equal?

- (A) -4
- (B) -3
- (C) -2
- (D) -1
- (E) 0

18. If $5z = 10 + 2z$, what is the value of $9z$?

	7	7	
6	8	8	6
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

17. If $\frac{8y}{3} - 4 = \frac{1}{6}$, then $\frac{1}{y}$ equals

- (A) 16
- (B) $\frac{25}{16}$
- (C) 1
- (D) $\frac{2}{3}$
- (E) $\frac{16}{25}$

INEQUALITIES

5. If $10 - x < 14$, which of the following expresses the entire range of possible values for x ?
- (A) $x < 4$
(B) $x < 2$
(C) $x > -4$
(D) $x > 4$
(E) $x = 4$
5. If $12 + 3x > x$, which of the following expresses the entire range of possible values for x ?
- (A) $x > -3$
(B) $x < 3$
(C) $x < 6$
(D) $x > 6$
(E) $x > -6$
6. $4x - 14 > -6$ is equivalent to
- (A) $2x < -5$
(B) $2x < -2$
(C) $x > -5$
(D) $x > -2$
(E) $x > 2$
6. If $7x - 5 < 13 + 4x$, what is the value of x ?
- (A) $x > 18$
(B) $x > 6$
(C) $x < 6$
(D) $x < \frac{17}{2}$
(E) $x < 18$
7. Which of the following gives the correct order from least to greatest?
- (A) $\frac{8}{9} < \frac{5}{7} < \frac{3}{5}$
(B) $\frac{8}{9} < \frac{3}{5} < \frac{5}{7}$
(C) $\frac{5}{7} < \frac{3}{5} < \frac{8}{9}$
(D) $\frac{3}{5} < \frac{8}{9} < \frac{5}{7}$
(E) $\frac{3}{5} < \frac{5}{7} < \frac{8}{9}$
9. If $3x - 8 < 12 + 5x$, then
- (A) $x > 10$
(B) $x < 10$
(C) $x > -10$
(D) $x < -10$
(E) $x > 0$
12. If $-5 < m < 10$ and $2 < n < 4$, which of the following must be true for $(m + n)$?
- (A) $-3 < (m + n) < 14$
(B) $-7 < (m + n) < 6$
(C) $-5 < (m + n) < 12$
(D) $8 < (m + n) < 14$
(E) $12 < (m + n) < 14$
13. If $\frac{7-2y}{3} < -5$, then
- (A) $y < -4$
(B) $y < 11$
(C) $y > -4$
(D) $y > 4$
(E) $y > 11$

14. If $a > 5$ and $b > 4$, then which of the following must be true?

- I. $a > b$
- II. $a + b > 9$
- III. $a + b > 11$

- (A) I only
- (B) II only
- (C) I and II only
- (D) II and III only
- (E) I, II, and III

15. If q, r, s, t, u are consecutive positive integers such that

$$q > r > s > t > u, \text{ what is } (q-r)(r-s) - (s-t)(t-u)?$$

- (A) -2
- (B) -1
- (C) 0
- (D) 1
- (E) It cannot be determined from the information given.

16. If x is an integer such that $17 \leq 2x \leq 37$, which of the following gives a complete range of all possible values of x ?

- (A) $8 \leq x \leq 19$
- (B) $8.5 \leq x \leq 18.5$
- (C) $9 \leq x \leq 18$
- (D) $9 \leq x \leq 19$
- (E) $17 \leq x \leq 37$

22. Which of the following accurately defines the range of $p - q$ if

$$15 \leq p \leq 30 \text{ and } 7 \leq q \leq 19?$$

- (A) $-4 \leq (p - q) \leq 23$
- (B) $-4 \leq (p - q) \leq 30$
- (C) $8 \leq (p - q) \leq 11$
- (D) $15 \leq (p - q) \leq 23$
- (E) $22 \leq (p - q) \leq 49$

SIMULTANEOUS EQUATIONS

Remember:

You can usually find out what you need by combining the two equations—either add or subtract.

10. If $3x + 2y = 7$ and $2x + 2y = 9$, what is the value of x ?

- (A) -2
- (B) 2
- (C) 7
- (D) 9
- (E) 16

14. If $-x - y = -2$ and $2x - y = -11$, then what is the value of x ?

- (A) -13
- (B) -9
- (C) -3
- (D) 3
- (E) 9

15. If $2x + 3y = 3x - 3y = 25$, what is the value of x ?

- (A) 5
- (B) 10
- (C) 25
- (D) 50
- (E) It cannot be determined from the information given.

16. If $12f + 5g = 13$ and $8f + 15g = 17$, then what is the value of $f + g$?

- (A) $\frac{2}{3}$
- (B) $\frac{3}{2}$
- (C) 2
- (D) $\frac{5}{2}$
- (E) 4

17. If $6j - 5k = 11$ and $5j - 6k = -22$, then what is the value of $2j + 2k$?

- (A) -33
- (B) -11
- (C) -6
- (D) 33
- (E) 66

19. If $4r + 3s = 7$, $2r + s = 1$, and $2r + 2s = t - 4$, what is the value of t ?

- (A) 6
- (B) 8
- (C) 10
- (D) 12
- (E) It cannot be determined from the information given.

EXPONENTS

When in doubt, expand it out.

2. If $q^2 = 81$, then $(q + 1)(q - 1) =$

- (A) 79
- (B) 80
- (C) 81
- (D) 82
- (E) 83

3. $10,000 + (3 \times 10^3) =$

- (A) 4,000
- (B) 10,003
- (C) 10,030
- (D) 10,300
- (E) 13,000

3. $(3x^3y^4)^4 =$

- (A) $12x^7y^8$
- (B) $27x^9y^6$
- (C) $81x^7y^8$
- (D) $81x^{12}y^{16}$
- (E) $81x^{81}y^{256}$

3. $(3^3)^2 =$

- (A) 18
- (B) 27
- (C) 81
- (D) 729
- (E) 6,561

3. $5^9 \div 5^3 =$

- (A) 5^{12}
- (B) 5^6
- (C) 5^5
- (D) 5^3
- (E) 5

7. If $3^5 \cdot 9^2 = 27^2 \cdot 3^k$ then $k =$

- (A) 4
- (B) 6
- (C) 8
- (D) 9
- (E) 12

7. If $a = 5$ and $b = 2$, then $a^2b - ab^2 + (ab)^2 =$

- (A) 20
- (B) 50
- (C) 100
- (D) 130
- (E) 170

8. If w is a positive integer, then $(2w)^3 =$

- (A) $2w^3$
- (B) $4w^2$
- (C) $8w$
- (D) $8w^3$
- (E) $16w$

12. $\left(-\frac{3}{4}\right)^k$ will be greatest for which of the

following values of k ?

- (A) 5
- (B) 4
- (C) 3
- (D) 2
- (E) 1

24. $\frac{1}{10^{11}} - \frac{1}{10^{12}} =$

- (A) $\frac{1}{10}$
- (B) $\frac{9}{10^{12}}$
- (C) $\frac{1}{10^{12}}$
- (D) $-\frac{9}{10^{12}}$
- (E) $-\frac{1}{10}$

ROOTS

6. If $a = 25$ and $b = 16$, then for what value of c will $\sqrt{a} + \sqrt{b} + \sqrt{c} = 15$?

- (A) 9
- (B) 16
- (C) 25
- (D) 36
- (E) 49

8. $(\sqrt{24})(\sqrt{3}) =$

- (A) $3\sqrt{6}$
- (B) $2\sqrt{24}$
- (C) 6
- (D) $4\sqrt{3}$
- (E) $6\sqrt{2}$



10. $\sqrt{\frac{1}{4}} + \sqrt{\frac{1}{16}} + \sqrt{\frac{9}{4}} =$

- (A) $\frac{1}{4}$
- (B) $\frac{11}{16}$
- (C) $\frac{9}{4}$
- (D) $\frac{41}{16}$
- (E) $\frac{83}{16}$

10. If $a = 2$ and $b = 3$, then what does

$a^2 + b^2 - \sqrt{a^2 b^2}$ equal?

- (A) 5
- (B) 6
- (C) 7
- (D) 13
- (E) 19

**STOP! YOUR HOMEWORK IS DONE!
GO GET SOME EXERCISE.**