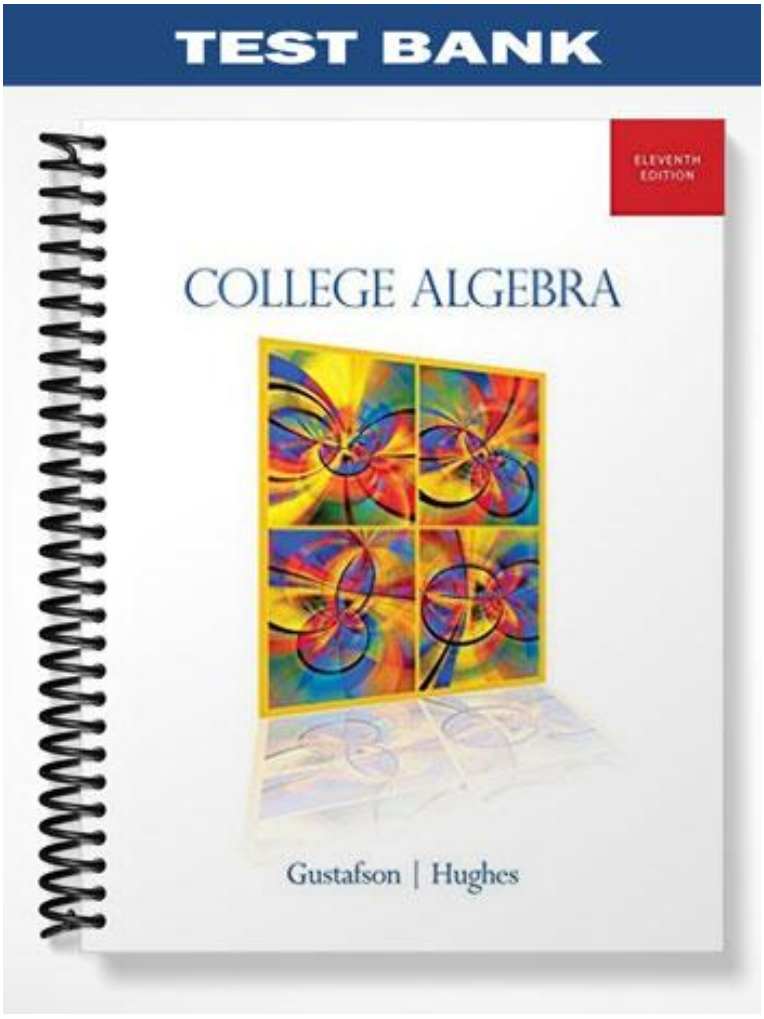
TEST BANK



Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. How many prime numbers are there between –2 and 18 on the number line?

a. 17
b. 0
c. 1
d. 19
e. 7
f. 18

____ 2. Select the correct representation of the inequality in interval notation.

$x \leq 9$

a. $[9, \infty)$
b. $[-\infty, 9]$
c. $(9, \infty)$
d. $(-\infty, 9]$
e. $(-\infty, 9)$

____ 3. Simplify the expression.

$(x^5)^4 (x^3)^3$

a. x^{15}
b. x^{29}
c. x^6
d. x^{-9}

____ 4. Simplify the expression.

$(-14x)^0$

Write the answer without using exponents.

a. -14
b. -1
c. 1
d. 14

____ 5. Simplify the expression.

$$\frac{1}{x^{-7}}$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

a. x^7
b. $\frac{1}{x^8}$
c. x^8
d. $\frac{1}{x^7}$

____ 6. Simplify the expression.

$$\frac{x^4x^2}{x^3x}$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

a. x^4
b. x^3
c. x^2
d. x^{10}

____ 7. Simplify the expression.

$$\frac{(8^{-2}z^{-4}y)^{-1}}{(5y^3z^{-3})^4(5yz^{-3})^{-1}}$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

a. $\dfrac{8z^{12}}{125y^{13}}$

b. $\dfrac{64z^{12}}{125y^{13}}$

c. $\dfrac{125y^{12}}{64z^{13}}$

d. $\dfrac{64z^{13}}{125y^{12}}$

____ 8. Simplify the expression.

$$\left(\frac{7x^{-5}y^3z^{-4}}{28x^6y^{11}z^{-9}}\right)^3$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

a. $\dfrac{z^5}{4x^{11}y^8}$

b. $\dfrac{z^{15}}{64x^{24}y^{33}}$

c. $\dfrac{z^{15}}{64x^{33}y^{24}}$

d. $\dfrac{z^{15}}{64x^{-33}y^{-24}}$

e. $\dfrac{z^5}{4x^{33}y^{24}}$

____ 9. Rationalize the numerator and simplify.

$$\frac{\sqrt{5}}{20}$$

a. $\frac{1}{4\sqrt{3}}$

b. $\frac{1}{4\sqrt{5}}$

c. $\frac{1}{8\sqrt{3}}$

d. $\frac{1}{4\sqrt{9}}$

e. $\frac{1}{5\sqrt{5}}$

____ 10. Simplify the radical expression.

$$\sqrt[6]{8}$$

a. $\sqrt[18]{2}$

b. $\sqrt[2]{200}$

c. $\sqrt[6]{2}$

d. $\sqrt[2]{2}$

e. $\sqrt[2]{8}$

____ 11. We can often multiply and divide radicals with different indexes. For example:

$$\sqrt{3}\sqrt[3]{5} = \sqrt[6]{27}\sqrt[6]{25} = \sqrt[6]{(27)(25)} = \sqrt[6]{675}$$

Use this idea to write the following expression as a single radical.

$$\frac{\sqrt[4]{2}}{\sqrt{6}}$$

a. $\frac{\sqrt[4]{72}}{6}$
b. $\frac{\sqrt[5]{72}}{6}$
c. $\frac{\sqrt[4]{72}}{8}$
d. $\frac{\sqrt[4]{72}}{2}$

____ 12. Simplify the expression.

$$-16^{3/2}$$

a. -192
b. 67
c. -64
d. -66
e. -128
f. -24

____ 13. Simplify the expression. Assume that all variables represent positive numbers, so that no absolute value symbols are needed.

$$\sqrt[4]{2xy^5} + y\sqrt[4]{512xy} - \sqrt[4]{2xy^5}$$

a. $8y\sqrt{3xy}$
b. $12y\sqrt{2xy}$
c. $4y\sqrt{4xy}$
d. $4y\sqrt{2xy}$

____ 14. Rationalize the denominator and simplify.

$$\frac{2}{\sqrt[3]{2}}$$

a. $\sqrt[3]{104}$
b. $\sqrt[3]{7}$
c. $\sqrt[4]{5}$
d. $\sqrt[3]{4}$
e. $\sqrt[6]{4}$

____ 15. Perform division and write the answer without using negative exponents.

$$\frac{-12x^6y^4z^9}{3x^9y^6z^0}$$

a. $\dfrac{4z^9}{x^3y^6}$
b. $\dfrac{-4z^4}{x^3y^2}$
c. $\dfrac{4z^9}{x^3y^2}$
d. $\dfrac{-4z^9}{x^3y^2}$

____ 16. Perform the division and write the answer without using negative exponents.

$$\frac{160x^5y^7 - 96x^2y^5 + 32xy}{4x^5y^4}$$

a. $24y^3 - \frac{40y}{x^3} + \frac{32}{x^4y^3}$

b. $40y^3 - \frac{40y}{x^4} + \frac{32}{x^4y^3}$

c. $24y^3 - \frac{24y}{x^3} + \frac{32}{x^4y^9}$

d. $40y^3 - \frac{24y}{x^3} + \frac{8}{x^4y^3}$

____ 17. Give the degree of the polynomial.

$$\sqrt{791}$$

a. 1/2
b. 0
c. This is not a polynomial
d. No defined degree

____ 18. Perform the operation and simplify.

$$-3a^2(a + 1) + 9a(a^2 - 6) - a^2(a + 6)$$

a. $5a^3 - 9a^2 - 54a$
b. $5a^3 - 9a^2 - 54$
c. $5a^2 + 9a^4 - 54$
d. 0

____ 19. Multiply the expression as you would multiply polynomials.

$$(x^{17/2} + y^{7/2})^2$$

a. $x^{17} - 2x^{17}y^7 + y^7$
b. $x^{17} + x^{17}y^7 + y^7$
c. $x^{17} + y^7$
d. $x^{17} + 2x^{17/2}y^{7/2} + y^7$

____ 20. Factor the expression completely.

$4z^2 + 28z + 49$

a. $(2z + 7)^2$
b. $7(2z + 7)$
c. $(2z + 7)(2z - 7)$
d. $(2z - 7)^2$

____ 21. Perform the operations and simplify.

$$\frac{2a}{13} \cdot \frac{3}{5b}$$

Assume that no denominators are 0.

a. $\frac{3}{2}$
b. $\frac{13a}{b5}$
c. $\frac{6a}{65b}$
d. $\frac{2}{3}$

____ 22. Simplify the fraction.

$$\frac{xy + 6x + 9y + 54}{x^3 + 729}$$

Assume that denominator is not 0.

a. $\frac{y - 6}{x^2 - 9x - 81}$
b. $\frac{y + 9}{x^2 - 9x + 81}$
c. $\frac{y + 6}{x^2 - 9x + 81}$
d. $\frac{y - 6}{x^2 - 9x + 81}$

____ 23. Perform the operations and simplify.

$$\frac{1}{x-4}+\frac{3}{x+4}-\frac{3x-4}{x^2-16}$$

Assume that no denominators are 0.

a. $\frac{4}{x+4}$

b. $\frac{1}{x+16}$

c. $\frac{1}{x+4}$

d. $\frac{1}{x-4}$

____ 24. Simplify the complex fraction.

$$\frac{\frac{4x^2}{y^4}}{\frac{8x^3z^3}{y^2}}$$

Assume that the denominators are not 0.

a. $\frac{1}{2}x^{-1}y^{-2}z^{-3}$

b. $\frac{1}{2}x^2y^3z^3$

c. $\frac{1}{2}x^2y^{-2}z^{-3}$

d. $\frac{1}{2}x^{-1}y^4z^{-3}$

____ 25. Simplify each complex fraction.

$$\frac{x+1-\frac{6}{x}}{x+5+\frac{6}{x}}$$

Assume that no denominators are 0.

a. $\frac{x+3}{x-3}$

b. $\frac{x-2}{x+2}$

c. $\frac{x+2}{x-2}$

d. $\frac{x-3}{x+3}$

Answer Section

MULTIPLE CHOICE

1. ANS: E PTS: 1
2. ANS: D PTS: 1
3. ANS: B PTS: 1
4. ANS: C PTS: 1
5. ANS: A PTS: 1
6. ANS: C PTS: 1
7. ANS: D PTS: 1
8. ANS: C PTS: 1
9. ANS: B PTS: 1
10. ANS: D PTS: 1
11. ANS: A PTS: 1
12. ANS: C PTS: 1
13. ANS: D PTS: 1
14. ANS: D PTS: 1
15. ANS: D PTS: 1
16. ANS: D PTS: 1
17. ANS: B PTS: 1
18. ANS: A PTS: 1
19. ANS: D PTS: 1
20. ANS: A PTS: 1
21. ANS: C PTS: 1
22. ANS: C PTS: 1
23. ANS: C PTS: 1
24. ANS: A PTS: 1
25. ANS: B PTS: 1

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. How many prime numbers are there between –6 and 14 on the number line?

a. 19
b. 13
c. 0
d. 14
e. 6
f. 5

____ 2. Select the correct representation of the inequality in interval notation.

$x \leq 3$

a. $(-\infty, 3)$
b. $(-\infty, 3]$
c. $[3, \infty)$
d. $[-\infty, 3]$
e. $(3, \infty)$

____ 3. Simplify the expression.

$(x^3)^3 (x^3)^2$

a. x^{11}
b. x^{-1}
c. x^{10}
d. x^{15}

____ 4. Simplify the expression.

$(-13x)^0$

Write the answer without using exponents.

a. 1
b. 13
c. -13
d. -1

____ 5. Simplify the expression.

$$\frac{1}{x^{-7}}$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

a. x^7
b. $\frac{1}{x^7}$
c. x^8
d. $\frac{1}{x^8}$

____ 6. Simplify the expression.

$$\frac{x^6x^4}{x^3x}$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

a. x^8
b. x^7
c. x^{14}
d. x^6

____ 7. Simplify the expression.

$$\frac{(8^{-2}z^{-5}y)^{-1}}{(5y^5z^{-1})^3(5yz^{-1})^{-2}}$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

a. $\frac{64z^6}{5y^{14}}$

b. $\frac{5y^{14}}{64z^6}$

c. $\frac{64z^{14}}{5y^6}$

d. $\frac{8z^5}{5y^{15}}$

____ 8. Simplify the expression.

$$\left(\frac{8x^{-4}y^5z^{-8}}{32x^4y^{12}z^{-13}}\right)^3$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

a. $\frac{z^5}{4x^8y^7}$

b. $\frac{z^{15}}{64x^{24}y^{21}}$

c. $\frac{z^{15}}{64x^{21}y^{24}}$

d. $\frac{z^{15}}{64x^{-24}y^{-21}}$

e. $\frac{z^5}{4x^{24}y^{21}}$

____ 9. Rationalize the numerator and simplify.

$$\frac{\sqrt{5}}{25}$$

a. $\frac{1}{10\sqrt{2}}$

b. $\frac{1}{5\sqrt{5}}$

c. $\frac{1}{5\sqrt{2}}$

d. $\frac{1}{6\sqrt{5}}$

e. $\frac{1}{5\sqrt{10}}$

____ 10. Simplify the radical expression.

$$\sqrt[4]{4}$$

a. $\sqrt[2]{4}$

b. $\sqrt[2]{2}$

c. $\sqrt[2]{200}$

d. $\sqrt[4]{2}$

e. $\sqrt[8]{2}$

____ 11. We can often multiply and divide radicals with different indexes. For example:

$$\sqrt{3}\sqrt[3]{5} = \sqrt[6]{27}\sqrt[6]{25} = \sqrt[6]{(27)(25)} = \sqrt[6]{675}$$

Use this idea to write the following expression as a single radical.

$$\frac{\sqrt[6]{4}}{\sqrt{5}}$$

a. $\frac{\sqrt[6]{500}}{9}$
b. $\frac{\sqrt[6]{500}}{5}$
c. $\frac{\sqrt[6]{500}}{4}$
d. $\frac{\sqrt[7]{500}}{5}$

____ 12. Simplify the expression.

$$-25^{4/2}$$

a. -1,250
b. 628
c. -1,875
d. -625
e. -50
f. -627

____ 13. Simplify the expression. Assume that all variables represent positive numbers, so that no absolute value symbols are needed.

$$\sqrt[4]{2xy^5} + y\sqrt[4]{512xy} - \sqrt[4]{2xy^5}$$

a. $4y\sqrt{4xy}$
b. $4y\sqrt{2xy}$
c. $12y\sqrt{2xy}$
d. $8y\sqrt{3xy}$

____ 14. Rationalize the denominator and simplify.

$$\frac{4}{\sqrt[4]{4}}$$

a. $\sqrt[4]{164}$
b. $\sqrt[5]{65}$
c. $\sqrt[4]{67}$
d. $\sqrt[4]{64}$
e. $\sqrt[8]{64}$

____ 15. Perform division and write the answer without using negative exponents.

$$\frac{-190x^6y^4z^9}{19x^9y^6z^0}$$

a. $\dfrac{10z^9}{x^3y^6}$
b. $\dfrac{10z^9}{x^3y^2}$
c. $\dfrac{-10z^4}{x^3y^2}$
d. $\dfrac{-10z^9}{x^3y^2}$

____ 16. Perform the division and write the answer without using negative exponents.

$$\frac{100x^5y^7 - 60x^2y^5 + 20xy}{10x^5y^4}$$

a. $6y^3 - \dfrac{6y}{x^3} + \dfrac{20}{x^4y^9}$
b. $10y^3 - \dfrac{10y}{x^4} + \dfrac{20}{x^4y^3}$
c. $10y^3 - \dfrac{6y}{x^3} + \dfrac{2}{x^4y^3}$
d. $6y^3 - \dfrac{10y}{x^3} + \dfrac{20}{x^4y^3}$

____ 17. Give the degree of the polynomial.

$\sqrt{576}$

a. 0
b. No defined degree
c. 1/2
d. This is not a polynomial

____ 18. Perform the operation and simplify.

$-3a^2(a + 1) + 6a(a^2 - 4) - a^2(a + 10)$

a. 0
b. $2a^3 - 13a^2 - 24$
c. $2a^3 - 13a^2 - 24a$
d. $2a^2 + 13a^4 - 24$

____ 19. Multiply the expression as you would multiply polynomials.

$(x^{7/2} + y^{9/2})^2$

a. $x^7 + 2x^{7/2}y^{9/2} + y^9$
b. $x^7 - 2x^7y^9 + y^9$
c. $x^7 + x^7y^9 + y^9$
d. $x^7 + y^9$

____ 20. Factor the expression completely.

$36z^2 + 84z + 49$

a. $(6z + 7)^2$
b. $(6z - 7)^2$
c. $(6z + 7)(6z - 7)$
d. $7(6z + 7)$

____ 21. Perform the operations and simplify.

$$\frac{23a}{2} \cdot \frac{11}{2b}$$

Assume that no denominators are 0.

a. $\frac{11}{23}$

b. $\frac{253a}{4b}$

c. $\frac{23}{11}$

d. $\frac{2a}{b2}$

____ 22. Simplify the fraction.

$$\frac{xy + 6x + 4y + 24}{x^3 + 64}$$

Assume that denominator is not 0.

a. $\frac{y - 6}{x^2 - 4x - 16}$

b. $\frac{y + 6}{x^2 - 4x + 16}$

c. $\frac{y - 6}{x^2 - 4x + 16}$

d. $\frac{y + 4}{x^2 - 4x + 16}$

____ 23. Perform the operations and simplify.

$$\frac{1}{x-4}+\frac{3}{x+4}-\frac{3x-4}{x^2-16}$$

Assume that no denominators are 0.

a. $\frac{1}{x+16}$

b. $\frac{1}{x+4}$

c. $\frac{1}{x-4}$

d. $\frac{4}{x+4}$

____ 24. Simplify the complex fraction.

$$\frac{\frac{3x^5}{y^2}}{\frac{6x^2z^4}{y^4}}$$

Assume that the denominators are not 0.

a. $\frac{1}{2}x^3y^2z^{-4}$

b. $\frac{1}{2}x^4y^2z^4$

c. $\frac{1}{2}x^5y^2z^{-4}$

d. $\frac{1}{2}x^3y^2z^{-4}$

____ 25. Simplify each complex fraction.

$$\frac{x+1-\frac{6}{x}}{x+5+\frac{6}{x}}$$

Assume that no denominators are 0.

a. $\frac{x-2}{x+2}$

b. $\frac{x+2}{x-2}$

c. $\frac{x-3}{x+3}$

d. $\frac{x+3}{x-3}$

Answer Section

MULTIPLE CHOICE

1. ANS: E PTS: 1
2. ANS: B PTS: 1
3. ANS: D PTS: 1
4. ANS: A PTS: 1
5. ANS: A PTS: 1
6. ANS: D PTS: 1
7. ANS: A PTS: 1
8. ANS: B PTS: 1
9. ANS: B PTS: 1
10. ANS: B PTS: 1
11. ANS: B PTS: 1
12. ANS: D PTS: 1
13. ANS: B PTS: 1
14. ANS: D PTS: 1
15. ANS: D PTS: 1
16. ANS: C PTS: 1
17. ANS: A PTS: 1
18. ANS: C PTS: 1
19. ANS: A PTS: 1
20. ANS: A PTS: 1
21. ANS: B PTS: 1
22. ANS: B PTS: 1
23. ANS: B PTS: 1
24. ANS: A PTS: 1
25. ANS: A PTS: 1

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. How many prime numbers are there between –5 and 20 on the number line?

a. 0
b. 4
c. 19
d. 24
e. 20
f. 8

____ 2. Select the correct representation of the inequality in interval notation.

$x \leq 7$

a. $[-\infty, 7]$
b. $(7, \infty)$
c. $[7, \infty)$
d. $(-\infty, 7)$
e. $(-\infty, 7]$

____ 3. Simplify the expression.

$(x^6)^4 (x^2)^2$

a. x^{-8}
b. x^6
c. x^{14}
d. x^{28}

____ 4. Simplify the expression.

$(-4x)^0$

Write the answer without using exponents.

a. 1
b. 4
c. -4
d. -1

____ 5. Simplify the expression.

$$\frac{1}{x^{-8}}$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

a. $\frac{1}{x^9}$
b. x^8
c. x^9
d. $\frac{1}{x^8}$

____ 6. Simplify the expression.

$$\frac{x^7x^4}{x^4x}$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

a. x^{16}
b. x^6
c. x^7
d. x^8

____ 7. Simplify the expression.

$$\frac{(8^{-2}z^{-5}y)^{-2}}{(5y^2z^{-5})^5(5yz^{-5})^{-1}}$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

a. $\frac{512z^{29}}{625y^{12}}$

b. $\frac{625y^{11}}{4096z^{30}}$

c. $\frac{4096z^{30}}{625y^{11}}$

d. $\frac{4096z^{11}}{625y^{30}}$

____ 8. Simplify the expression.

$$\left(\frac{5x^{-5}y^5z^{-7}}{20x^6y^{10}z^{-12}}\right)^3$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

a. $\frac{z^5}{4x^{33}y^{15}}$

b. $\frac{z^{15}}{64x^{33}y^{15}}$

c. $\frac{z^{15}}{64x^{15}y^{33}}$

d. $\frac{z^5}{4x^{11}y^5}$

e. $\frac{z^{15}}{64x^{-33}y^{-15}}$

____ 9. Rationalize the numerator and simplify.

$$\frac{\sqrt{2}}{8}$$

a. $\frac{1}{8\sqrt{5}}$

b. $\frac{1}{4\sqrt{2}}$

c. $\frac{1}{4\sqrt{6}}$

d. $\frac{1}{5\sqrt{2}}$

e. $\frac{1}{4\sqrt{5}}$

____ 10. Simplify the radical expression.

$$\sqrt[4]{49}$$

a. $\sqrt[8]{7}$

b. $\sqrt[2]{700}$

c. $\sqrt[2]{49}$

d. $\sqrt[4]{7}$

e. $\sqrt[2]{7}$

____ 11. We can often multiply and divide radicals with different indexes. For example:

$$\sqrt{3}\sqrt[3]{5} = \sqrt[6]{27}\sqrt[6]{25} = \sqrt[6]{(27)(25)} = \sqrt[6]{675}$$

Use this idea to write the following expression as a single radical.

$$\frac{\sqrt[6]{4}}{\sqrt{7}}$$

a. $\frac{\sqrt[6]{1372}}{11}$
b. $\frac{\sqrt[7]{1372}}{7}$
c. $\frac{\sqrt[6]{1372}}{4}$
d. $\frac{\sqrt[6]{1372}}{7}$

____ 12. Simplify the expression.

$$-8^{4/3}$$

a. -10.6667
b. 19
c. -32
d. -48
e. -18
f. -16

____ 13. Simplify the expression. Assume that all variables represent positive numbers, so that no absolute value symbols are needed.

$$\sqrt[4]{2xy^5} + y\sqrt[4]{512xy} - \sqrt[4]{2xy^5}$$

a. $12y\sqrt{2xy}$
b. $8y\sqrt{3xy}$
c. $4y\sqrt{2xy}$
d. $4y\sqrt{4xy}$

____ 14. Rationalize the denominator and simplify.

$$\frac{3}{\sqrt[5]{3}}$$

a. $\sqrt[6]{82}$
b. $\sqrt[5]{181}$
c. $\sqrt[5]{84}$
d. $\sqrt[10]{81}$
e. $\sqrt[5]{81}$

____ 15. Perform division and write the answer without using negative exponents.

$$\frac{-56x^6y^4z^9}{14x^9y^6z^0}$$

a. $\dfrac{-4z^4}{x^3y^2}$
b. $\dfrac{-4z^9}{x^3y^2}$
c. $\dfrac{4z^9}{x^3y^6}$
d. $\dfrac{4z^9}{x^3y^2}$

____ 16. Perform the division and write the answer without using negative exponents.

$$\frac{400x^5y^7 - 240x^2y^5 + 80xy}{16x^5y^4}$$

a. $25y^3 - \dfrac{15y}{x^3} + \dfrac{5}{x^4y^3}$
b. $15y^3 - \dfrac{15y}{x^3} + \dfrac{80}{x^4y^9}$
c. $15y^3 - \dfrac{25y}{x^3} + \dfrac{80}{x^4y^3}$
d. $25y^3 - \dfrac{25y}{x^4} + \dfrac{80}{x^4y^3}$

____ 17. Give the degree of the polynomial.

$\sqrt{127}$

a. 1/2
b. No defined degree
c. This is not a polynomial
d. 0

____ 18. Perform the operation and simplify.

$-3a^2(a + 1) + 7a(a^2 - 4) - a^2(a + 9)$

a. $3a^2 + 12a^4 - 28$
b. $3a^3 - 12a^2 - 28$
c. 0
d. $3a^3 - 12a^2 - 28a$

____ 19. Multiply the expression as you would multiply polynomials.

$(x^{11/2} + y^{15/2})^2$

a. $x^{11} + 2x^{11/2}y^{15/2} + y^{15}$
b. $x^{11} + x^{11}y^{15} + y^{15}$
c. $x^{11} - 2x^{11}y^{15} + y^{15}$
d. $x^{11} + y^{15}$

____ 20. Factor the expression completely.

$9z^2 + 42z + 49$

a. $(3z - 7)^2$
b. $(3z + 7)(3z - 7)$
c. $7(3z + 7)$
d. $(3z + 7)^2$

____ 21. Perform the operations and simplify.

$$\frac{5a}{3} \cdot \frac{2}{7b}$$

Assume that no denominators are 0.

a. $\frac{3a}{b7}$

b. $\frac{5}{2}$

c. $\frac{2}{5}$

d. $\frac{10a}{21b}$

____ 22. Simplify the fraction.

$$\frac{xy + 6x + 8y + 48}{x^3 + 512}$$

Assume that denominator is not 0.

a. $\frac{y - 6}{x^2 - 8x + 64}$

b. $\frac{y + 8}{x^2 - 8x + 64}$

c. $\frac{y - 6}{x^2 - 8x - 64}$

d. $\frac{y + 6}{x^2 - 8x + 64}$

____ 23. Perform the operations and simplify.

$$\frac{1}{x-6}+\frac{3}{x+6}-\frac{3x-6}{x^2-36}$$

Assume that no denominators are 0.

a. $\frac{1}{x-6}$

b. $\frac{1}{x+36}$

c. $\frac{1}{x+6}$

d. $\frac{6}{x+6}$

____ 24. Simplify the complex fraction.

$$\frac{\frac{2x^2}{y^3}}{\frac{4x^4z^3}{y^5}}$$

Assume that the denominators are not 0.

a. $\frac{1}{2}x^2y^2z^{-3}$

b. $\frac{1}{2}x^{-2}y^3z^{-3}$

c. $\frac{1}{2}x^{-2}y^2z^{-3}$

d. $\frac{1}{2}x^5y^4z^3$

____ 25. Simplify each complex fraction.

$$\frac{x+2-\frac{63}{x}}{x+16+\frac{63}{x}}$$

Assume that no denominators are 0.

a. $\frac{x+9}{x-9}$

b. $\frac{x-7}{x+7}$

c. $\frac{x+7}{x-7}$

d. $\frac{x-9}{x+9}$

Answer Section

MULTIPLE CHOICE

1. ANS: F PTS: 1
2. ANS: E PTS: 1
3. ANS: D PTS: 1
4. ANS: A PTS: 1
5. ANS: B PTS: 1
6. ANS: B PTS: 1
7. ANS: C PTS: 1
8. ANS: B PTS: 1
9. ANS: B PTS: 1
10. ANS: E PTS: 1
11. ANS: D PTS: 1
12. ANS: F PTS: 1
13. ANS: C PTS: 1
14. ANS: E PTS: 1
15. ANS: B PTS: 1
16. ANS: A PTS: 1
17. ANS: D PTS: 1
18. ANS: D PTS: 1
19. ANS: A PTS: 1
20. ANS: D PTS: 1
21. ANS: D PTS: 1
22. ANS: D PTS: 1
23. ANS: C PTS: 1
24. ANS: C PTS: 1
25. ANS: B PTS: 1

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. How many natural numbers are there between –16.5 and 6.5 on the number line?

a. 0
b. 7
c. 12
d. 6
e. 23

____ 2. Identify the correct union of intervals for the inequality.

$x \leq -16$ or $x > 5$

a. $(-\infty, -16] \cup (5, \infty)$
b. $(-\infty, -16) \cup [5, \infty)$
c. $(-\infty, -16) \cup (5, \infty)$
d. $(-\infty, -16] \cup (5, \infty]$
e. $(-\infty, -16] \cup [5, \infty)$

____ 3. Write the expression without using absolute value symbols.

$|x+4| - |x-11|$ for $x < -8$

$|x+4| - |x-11| =$ _____ for $x < -8$

a. 15
b. $2x - 15$
c. 7
d. $15 - 2x$
e. –15

____ 4. Calculate the volume of a box that has dimensions of 6,000 by 8,600 by 4,800 millimeters.

a. $2.4768 \times 10^{10}\ \text{mm}^3$
b. $2.4768 \times 10^{11}\ \text{mm}^3$
c. $1.9975 \times 10^{10}\ \text{mm}^3$
d. $1.9975 \times 10^{11}\ \text{mm}^3$

____ 5. Simplify the expression.

$$\left(\frac{a^{-5}}{b^{-3}}\right)^{-4}$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

a. $\frac{a^{12}}{b^{20}}$
b. $\frac{a^{20}}{b^{12}}$
c. $\frac{b^{12}}{a^{20}}$
d. $\frac{b^{20}}{a^{12}}$

____ 6. Simplify the expression.

$$\left(\frac{r^5 r^{-1}}{r^3 r^{-3}}\right)^2$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

a. r^2
b. r^8
c. r^0
d. r^{12}

____ 7. Express the number -176,000,000 in scientific notation.

a. -1.76×10^8
b. -1.76×10^7
c. -17.6×10^9
d. -1.76×10^9

____ 8. We can often multiply and divide radicals with different indexes. For example:

$$\sqrt{3}\sqrt[3]{5} = \sqrt[6]{27}\sqrt[6]{25} = \sqrt[6]{(27)(25)} = \sqrt[6]{675}$$

Use this idea to write the following expression as a single radical.

$$\sqrt{4}\sqrt[3]{4}$$

a. $\sqrt{1024}$
b. $\sqrt[6]{1024}$
c. $\sqrt[3]{1024}$
d. $\sqrt[6]{4}$
e. $\sqrt[6]{256}$

____ 9. Simplify the expression.

$$(9y^2)^{1/2}$$

a. $9|y|$
b. $3y$
c. $3y^2$
d. $3|y|$
e. $3|y^2|$

____ 10. Simplify the expression.

$$\left(-\frac{3{,}125x^{10}}{32y^5}\right)^{1/5}$$

a. $\frac{5x^2}{2y}$
b. $-\frac{5x^2}{2y^2}$
c. $\frac{5x^3}{2y}$
d. $-\frac{5x^2}{2y}$

____ 11. Simplify the expression.

$$\frac{a^{1/5}a^{4/5}}{a^{2/5}}$$

Write all answers without using negative exponents. Assume that all variables represent positive numbers.

a. $a^{3/10}$
b. $a^{7/5}$
c. $a^{3/5}$
d. $a^{5/5}$
e. $a^{3/8}$

____ 12. Perform the division.

$$x^2 + x - 1 \overline{)\, 13x^3 - 8x^2 - 34x + 21}$$

a. $13x - 23$
b. $13x - 21$
c. $13x^2 - 21$
d. $23 - 13x$

____ 13. Perform the operations and simplify.

$(8x^3 - 3x^2) + (5x^3 - 3x)$

a. $13x - 3x^2 - 3x^3$
b. 0
c. $7x^3$
d. $13x^3 - 3x^2 - 3x$

____ 14. Perform the operation and simplify.

$(a - 15)^2$

a. $a^2 + 30a + 225$
b. $a^2 - 15a + 225$
c. $a^2 - 225$
d. $a^2 - 30a + 225$
e. $a^2 + 225$

____ 15. Multiply the expression as you would multiply polynomials.

$(a^{11/2} + b^{3/2})(a^{11/2} - b^{3/2})$

a. $a^{11} - b^3$
b. $(a + b)^4$
c. $(a - b)^7$
d. $a^{22} - b^6$

____ 16. Perform the multiplication and simplify.

$(x-y)(3x+14y)^2$

a. $9x^3 + 75x^2y + 112xy^2 + 196y^3$
b. $9x^3 + 112x^2y + 196xy^2 + 75y^3$
c. $196x^3 + 112x^2y + 75xy^2 + 9y^3$
d. $9x^3 + 75x^2y + 112xy^2 - 196y^3$
e. $9x^3 - 75x^2y + 112xy^2 + 196y^3$

____ 17. Factor the expression completely.

$10x^2 + 5x^3$

a. $5x^2 (2 - x)$
b. $5x^2 (2 + x^2)$
c. $5x^2 (3 + x)$
d. $5x^2 (2 + x)$

____ 18. Factor the expression completely.

$3x^3 + 3x^2 - 13x - 13$

a. $(x - 1) (3x^2 + 13)$
b. $(1 - x) (3x^2 - 13)$
c. $(x + 1) (3x^2 - 13)$
d. $(x + 1) (13 - 3x^2)$

____ 19. Factor the expression completely.

$64x^{10} + 1$

a. $(8x^5 + 1)^2$
b. $(8x^5 - 1)^2$
c. $(8x^5 + 1) (8x^5 - 1)$
d. The expression is prime.

____ 20. Factor the expression completely.

$56x^2 - 29xy - 40y^2$

a. $(7x - 8y)(8x + 5y)$
b. $(7x - 8y)(5x + 8y)$
c. $(5x - 8y)(8x + 7y)$
d. $(7x + 8y)(8x - 5y)$

____ 21. Factor the expression completely.

$22r^2 - 13rs - 30s^2$

a. $(2r - 3s)(11r + 10s)$
b. $(3r - 2s)(11r + 10s)$
c. $(2r + 3s)(11r - 10s)$
d. $(2r - 3s)(10r + 11s)$

____ 22. Factor the expression completely.

$z^2 + 4z + 4 - 144y^2$

a. $(z - 2 + 12y)(z + 2 + 12y)$
b. $(z + 2 + 12y)(z + 2 - 12y)$
c. $(z - 2 + 12y)(z - 2 - 12y)$
d. $(z + 12 + 2y)(z + 12 - 2y)$

____ 23. Factor the expression completely.

$(4x - 4y)^3 + 125$

a. $(4x + 4y - 5) \cdot (16x^2 - 20x - 32xy + 20y + 16y^2 + 25)$
b. $(4x - 4y + 5) \cdot (16x^2 + 20x + 32xy - 20y - 16y^2 + 25)$
c. $(4x + 4y - 5) \cdot (16x^2 + 20x + 32xy - 20y - 16y^2 + 25)$
d. $(4x - 4y + 5) \cdot (16x^2 - 20x + 32xy - 20y + 16y^2 + 25)$
e. $(4x - 4y + 5) \cdot (16x^2 - 20x - 32xy + 20y + 16y^2 + 25)$

____ 24. Simplify the fraction.

$$\frac{3x-9}{x^2-9}$$

Assume that the denominator is not 0.

a. $\frac{x}{x-3}$
b. $\frac{3}{x+3}$
c. $\frac{1}{x-1}$
d. $\frac{1}{x+1}$
e. $\frac{x}{x+3}$
f. $\frac{3}{x-3}$

____ 25. Perform the operations and simplify.

$$\frac{x+8}{x^2+11x+24}+\frac{x}{x^2-9}$$

Assume that no denominators are 0.

a. $\frac{2x-9}{x^2-3}$
b. $\frac{2x+3}{x^2-9}$
c. $\frac{2x-3}{x^2-9}$
d. $\frac{2x-3}{x^2+9}$

Answer Section

MULTIPLE CHOICE

1. ANS: D PTS: 1
2. ANS: A PTS: 1
3. ANS: E PTS: 1
4. ANS: B PTS: 1
5. ANS: B PTS: 1
6. ANS: B PTS: 1
7. ANS: A PTS: 1
8. ANS: B PTS: 1
9. ANS: D PTS: 1
10. ANS: D PTS: 1
11. ANS: C PTS: 1
12. ANS: B PTS: 1
13. ANS: D PTS: 1
14. ANS: D PTS: 1
15. ANS: A PTS: 1
16. ANS: D PTS: 1
17. ANS: D PTS: 1
18. ANS: C PTS: 1
19. ANS: D PTS: 1
20. ANS: A PTS: 1
21. ANS: A PTS: 1
22. ANS: B PTS: 1
23. ANS: E PTS: 1
24. ANS: B PTS: 1
25. ANS: C PTS: 1

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. How many natural numbers are there between –6.5 and 12.5 on the number line?

a. 10
b. 0
c. 13
d. 12
e. 19

____ 2. Identify the correct union of intervals for the inequality.

$x \leq -18$ or $x > 4$

a. $(-\infty, -18] \cup (4, \infty)$
b. $(-\infty, -18) \cup (4, \infty)$
c. $(-\infty, -18] \cup (4, \infty]$
d. $(-\infty, -18] \cup [4, \infty)$
e. $(-\infty, -18) \cup [4, \infty)$

____ 3. Write the expression without using absolute value symbols.

$|x+4| - |x-14|$ for $x < -8$

$|x+4| - |x-14| =$ _____ for $x < -8$

a. 10
b. –18
c. $2x - 18$
d. $18 - 2x$
e. 18

____ 4. Calculate the volume of a box that has dimensions of 4,000 by 8,400 by 5,300 millimeters.

a. $1.7808 \times 10^{11}\ \text{mm}^3$
b. $1.2948 \times 10^{11}\ \text{mm}^3$
c. $1.7808 \times 10^{10}\ \text{mm}^3$
d. $1.2948 \times 10^{10}\ \text{mm}^3$

____ 5. Simplify the expression.

$$\left(\frac{a^{-1}}{b^{-4}}\right)^{-5}$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

a. $\frac{a^{20}}{b^5}$
b. $\frac{b^5}{a^{20}}$
c. $\frac{a^5}{b^{20}}$
d. $\frac{b^{20}}{a^5}$

____ 6. Simplify the expression.

$$\left(\frac{r^4 r^{-2}}{r^4 r^{-4}}\right)^5$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

a. r^{10}
b. r^0
c. r^{30}
d. r^5

____ 7. Express the number -174,000,000 in scientific notation.

a. -1.74×10^9
b. -1.74×10^8
c. -17.4×10^9
d. -1.74×10^7

____ 8. We can often multiply and divide radicals with different indexes. For example:

$$\sqrt{3}\sqrt[3]{5} = \sqrt[6]{27}\sqrt[6]{25} = \sqrt[6]{(27)(25)} = \sqrt[6]{675}$$

Use this idea to write the following expression as a single radical.

$$\sqrt{3}\sqrt[3]{3}$$

a. $\sqrt[6]{81}$
b. $\sqrt[6]{3}$
c. $\sqrt{243}$
d. $\sqrt[3]{243}$
e. $\sqrt[6]{243}$

____ 9. Simplify the expression.

$$(625y^4)^{1/4}$$

a. $5|y|$
b. $5|y^2|$
c. $25|y|$
d. $5y^2$
e. $5y$

____ 10. Simplify the expression.

$$\left(-\frac{343x^9}{125y^3}\right)^{1/3}$$

a. $\frac{7x^3}{5y}$
b. $-\frac{7x^3}{5y}$
c. $-\frac{7x^3}{5y^2}$
d. $\frac{7x^4}{5y}$

____ 11. Simplify the expression.

$$\frac{a^{3/7}a^{2/7}}{a^{1/7}}$$

Write all answers without using negative exponents. Assume that all variables represent positive numbers.

a. $a^{4/10}$
b. $a^{6/7}$
c. $a^{4/14}$
d. $a^{4/7}$
e. $a^{5/7}$

____ 12. Perform the division.

$$x^2 + x - 1 \overline{)\, 3x^3 - 2x^2 - 8x + 5}$$

a. $3x - 10$
b. $10 - 3x$
c. $3x^2 - 5$
d. $3x - 5$

____ 13. Perform the operations and simplify.

$(7x^3 - 5x^2) + (7x^3 - 5x)$

a. $14x - 5x^2 - 5x^3$
b. $4x^3$
c. 0
d. $14x^3 - 5x^2 - 5x$

____ 14. Perform the operation and simplify.

$(a - 14)^2$

a. $a^2 - 28a + 196$
b. $a^2 - 14a + 196$
c. $a^2 - 196$
d. $a^2 + 196$
e. $a^2 + 28a + 196$

____ 15. Multiply the expression as you would multiply polynomials.

$(a^{19/2} + b^{15/2})(a^{19/2} - b^{15/2})$

a. $a^{19} - b^{15}$
b. $(a - b)^{17}$
c. $(a + b)^2$
d. $a^{38} - b^{30}$

____ 16. Perform the multiplication and simplify.

$(x-y)(3x+14y)^2$

a. $9x^3 + 112x^2y + 196xy^2 + 75y^3$
b. $9x^3 + 75x^2y + 112xy^2 + 196y^3$
c. $196x^3 + 112x^2y + 75xy^2 + 9y^3$
d. $9x^3 + 75x^2y + 112xy^2 - 196y^3$
e. $9x^3 - 75x^2y + 112xy^2 + 196y^3$

____ 17. Factor the expression completely.

$6x^2 + 3x^3$

a. $3x^2 (3 + x)$
b. $3x^2 (2 + x)$
c. $3x^2 (2 + x^2)$
d. $3x^2 (2 - x)$

____ 18. Factor the expression completely.

$8x^3 + 8x^2 - 5x - 5$

a. $(x - 1) (8x^2 + 5)$
b. $(1 - x) (8x^2 - 5)$
c. $(x + 1) (8x^2 - 5)$
d. $(x + 1) (5 - 8x^2)$

____ 19. Factor the expression completely.

$64x^{10} + 1$

a. $(8x^5 - 1)^2$
b. The expression is prime.
c. $(8x^5 + 1)^2$
d. $(8x^5 + 1) (8x^5 - 1)$

____ 20. Factor the expression completely.

$30x^2 - 13xy - 56y^2$

a. $(5x - 8y)(6x + 7y)$
b. $(5x + 8y)(6x - 7y)$
c. $(7x - 8y)(6x + 5y)$
d. $(5x - 8y)(7x + 6y)$

____ 21. Factor the expression completely.

$4r^2 - 4rs - 35s^2$

a. $(7r - 2s)(2r + 5s)$
b. $(2r - 7s)(2r + 5s)$
c. $(2r + 7s)(2r - 5s)$
d. $(2r - 7s)(5r + 2s)$

____ 22. Factor the expression completely.

$z^2 + 8z + 16 - 196y^2$

a. $(z - 4 + 14y)(z - 4 - 14y)$
b. $(z - 4 + 14y)(z + 4 + 14y)$
c. $(z + 14 + 4y)(z + 14 - 4y)$
d. $(z + 4 + 14y)(z + 4 - 14y)$

____ 23. Factor the expression completely.

$(4x - 5y)^3 + 64$

a. $(4x - 5y + 4) \cdot (16x^2 + 16x + 40xy - 20y - 25y^2 + 16)$
b. $(4x - 5y + 4) \cdot (16x^2 - 16x + 40xy - 20y + 25y^2 + 16)$
c. $(4x + 5y - 4) \cdot (16x^2 + 16x + 40xy - 20y - 25y^2 + 16)$
d. $(4x + 5y - 4) \cdot (16x^2 - 16x - 40xy + 20y + 25y^2 + 16)$
e. $(4x - 5y + 4) \cdot (16x^2 - 16x - 40xy + 20y + 25y^2 + 16)$

____ 24. Simplify the fraction.

$$\frac{7x - 49}{x^2 - 49}$$

Assume that the denominator is not 0.

a. $\frac{1}{x - 1}$

b. $\frac{7}{x + 7}$

c. $\frac{x}{x + 7}$

d. $\frac{x}{x - 7}$

e. $\frac{7}{x - 7}$

f. $\frac{1}{x + 1}$

____ 25. Perform the operations and simplify.

$$\frac{x + 6}{x^2 + 13x + 42} + \frac{x}{x^2 - 49}$$

Assume that no denominators are 0.

a. $\frac{2x - 49}{x^2 - 7}$

b. $\frac{2x - 7}{x^2 - 49}$

c. $\frac{2x - 7}{x^2 + 49}$

d. $\frac{2x + 7}{x^2 - 49}$

Answer Section

MULTIPLE CHOICE

1. ANS: D PTS: 1
2. ANS: A PTS: 1
3. ANS: B PTS: 1
4. ANS: A PTS: 1
5. ANS: C PTS: 1
6. ANS: A PTS: 1
7. ANS: B PTS: 1
8. ANS: E PTS: 1
9. ANS: A PTS: 1
10. ANS: B PTS: 1
11. ANS: D PTS: 1
12. ANS: D PTS: 1
13. ANS: D PTS: 1
14. ANS: A PTS: 1
15. ANS: A PTS: 1
16. ANS: D PTS: 1
17. ANS: B PTS: 1
18. ANS: C PTS: 1
19. ANS: B PTS: 1
20. ANS: A PTS: 1
21. ANS: B PTS: 1
22. ANS: D PTS: 1
23. ANS: E PTS: 1
24. ANS: B PTS: 1
25. ANS: B PTS: 1

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. How many natural numbers are there between –12.5 and 6.5 on the number line?

a. 0
b. 19
c. 6
d. 10
e. 7

____ 2. Identify the correct union of intervals for the inequality.

$x \leq -14$ or $x > 10$

a. $(-\infty, -14] \cup (10, \infty)$
b. $(-\infty, -14) \cup [10, \infty)$
c. $(-\infty, -14] \cup [10, \infty)$
d. $(-\infty, -14) \cup (10, \infty)$
e. $(-\infty, -14] \cup (10, \infty]$

____ 3. Write the expression without using absolute value symbols.

$|x + 9| - |x - 13|$ for $x < -13$

$|x + 9| - |x - 13| =$ _____ for $x < -13$

a. $2x - 22$
b. 22
c. 4
d. $22 - 2x$
e. –22

____ 4. Calculate the volume of a box that has dimensions of 6,000 by 9,300 by 4,300 millimeters.

a. $2.3994 \times 10^{11}\ \text{mm}^3$
b. $1.932 \times 10^{11}\ \text{mm}^3$
c. $1.932 \times 10^{10}\ \text{mm}^3$
d. $2.3994 \times 10^{10}\ \text{mm}^3$

____ 5. Simplify the expression.

$$\left(\frac{a^{-2}}{b^{-4}}\right)^{-5}$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

a. $\frac{b^{10}}{a^{20}}$
b. $\frac{b^{20}}{a^{10}}$
c. $\frac{a^{20}}{b^{10}}$
d. $\frac{a^{10}}{b^{20}}$

____ 6. Simplify the expression.

$$\left(\frac{r^5 r^{-1}}{r^6 r^{-6}}\right)^4$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

a. r^4
b. r^{24}
c. r^0
d. r^{16}

____ 7. Express the number -187,000,000 in scientific notation.

a. -1.87×10^8
b. -1.87×10^7
c. -1.87×10^9
d. -18.7×10^9

____ 8. We can often multiply and divide radicals with different indexes. For example:

$$\sqrt{3}\sqrt[3]{5} = \sqrt[6]{27}\sqrt[6]{25} = \sqrt[6]{(27)(25)} = \sqrt[6]{675}$$

Use this idea to write the following expression as a single radical.

$$\sqrt{5}\sqrt[3]{5}$$

a. $\sqrt[3]{3125}$
b. $\sqrt[6]{5}$
c. $\sqrt[6]{3125}$
d. $\sqrt{3125}$
e. $\sqrt[6]{625}$

____ 9. Simplify the expression.

$$(625y^4)^{1/4}$$

a. $5|y|$
b. $25|y|$
c. $5|y^2|$
d. $5y$
e. $5y^2$

____ 10. Simplify the expression.

$$\left(-\frac{3{,}125x^{10}}{32y^5}\right)^{1/5}$$

a. $-\frac{5x^2}{2y^2}$
b. $\frac{5x^3}{2y}$
c. $-\frac{5x^2}{2y}$
d. $\frac{5x^2}{2y}$

____ 11. Simplify the expression.

$$\frac{a^{2/5}a^{2/5}}{a^{1/5}}$$

Write all answers without using negative exponents. Assume that all variables represent positive numbers.

a. $a^{3/5}$
b. $a^{4/5}$
c. $a^{5/5}$
d. $a^{3/10}$
e. $a^{3/8}$

____ 12. Perform the division.

$$x^2 + x - 1 \overline{)\, 11x^3 - 2x^2 - 24x + 13}$$

a. $11x - 13$
b. $11x - 15$
c. $15 - 11x$
d. $11x^2 - 13$

____ 13. Perform the operations and simplify.

$(5x^3 - 6x^2) + (9x^3 - 3x)$

a. $14x - 6x^2 - 3x^3$
b. $5x^3$
c. 0
d. $14x^3 - 6x^2 - 3x$

____ 14. Perform the operation and simplify.

$(a - 8)^2$

a. $a^2 - 8a + 64$
b. $a^2 - 16a + 64$
c. $a^2 - 64$
d. $a^2 + 64$
e. $a^2 + 16a + 64$

____ 15. Multiply the expression as you would multiply polynomials.

$(a^{19/2} + b^{9/2})(a^{19/2} - b^{9/2})$

a. $(a - b)^{14}$
b. $a^{38} - b^{18}$
c. $(a + b)^{5}$
d. $a^{19} - b^{9}$

____ 16. Perform the multiplication and simplify.

$(x-y)(4x+14y)^2$

a. $16x^3 + 84x^2y + 196xy^2 + 96y^3$
b. $16x^3 + 96x^2y + 84xy^2 + 196y^3$
c. $16x^3 + 96x^2y + 84xy^2 - 196y^3$
d. $196x^3 + 84x^2y + 96xy^2 + 16y^3$
e. $16x^3 - 96x^2y + 84xy^2 + 196y^3$

____ 17. Factor the expression completely.

$6x^2 + 3x^3$

a. $3x^2 (2 - x)$
b. $3x^2 (2 + x)$
c. $3x^2 (3 + x)$
d. $3x^2 (2 + x^2)$

____ 18. Factor the expression completely.

$4x^3 + 4x^2 - 7x - 7$

a. $(1 - x) (4x^2 - 7)$
b. $(x - 1) (4x^2 + 7)$
c. $(x + 1) (7 - 4x^2)$
d. $(x + 1) (4x^2 - 7)$

____ 19. Factor the expression completely.

$25x^8 + 1$

a. The expression is prime.
b. $(5x^4 + 1)^2$
c. $(5x^4 - 1)^2$
d. $(5x^4 + 1) (5x^4 - 1)$

____ 20. Factor the expression completely.

$30x^2 - 13xy - 56y^2$

a. $(7x - 8y)(6x + 5y)$
b. $(5x - 8y)(7x + 6y)$
c. $(5x - 8y)(6x + 7y)$
d. $(5x + 8y)(6x - 7y)$

____ 21. Factor the expression completely.

$8r^2 - 16rs - 90s^2$

a. $(2r + 9s)(4r - 10s)$
b. $(9r - 2s)(4r + 10s)$
c. $(2r - 9s)(4r + 10s)$
d. $(2r - 9s)(10r + 4s)$

____ 22. Factor the expression completely.

$z^2 + 6z + 9 - 36y^2$

a. $(z + 6 + 3y)(z + 6 - 3y)$
b. $(z - 3 + 6y)(z + 3 + 6y)$
c. $(z + 3 + 6y)(z + 3 - 6y)$
d. $(z - 3 + 6y)(z - 3 - 6y)$

____ 23. Factor the expression completely.

$(2x - 5y)^3 + 125$

a. $(2x - 5y + 5) \cdot (4x^2 - 10x - 20xy + 25y + 25y^2 + 25)$
b. $(2x - 5y + 5) \cdot (4x^2 - 10x + 20xy - 25y + 25y^2 + 25)$
c. $(2x - 5y + 5) \cdot (4x^2 + 10x + 20xy - 25y - 25y^2 + 25)$
d. $(2x + 5y - 5) \cdot (4x^2 + 10x + 20xy - 25y - 25y^2 + 25)$
e. $(2x + 5y - 5) \cdot (4x^2 - 10x - 20xy + 25y + 25y^2 + 25)$

____ 24. Simplify the fraction.

$$\frac{8x - 64}{x^2 - 64}$$

Assume that the denominator is not 0.

a. $\frac{x}{x - 8}$

b. $\frac{8}{x + 8}$

c. $\frac{1}{x - 1}$

d. $\frac{1}{x + 1}$

e. $\frac{8}{x - 8}$

f. $\frac{x}{x + 8}$

____ 25. Perform the operations and simplify.

$$\frac{x + 3}{x^2 + 9x + 18} + \frac{x}{x^2 - 36}$$

Assume that no denominators are 0.

a. $\frac{2x - 6}{x^2 + 36}$

b. $\frac{2x - 36}{x^2 - 6}$

c. $\frac{2x + 6}{x^2 - 36}$

d. $\frac{2x - 6}{x^2 - 36}$

Answer Section

MULTIPLE CHOICE

1. ANS: C PTS: 1
2. ANS: A PTS: 1
3. ANS: E PTS: 1
4. ANS: A PTS: 1
5. ANS: D PTS: 1
6. ANS: D PTS: 1
7. ANS: A PTS: 1
8. ANS: C PTS: 1
9. ANS: A PTS: 1
10. ANS: C PTS: 1
11. ANS: A PTS: 1
12. ANS: A PTS: 1
13. ANS: D PTS: 1
14. ANS: B PTS: 1
15. ANS: D PTS: 1
16. ANS: C PTS: 1
17. ANS: B PTS: 1
18. ANS: D PTS: 1
19. ANS: A PTS: 1
20. ANS: C PTS: 1
21. ANS: C PTS: 1
22. ANS: C PTS: 1
23. ANS: A PTS: 1
24. ANS: B PTS: 1
25. ANS: D PTS: 1

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. *x* represents a real number. Find any restrictions on *x*.

$x + 2 = 5$

a. $(0, \infty)$
b. 0
c. $x \geq -3$
d. $(-\infty, 2)$
e. no restrictions

____ 2. Solve the equation.

$4x + 8 = 36$

a. $x = 7$
b. $x = 11$
c. $x = 15$
d. $x = –11$
e. $x = 1$

____ 3. Solve the equation

$$\frac{9}{x-4} = 1$$

a. $x = 5$
b. $x = 13$
c. $x = 16$
d. $x = –16$
e. $x = –13$

____ 4. Juan scored 10 points higher on his midterm and 26 points higher on his final than he did on his first exam. If his mean (average) score was 45, what was his score on the first exam?

a. 32
b. 40
c. 33
d. 31
e. 35

____ 5. One morning, John drove 6 hours before stopping to eat. After lunch, he increased his speed by 10 mph. If he completed a 390-mile trip in 9 hours of driving time, how fast did he drive in the morning?

a. 36 mph
b. 40 mph
c. 48 mph
d. 33 mph
e. 43 mph

____ 6. Jake can wash a car in 40 minutes, while Harold can wash the same car in 50 minutes. How long will it take them to wash the car if they work together?

a. 40 minutes
b. $\frac{9}{200}$ minutes
c. 10 minutes
d. 30 minutes
e. $\frac{200}{9}$ minutes

____ 7. Solve the equation $x^2 - 12x - 45 = 0$ by completing the square.

a. $x = -3, x = 6$
b. $x = 3, x = -15$
c. $x = 9, x = 15$
d. $x = -3, x = 15$
e. $x = 6, x = 3$

____ 8. Solve the formula

$$\frac{x^2}{g^2} + \frac{y^2}{e^2} = 1 \; ; y$$

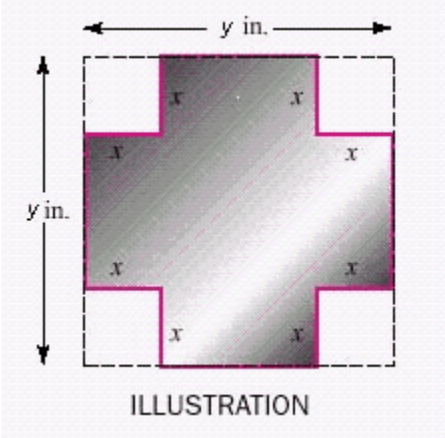
for the indicated variable.

a. $y = e\sqrt{\left(1 - \frac{x}{g}\right)\left(1 + \frac{x}{g}\right)}, y = -e\sqrt{\left(1 - \frac{x}{g}\right)\left(1 + \frac{x}{g}\right)}$
b. $y = \sqrt{e\left(1 - xg\right)\left(1 + xg\right)}, y = -\sqrt{e\left(1 - xg\right)\left(1 + xg\right)}$
c. $y = \sqrt{e\left(1 - \frac{x}{g}\right)^2}, y = -\sqrt{e\left(1 - \frac{x}{g}\right)^2}$
d. $y = e\sqrt{\left(a - \frac{x}{g}\right)\left(a + \frac{x}{g}\right)}, y = -e\sqrt{\left(a - \frac{x}{g}\right)\left(a + \frac{x}{g}\right)}$
e. $y = \sqrt{e\left(2 - xg\right)\left(1 + xg\right)}, y = -\sqrt{e\left(2 - xg\right)\left(1 + xg\right)}$

____ 9. Does the equation $6.269x^2 - 3.015x + 3.445 = 0$ have any roots that are real numbers?

a. no
b. yes

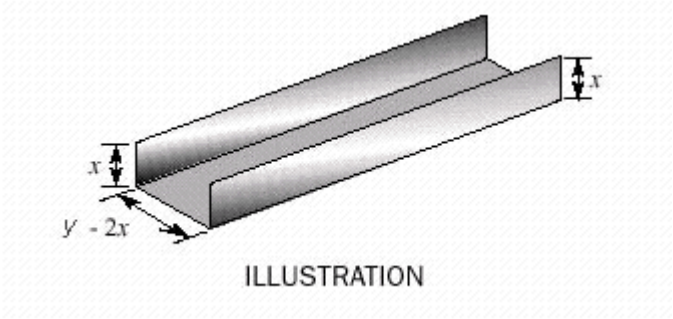
____ 10. A piece of tin, $y = 16$ inches on a side, is to have four equal squares cut from its corners, as in the illustration. If the edges are then to be folded up to make a box with a floor area of 16 square inches, find the depth of the box.



ILLUSTRATION

a. 11 in
b. 13 in
c. 6 in
d. 12 in
e. 9 in

____ 11. A piece of sheet metal, 16 inches wide, is bent to form the gutter shown in the illustration. If the cross-sectional area is 32 square inches, find the depth of the gutter.



ILLUSTRATION

a. 5 in
b. 6 in
c. 7 in
d. 4 in

____ 12. A hose can fill a swimming pool in 18 hours. Another hose needs 3 more hours to fill the pool than the two hoses combined. How long would it take the second hose to fill the pool?

a. 9 hours
b. 14 hours
c. 18 hours
d. 6 hours
e. 12 hours

____ 13. Simplify the expression.

i^{14}

a. -6
b. $-i$
c. -1
d. i
e. 1

____ 14. Simplify the expression.

i^{-26}

a. $-i$
b. $-3i$
c. -1
d. 1
e. i

____ 15. Find the values of x and y.

$x + 89i = y - yi$

a. $x = 89, y = 89$
b. $x = 89, y = 178$
c. $x = -89, y = -89$
d. $x = 89, y = -89$
e. $x = -89, y = 89$

____ 16. Do the operation and express the answer in $a + bi$ form.

$$\frac{4+i}{8-i\sqrt{3}}$$

a. $\frac{67+\sqrt{3}}{67} - \frac{8+4\sqrt{3}}{67}i$
b. $\frac{32+\sqrt{3}}{67} + \frac{8-4\sqrt{3}}{1}i$
c. $\frac{67-\sqrt{3}}{67} - \frac{8-4\sqrt{3}}{67}i$
d. $\frac{32-\sqrt{3}}{67} + \frac{8+4\sqrt{3}}{67}i$
e. $\frac{32-\sqrt{3}}{67} - \frac{8-4\sqrt{3}}{33}i$

____ 17. Factor the expression over the set of complex numbers

$9a^2 + 16$

a. $(-3a + 4i)(-3a + 4i)$
b. $(3a + 4i)(3a - 4i)$
c. $(3a + 4)(3a - 4)$
d. $(3 + 4i)(3 - 4i)$
e. $(3a + 4i)(3a + 4i)$

____ 18. In electronics, the formula $V = IR$ is called **Ohm's law**. It gives the relationship in a circuit between the voltage V (in volts), the current I (in amperes), and the resistance R (in ohms).

Find V when $I = 8 - 7i$ amperes and $R = 2 + 8i$ ohms.

a. $V = i$ volts
b. $V = 72 + 78i$ volts
c. $V = 72$ volts
d. $V = 78$ volts
e. $V = 72 + 50i$ volts

____ 19. Solve the inequality.

$2x - 13 < -7$

a. $(3, \infty)$
b. $[3, \infty)$
c. $(-3, \infty)$
d. $(-\infty, 3)$
e. $(-\infty, 3]$

____ 20. Solve the inequality.

$$\frac{12(x-8)}{5} \geq \frac{6(x+4)}{4}$$

a. $(-28, \infty)$
b. $(28, \infty)$
c. $[-28, \infty)$
d. $[28, \infty)$
e. none of the above

____ 21. Solve the inequality.

$\frac{4}{x} > 2$

a. $(0, 2]$
b. $(0, 2)$
c. $[0, 2]$
d. $(-\infty, 2)$
e. $[0, 2)$

____ 22. Express the relationship $4 < C < 18$ in terms of F, if $F = \frac{3}{2}C + 17$.

a. $24 < F < 45$
b. $22 < F < 43$
c. $21 < F < 42$
d. $27 < F < 40$
e. $23 < F < 44$

____ 23. Solve the inequality. Express the solution set in interval notation.

$| 3x - 2 | < 5$

a. $(3, 7)$
b. $(-1, \frac{3}{7})$
c. $(-1, \frac{7}{3})$
d. $(1, \frac{7}{3})$
e. $(-\infty, -\frac{7}{3}) \cup (-1, \infty)$

____ 24. Solve the inequality. Express the solution set in interval notation.

$0 < | 4x + 7 | < 11$

a. $(-\frac{7}{4}, 1)$
b. $(-\infty, -\frac{7}{4}) \cup (1, \infty)$
c. $(-\frac{9}{2}, -\frac{7}{4})$
d. $(-\infty, -1) \cup (\frac{7}{4}, \infty)$
e. $(-\frac{9}{2}, -\frac{7}{4}) \cup (-\frac{7}{4}, 1)$

____ 25. Solve the inequality. Express the solution set in interval notation.

$$5 < \left| \frac{x-14}{3} \right| < 8$$

a. $(-38,-29) \cup (1,10)$
b. $(-10,1) \cup (29,38)$
c. $(-10,-1) \cup (29,38)$
d. $(-1,29)$
e. none of the above

Answer Section

MULTIPLE CHOICE

1. ANS: E PTS: 1
2. ANS: A PTS: 1
3. ANS: B PTS: 1
4. ANS: C PTS: 1
5. ANS: B PTS: 1
6. ANS: E PTS: 1
7. ANS: D PTS: 1
8. ANS: A PTS: 1
9. ANS: A PTS: 1
10. ANS: C PTS: 1
11. ANS: D PTS: 1
12. ANS: A PTS: 1
13. ANS: C PTS: 1
14. ANS: C PTS: 1
15. ANS: C PTS: 1
16. ANS: D PTS: 1
17. ANS: B PTS: 1
18. ANS: E PTS: 1
19. ANS: D PTS: 1
20. ANS: D PTS: 1
21. ANS: B PTS: 1
22. ANS: E PTS: 1
23. ANS: C PTS: 1
24. ANS: E PTS: 1
25. ANS: C PTS: 1

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. *x* represents a real number. Find any restrictions on *x*.

$x + 1 = 8$

a. no restrictions
b. $x \geq -3$
c. 0
d. $(-\infty, 1)$
e. $(0, \infty)$

____ 2. Solve the equation.

$2x + 6 = 22$

a. $x = 8$
b. $x = 18$
c. $x = 2$
d. $x = 14$
e. $x = –14$

____ 3. Solve the equation

$$\frac{6}{x-4} = 1$$

a. $x = 10$
b. $x = –10$
c. $x = 2$
d. $x = –13$
e. $x = 13$

____ 4. Juan scored 4 points higher on his midterm and 2 points higher on his final than he did on his first exam. If his mean (average) score was 138, what was his score on the first exam?

a. 134
b. 138
c. 136
d. 135
e. 143

____ 5. One morning, John drove 6 hours before stopping to eat. After lunch, he increased his speed by 10 mph. If he completed a 390-mile trip in 9 hours of driving time, how fast did he drive in the morning?

a. 33 mph
b. 36 mph
c. 48 mph
d. 43 mph
e. 40 mph

____ 6. Jake can wash a car in 25 minutes, while Harold can wash the same car in 30 minutes. How long will it take them to wash the car if they work together?

a. $\frac{150}{11}$ minutes
b. 5 minutes
c. 20 minutes
d. $\frac{11}{150}$ minutes
e. 25 minutes

____ 7. Solve the equation $x^2 - 12x - 45 = 0$ by completing the square.

a. $x = 6, x = 10$
b. $x = 3, x = -15$
c. $x = 9, x = 15$
d. $x = -3, x = 15$
e. $x = -3, x = 6$

____ 8. Solve the formula

$$\frac{x^2}{d^2} + \frac{y^2}{n^2} = 1 \; ; y$$

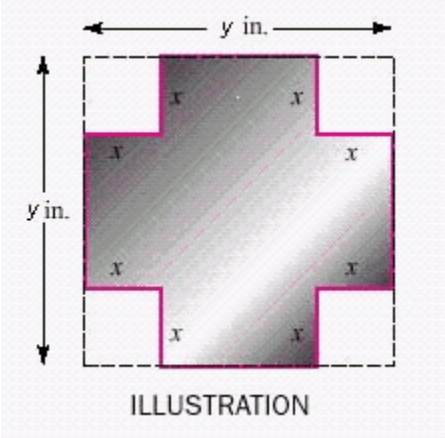
for the indicated variable.

a. $y = \sqrt{n(2-xd)(1+xd)}\,, y = -\sqrt{n(2-xd)(1+xd)}$
b. $y = \sqrt{n(1-xd)(1+xd)}\,, y = -\sqrt{n(1-xd)(1+xd)}$
c. $y = n\sqrt{\left(1-\frac{x}{d}\right)\left(1+\frac{x}{d}\right)}\,, y = -n\sqrt{\left(1-\frac{x}{d}\right)\left(1+\frac{x}{d}\right)}$
d. $y = \sqrt{n\left(1-\frac{x}{d}\right)^2}\,, y = -\sqrt{n\left(1-\frac{x}{d}\right)^2}$
e. $y = n\sqrt{\left(a-\frac{x}{d}\right)\left(a+\frac{x}{d}\right)}\,, y = -n\sqrt{\left(a-\frac{x}{d}\right)\left(a+\frac{x}{d}\right)}$

____ 9. Does the equation $6.356x^2 - 8.036x + 1.688 = 0$ have any roots that are real numbers?

a. yes
b. no

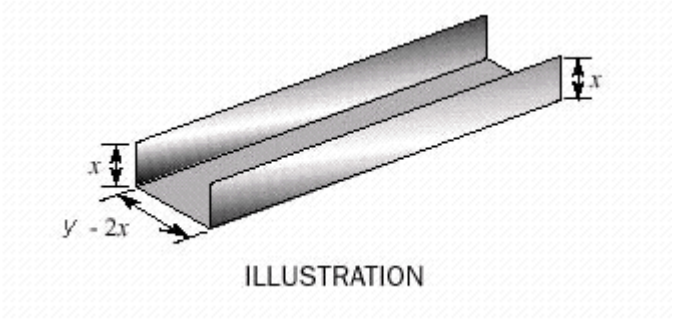
____ 10. A piece of tin, $y = 12$ inches on a side, is to have four equal squares cut from its corners, as in the illustration. If the edges are then to be folded up to make a box with a floor area of 16 square inches, find the depth of the box.



ILLUSTRATION

a. 9 in
b. 4 in
c. 8 in
d. 7 in
e. 11 in

____ 11. A piece of sheet metal, 9 inches wide, is bent to form the gutter shown in the illustration. If the cross-sectional area is 10 square inches, find the depth of the gutter.



ILLUSTRATION

a. 2 in
b. 3 in
c. 5 in
d. 4 in

____ 12. A hose can fill a swimming pool in 12 hours. Another hose needs 2 more hours to fill the pool than the two hoses combined. How long would it take the second hose to fill the pool?

a. 4 hours
b. 12 hours
c. 10 hours
d. 6 hours
e. 8 hours

____ 13. Simplify the expression.

i^{34}

a. 1
b. i
c. $-i$
d. -6
e. -1

____ 14. Simplify the expression.

i^{-26}

a. i
b. 1
c. $-i$
d. $-3i$
e. -1

____ 15. Find the values of x and y.

$x + 62i = y - yi$

a. $x = 62, y = 62$
b. $x = 62, y = -62$
c. $x = -62, y = -62$
d. $x = 62, y = 124$
e. $x = -62, y = 62$

____ 16. Do the operation and express the answer in $a + bi$ form.

$$\frac{3+i}{5-i\sqrt{7}}$$

a. $\frac{15+\sqrt{7}}{32} + \frac{5-3\sqrt{7}}{1}i$
b. $\frac{32+\sqrt{7}}{32} - \frac{5+3\sqrt{7}}{32}i$
c. $\frac{15-\sqrt{7}}{32} + \frac{5+3\sqrt{7}}{32}i$
d. $\frac{32-\sqrt{7}}{32} - \frac{5-3\sqrt{7}}{32}i$
e. $\frac{15-\sqrt{7}}{32} - \frac{5-3\sqrt{7}}{16}i$

____ 17. Factor the expression over the set of complex numbers

$4a^2 + 9$

a. $(2 + 3i)(2 - 3i)$
b. $(2a + 3)(2a - 3)$
c. $(-2a + 3i)(-2a + 3i)$
d. $(2a + 3i)(2a - 3i)$
e. $(2a + 3i)(2a + 3i)$

____ 18. In electronics, the formula $V = IR$ is called **Ohm's law**. It gives the relationship in a circuit between the voltage V (in volts), the current I (in amperes), and the resistance R (in ohms).

Find V when $I = 5 - 2i$ amperes and $R = 6 + 9i$ ohms.

a. $V = 57$ volts
b. $V = 48 + 57i$ volts
c. $V = 48 + 33i$ volts
d. $V = 48$ volts
e. $V = i$ volts

____ 19. Solve the inequality.

$2x - 13 < -1$

a. $(-\infty, 6)$
b. $(-6, \infty)$
c. $[6, \infty)$
d. $(6, \infty)$
e. $(-\infty, 6]$

____ 20. Solve the inequality.

$$\frac{18(x-8)}{5} \geq \frac{9(x+4)}{4}$$

a. none of the above
b. $(28, \infty)$
c. $[-28, \infty)$
d. $(-28, \infty)$
e. $[28, \infty)$

____ 21. Solve the inequality.

$\frac{4}{x} > 2$

a. $(0, 2]$
b. $(-\infty, 2)$
c. $[0, 2]$
d. $(0, 2)$
e. $[0, 2)$

____ 22. Express the relationship $6 < C < 16$ in terms of F, if $F = \frac{9}{2}C + 17$.

a. $42 < F < 87$
b. $45 < F < 90$
c. $44 < F < 89$
d. $43 < F < 88$
e. $48 < F < 85$

____ 23. Solve the inequality. Express the solution set in interval notation.

$| 3x - 4 | < 7$

a. $(-1, \frac{11}{3})$
b. $(-1, \frac{3}{11})$
c. $(1, \frac{11}{3})$
d. $(3, 11)$
e. $(-\infty, -\frac{11}{3}) \cup (-1, \infty)$

____ 24. Solve the inequality. Express the solution set in interval notation.

$0 < | 4x + 3 | < 7$

a. $(-\frac{5}{2}, -\frac{3}{4})$
b. $(-\frac{5}{2}, -\frac{3}{4}) \cup (-\frac{3}{4}, 1)$
c. $(-\frac{3}{4}, 1)$
d. $(-\infty, -\frac{3}{4}) \cup (1, \infty)$
e. $(-\infty, -1) \cup (\frac{3}{4}, \infty)$

____ 25. Solve the inequality. Express the solution set in interval notation.

$$8 < \left| \frac{x-23}{3} \right| < 10$$

a. $(-7,-1) \cup (47,53)$
b. $(-53,-47) \cup (1,7)$
c. $(-1,47)$
d. none of the above
e. $(-7,1) \cup (47,53)$

Answer Section

MULTIPLE CHOICE

1. ANS: A PTS: 1
2. ANS: A PTS: 1
3. ANS: A PTS: 1
4. ANS: C PTS: 1
5. ANS: E PTS: 1
6. ANS: A PTS: 1
7. ANS: D PTS: 1
8. ANS: C PTS: 1
9. ANS: A PTS: 1
10. ANS: B PTS: 1
11. ANS: A PTS: 1
12. ANS: D PTS: 1
13. ANS: E PTS: 1
14. ANS: E PTS: 1
15. ANS: C PTS: 1
16. ANS: C PTS: 1
17. ANS: D PTS: 1
18. ANS: C PTS: 1
19. ANS: A PTS: 1
20. ANS: E PTS: 1
21. ANS: D PTS: 1
22. ANS: C PTS: 1
23. ANS: A PTS: 1
24. ANS: B PTS: 1
25. ANS: A PTS: 1