MATH0200  online  PLACEMENT TEST 182 QUESTIONS  11–08–13  Fall 2013

elementary and intermediate Algebra
Warm-up
Name___________________________________

website  www.alvarezmathhelp.com
PROGRAMS ALVAREZLAB (SAVE AND EXTRACT TO YOUR COMPUTER)
VIDEOS (ON DEMAND)
INTERACTMATH (MCKENNA AND KIRK  BEGINNING AND INTERMEDIATE ALG)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Subtract.
1) 40 - (-54)  
   A) -14  B) 94  C) 14  D) -94
   Objective: (1.3) Subtract Real Numbers

2) (-8) - (-22)  
   A) -14  B) 30  C) 14  D) -30
   Objective: (1.3) Subtract Real Numbers

Perform the indicated operations.
3) 17 - (-19) + 14 + (-18)  
   A) 32  B) -4  C) 30  D) -30
   Objective: (1.3) Add/Subtract More Than Two Real Numbers

Evaluate.
4) -10^2  
   A) -20  B) -1000  C) -100  D) -1024
   Objective: (1.5) Evaluate Exponential Expression

5) (-6)^2  
   A) -36  B) -12  C) 12  D) 36
   Objective: (1.5) Evaluate Exponential Expression

Simplify using the order of operations.
6) 8 + 2(-4 - 1)  
   A) 2  B) 14  C) -2  D) -1
   Objective: (1.5) Simplify Using Order of Operations

Evaluate the following algebraic expression using the indicated values.
7) \( \frac{8(a - b)}{-9c - d} \) when a = 7, b = 0, c = -9, d = 82
   A) 28  B) -56  C) -28  D) 56
   Objective: (1.5) Evaluate Algebraic Expression Using Indicated Values

Simplify by combining like terms.
8) -9x - 3x  
   A) -12x  B) -12 + x  C) -6x  D) 27x
   Objective: (1.5) Simplify by Combining Like Terms
9) $7a - 2a + 5b$
   A) $-5a + 5b$
   B) $9a + 5b$
   C) $10a$
   D) $5a + 5b$
   Objective: (1.5) Simplify by Combining Like Terms

10) $7x + 6 + 3x - x + 4$
   A) $11x + 10$
   B) $9x + 10$
   C) $10x + 10$
   D) $10x - 10$
   Objective: (1.5) Simplify by Combining Like Terms

11) $3x^2 - 9x - 4 + 5x - 6 + 9x^2$
   A) $5x^2 + 8x - 15$
   B) $12x^2 - 4x - 10$
   C) $-2x^3$
   D) $12x^2 - 4x^2 - 10$
   Objective: (1.5) Simplify by Combining Like Terms

Use the Distributive Property to remove parentheses, and then combine like terms.

12) $9(y + 8) - 6$
   A) $9y + 18$
   B) $9y + 2$
   C) $9y + 66$
   D) $17y - 6$
   Objective: (1.5) Use Distributive Property and Combine Like Terms

13) $9x - (7 - 3x)$
   A) $6x - 7$
   B) $12x + 7$
   C) $12x - 7$
   D) $9x - 10$
   Objective: (1.5) Use Distributive Property and Combine Like Terms

14) $4x + 8 - 2(-4x - 8)$
   A) $-8x - 16$
   B) $-12x - 24$
   C) $12x + 24$
   D) $8x + 16$
   Objective: (1.5) Use Distributive Property and Combine Like Terms

15) $-4(9r + 7) + 6(3r + 5)$
   A) $-18r + 2$
   B) $-18r + 7$
   C) $5r + 3$
   D) $-64r$
   Objective: (1.5) Use Distributive Property and Combine Like Terms

Solve the linear equation and check the solution.

16) $13(x - 52) = 26$
   A) $52$
   B) $26$
   C) $50$
   D) $54$
   Objective: (2.2) Solve Linear Equation (Grouping Symbols)

17) $6x - (5x - 1) = 2$
   A) $\{1\}$
   B) $\left\{-\frac{1}{11}\right\}$
   C) $\{-1\}$
   D) $\left\{\frac{1}{11}\right\}$
   Objective: (2.2) Solve Linear Equation (Grouping Symbols)

18) $-7x + 3(2x - 4) = -9 - 4x$
   A) $\left\{\frac{21}{5}\right\}$
   B) $\{1\}$
   C) $\{-1\}$
   D) $\{-7\}$
   Objective: (2.2) Solve Linear Equation (Grouping Symbols)

19) $-7q + 1.0 = -24.5 - 1.9q$
   A) $\{5\}$
   B) $\{3.9\}$
   C) $\{-31\}$
   D) $\{3.6\}$
   Objective: (2.2) Solve Linear Equation (Decimals)
20) \( \frac{1}{2}x + \frac{6}{5} = \frac{2}{5}x \)

A) \{-16\}  
B) \{16\}  
C) \{12\}  
D) \{-12\}

Objective: (2.2) Solve Linear Equation (Fractions)

21) \( \frac{7}{3} - \frac{x}{3} = \frac{x}{4} \)

A) \{7\}  
B) \{4\}  
C) \{-4\}  
D) \left\{ \frac{28}{5} \right\}

Objective: (2.2) Solve Linear Equation (Fractions)

22) \( \frac{r + 6}{5} = \frac{r + 8}{7} \)

A) \{1\}  
B) \{2\}  
C) \{-2\}  
D) \{-1\}

Objective: (2.2) Solve Linear Equation (Fractions)

23) \( \frac{17x}{16} + \frac{x}{16} = 6x + \frac{1}{8} + \frac{15}{16}x \)

A) \left\{ -\frac{2}{93} \right\}  
B) \left\{ \frac{1}{93} \right\}  
C) \left\{ -\frac{1}{93} \right\}  
D) \left\{ \frac{2}{99} \right\}

Objective: (2.2) Solve Linear Equation (Fractions)

Solve for the indicated variable.

24) \( A = P(1 + rt) \), for \( t \)

A) \( t = \frac{Pr}{A - P} \)  
B) \( t = \frac{A}{r} \)  
C) \( t = \frac{P - A}{Pr} \)  
D) \( t = \frac{A - P}{Pr} \)

Objective: (2.3) Solve Literal Equation for Variable

25) \( A = \frac{1}{2}h(a + b) \), for \( a \)

A) \( a = \frac{A - hb}{2h} \)  
B) \( a = \frac{hb - 2A}{h} \)  
C) \( a = \frac{2Ab - h}{h} \)  
D) \( a = \frac{2A - hb}{h} \)

Objective: (2.3) Solve Literal Equation for Variable
Solve the problem by utilizing the 4P’s: Prepare, Plan, Process, and Ponder.

26) Solve the formula for the volume of a right circular cone, \( V = \frac{1}{3} \pi r^2 h \), for the height \( h \). Determine the height of a right circular cone with a radius of 2 meters and a volume of \( 16\pi \) cubic meters.

\[
V = \frac{1}{3} \pi r^2 h
\]

A) \( h = \frac{3V}{\pi r^2} \); \( h = 24 \text{ m} \)
B) \( h = \frac{3V}{\pi r^2} \); \( h = 12 \text{ m} \)
C) \( h = \frac{3V}{\pi r^2} \); \( h = 8 \text{ m} \)
D) \( h = \frac{3V}{\pi r^2} \); \( h = 4 \text{ m} \)

Objective: (2.3) Solve 4Ps Application

Solve for the indicated variable.

27) \(-16 = -9p + 3q\), for \( p \)

A) \( p = \frac{9 - 16q}{3} \)
B) \( p = \frac{16 + 3q}{9} \)
C) \( p = -16 - 3q \)
D) \( p = \frac{16 - 3q}{-9} \)

Objective: (2.3) Solve Challenge Problems

28) \( \frac{x}{a} + \frac{y}{b} = 1 \), for \( x \)

A) \( x = a\left(1 - \frac{y}{b}\right) \)
B) \( x = a\left(\frac{y}{b} - 1\right) \)
C) \( x = b\left(1 - \frac{y}{a}\right) \)
D) \( x = a\left(1 + \frac{y}{b}\right) \)

Objective: (2.3) Solve Challenge Problems

29) \( ax + by = c \), for \( x \)

A) \( x = \frac{c - ay}{b} \)
B) \( x = \frac{c + ay}{b} \)
C) \( x = \frac{c - by}{a} \)
D) \( x = \frac{c + by}{a} \)

Objective: (2.3) Solve Challenge Problems
Solve the linear inequality and graph the solution set. State the solution using interval notation.

30) \( 4x - 4 \geq 20 \)

A) \([4, \infty)\)

B) \([6, \infty)\)

C) \((\infty, 4]\)

D) \((\infty, 6]\)

31) \(36 - 6x \geq -6\)

A) \((\infty, -5]\)

B) \([-5, \infty)\)

C) \([7, \infty)\)

D) \((\infty, 7]\)

32) \(\frac{x}{2} \geq 3 + \frac{x}{8}\)

A) \([8, \infty)\)

B) \([-8, \infty)\)

C) \((8, \infty)\)

D) \((\infty, 8]\)

Objective: (2.4) Solve and Graph Linear Inequality
Solve the inequality for $x$. Write the answer using interval notation.

33) \[ \frac{x + 7}{6} - \frac{5}{48} > \frac{x + 3}{8} \]

A) \( -\frac{33}{2}, \infty \)  
B) \( -\infty, -\frac{33}{2} \)  
C) \( -\infty, -\frac{43}{14} \)  
D) \( \frac{79}{2}, \infty \)

Objective: (2.4) Solve Challenge Problems

Solve the double inequality for $x$. State the solution using interval notation.

34) \( 13 \leq 3x + 1 \leq 19 \)

A) \([4, 6]\)  
B) \([-6, -4]\)  
C) \((4, 6)\)  
D) \((-6, -4)\)

Objective: (2.5) Solve Double Inequality

Solve the absolute value equation and write the solution set using set notation.

35) \( |r - 2| = 5 \)

A) \{-7\}  
B) \([-3, 7]\)  
C) \[\]\)  
D) \{3, 7\}

Objective: (2.6) Solve Absolute Value Equations

Solve the absolute value inequality. Graph the solution set, then write the answer using interval notation.

36) \( |x - 9| < 16 \)

A) \((-\infty, 25)\)

B) \((-25, 7)\)

C) \((-7, 25)\)

D) \((-\infty, -7)\)

Objective: (2.6) Solve and Graph Absolute Value Inequality \((<, \leq)\)
Solve the absolute value equation or inequality. State the solution using set notation or interval notation, whichever is appropriate.

37) \(|x + 6| > 16\)
   A) \((-10, 22)\)
   B) \((10, \infty)\)
   C) \((-\infty, -22) \cup (10, \infty)\)
   D) \((-22, 10)\)

Objective: (2.6) Solve and Graph Absolute Value Inequality (>, ≥)

Determine if the ordered pair is a solution to the equation.

38) \((3, 5)\) \(5x + y = 20\)
   A) yes
   B) no

Objective: (3.1) Determine if Ordered Pair Is Solution to Equation

Use the intercept method to graph the solutions of the linear equation.

39) \(2x - 3y = 6\)

A)
B)
Objective: (3.2) Graph Linear Equation Using Intercept Method

Find the slope of the straight line through the two solution points.

40) (8, 3) and (-4, 4)
A) \( m = -\frac{5}{8} \)  
B) \( m = -12 \)  
C) \( m = -\frac{1}{12} \)  
D) \( m = -\frac{8}{5} \)

Objective: (3.3) Find Slope of Line Given Two Points

Find the slope and the y-intercept by using the slope-intercept form of the equation of the line. If necessary, solve for y first.

41) \( 2x - 3y = -8 \)
A) \( m = \frac{3}{2}, (0, -4) \)  
B) \( m = \frac{2}{3}, \left(0, \frac{8}{3}\right) \)  
C) \( m = -\frac{2}{3}, \left(0, \frac{8}{3}\right) \)  
D) \( m = -\frac{2}{3}, \left(0, -\frac{8}{3}\right) \)

Objective: (3.3) Find Slope and y-Intercept Given Equation

Graph the solutions of the linear equation by using the slope and y-intercept.

42) \( y = 2x - 6 \)
Objective: (3.3) Graph Linear Equation Using Slope and y-Intercept

Write the equation of the line having the given slope and passing through the given point.

43) \( m = 3, (-3, 6) \)
   A) \( x = 3y - 15 \)  B) \( y = 3x - 15 \)  C) \( x = 3y + 15 \)  D) \( y = 3x + 15 \)

43) ____

Objective: (3.4) Write Equation of Line Given Slope and Point

Determine if the pair of lines is parallel, perpendicular, or neither.

44) \( y = 6x - 8 \)
   \( y = -\frac{1}{6}x - 1 \)
   A) parallel  B) perpendicular  C) neither

44) ____

Objective: (3.4) Determine if Lines Are Parallel, Perpendicular, or Neither

45) \( y = 9x - 6 \)
   \( y = 9x + 4 \)
   A) perpendicular  B) parallel  C) neither

45) ____

Objective: (3.4) Determine if Lines Are Parallel, Perpendicular, or Neither

46) \( y = 5x - 4 \)
   \( y = -5x - 8 \)
   A) parallel  B) perpendicular  C) neither

46) ____

Objective: (3.4) Determine if Lines Are Parallel, Perpendicular, or Neither
Solve the system of linear equations using the Substitution Method.

47) \[
\begin{align*}
\begin{cases}
x + y &= 10 \\
3x + 5y &= 16
\end{cases}
\end{align*}
\]
A) \{(17, -7)\}  B) \{(x, y)| x + y = 10\}
C) \{\}  D) \{(3, 7)\}

Objective: (4.2) Solve System of Linear Equations Using Substitution

48) \[
\begin{align*}
\begin{cases}
x + y &= 16 \\
y &= 3x
\end{cases}
\end{align*}
\]
A) \{\}  B) \{(-4, -12)\}
C) \{(4, 12)\}  D) \{(x, y)| x + y = 16\}

Objective: (4.2) Solve System of Linear Equations Using Substitution

49) \[
\begin{align*}
\begin{cases}
8x - 4y &= 8 \\
2x - y &= 5
\end{cases}
\end{align*}
\]
A) \{(4, -3)\}  B) \{(x, y)| 8x - 4y = 8\}
C) \{(-4, 13)\}  D) \{\}

Objective: (4.2) Solve System of Linear Equations Using Substitution (Inconsistent/Dependent)

Solve the system of linear equations using the Elimination Method.

50) \[
\begin{align*}
\begin{cases}
x - y &= 7 \\
x + y &= 5
\end{cases}
\end{align*}
\]
A) \{\}  B) \{(-6, -13)\}
C) \{(x, y)| x - y = 7\}  D) \{(6, -1)\}

Objective: (4.3) Solve System of Linear Equations Using Elimination

51) \[
\begin{align*}
\begin{cases}
0.03x - 0.1y &= 1 \\
-0.2x + 0.02y &= 58
\end{cases}
\end{align*}
\]
A) \{(300, 80)\}  B) \{(-300, -100)\}
C) \{(x, y)| 0.03x - 0.1y = 1\}  D) \{\}

Objective: (4.3) Solve Challenge Problem

Subtract. Write the difference in descending powers of the variable.

52) \((8x^2 - 5x + 20) - (3x^2 + 5x - 40)\)
A) \(5x^2 + 10x - 60\)  B) \(5x^2 - 10x - 20\)
C) \(5x^2 + 10x + 60\)  D) \(5x^2 - 10x + 60\)

Objective: (5.3) Subtract Polynomials

Evaluate the polynomial with the indicated value for the variable.

53) \(-2x^3 - 5x^2 - x - 46\) for \(x = -2\)
A) \(-58\)  B) \(-18\)
C) \(-48\)  D) \(-60\)

Objective: (5.3) Evaluate Polynomial

Multiply the monomials.

54) \((-4x^3y^4)(-5x^2y^2)\)
A) \(20x^5y^5\)  B) \(20x^5y^6\)
C) \(20xy^6\)  D) \(20xy^5\)

Objective: (5.4) Multiply Monomial by Monomial
Multiply.

55) $9x(-10x - 2)$

A) $-10x^2 - 18x$  
B) $-108x^2$  
C) $-90x^2 - 2x$  
D) $-90x^2 - 18x$

Objective: (5.4) Multiply Monomial by Polynomial

Multiply using the Distributive Property.

56) $(y + 4)(y + 7)$

A) $2y^2 + 28$  
B) $2y + 28$  
C) $y^2 + 11y + 11$  
D) $y^2 + 11y + 28$

Objective: (5.4) Multiply Binomial by Binomial

57) $(2x - 10)(x - 12)$

A) $x^2 + 120x - 34$  
B) $2x^2 + 31x + 120$  
C) $2x^2 - 34x + 120$  
D) $x^2 - 34x + 31$

Objective: (5.4) Multiply Binomial by Binomial

58) $(5x + 7)(4x - 10)$

A) $20x^2 - 22x - 22$  
B) $9x^2 - 22x - 22$  
C) $20x^2 - 22x - 70$  
D) $9x^2 - 22x - 70$

Objective: (5.4) Multiply Binomial by Binomial

59) $(x - 11y)(5x + 6y)$

A) $5x^2 - 49xy - 66y^2$  
B) $5x^2 - 49xy - 49y^2$  
C) $x^2 - 49xy - 49y^2$  
D) $x^2 - 49xy - 66y^2$

Objective: (5.4) Multiply Binomial by Binomial

Multiply.

60) $(x + 1)(x^2 - x + 1)$

A) $x^3 + 2x^2 - 2x - 1$  
B) $x^3 + 1$  
C) $x^3 + 2x^2 + 2x + 1$  
D) $x^3 - 1$

Objective: (5.4) Multiply Polynomial by Polynomial
Solve the problem by utilizing the 4P’s: Prepare, Plan, Process, and Ponder.

61) Use the figure to:
   a. Find the exact area of the shaded region leaving $\pi$ in the answer.
   b. Find the approximate area (in square yards) by letting $x = 5$ yards and $\pi \approx 3.14$

![Diagram of a circle with a shaded region]

61) 

A) a. $\left(-\frac{(64 + \pi)}{16}\right)x^2 - 16x - 16$ units$^2$
   b. $-191.09$ yd$^2$

B) a. $\left(\frac{(64 - \pi)}{16}\right)x^2 + 16x + 16$ units$^2$
   b. $191.09$ yd$^2$

C) a. $\left(\frac{(64 + \pi)}{16}\right)x^2 + 16x + 16$ units$^2$
   b. $200.91$ yd$^2$

D) a. $\left(\frac{(4 - \pi)}{16}\right)x^2 + 16x + 16$ units$^2$
   b. $97.34$ yd$^2$

Objective: (5.4) Solve 4Ps Application
62) Use the figures to:
   a. Find the areas of the two triangles and write the answers as polynomials. Recall that the area of a triangle is given by \( A = \frac{1}{2}bh \).
   b. If \( x = 8 \) meters, find the numeric values for each area in square meters.

\[
\begin{align*}
\text{Triangle 1:} & \quad 5x^2 - 4x + 3 \\
\text{Triangle 2:} & \quad x^2 - 3x + 8
\end{align*}
\]

A) a. \( 20x^3 - 16x^2 + 12x \text{ units}^2; \ x^3 + 5x^2 - 16x + 64 \text{ units}^2 \)
   b. 9312 m\(^2\); 768 m\(^2\)

B) a. \( 10x^3 - 8x^2 - 6x \text{ units}^2; \ \frac{1}{2}x^3 + \frac{5}{2}x^2 - 8x - 32 \text{ units}^2 \)
   b. 4560 m\(^2\); 640 m\(^2\)

C) a. \( 10x^3 + 8x^2 + 6x \text{ units}^2; \ \frac{1}{2}x^3 + \frac{5}{2}x^2 + 8x + 32 \text{ units}^2 \)
   b. 5680 m\(^2\); 512 m\(^2\)

D) a. \( 10x^3 - 8x^2 + 6x \text{ units}^2; \ \frac{1}{2}x^3 + \frac{5}{2}x^2 - 8x + 32 \text{ units}^2 \)
   b. 4656 m\(^2\); 384 m\(^2\)

Objective: (5.4) Solve 4Ps Application

Multiply using the FOIL method.
63) \((a + 5)(a + 5)\)
   A) \( a^2 + 10a + 10 \) B) \( 2a + 25 \) C) \( 2a^2 + 25 \) D) \( a^2 + 10a + 25 \)

Objective: (5.5) Multiply Two Binomials Using FOIL Method

64) \((m - a)^2\)
   A) \( m^2 + 2ma + a^2 \) B) \( m^2 - 2ma + a^2 \) C) \( m^2 - ma + a^2 \) D) \( m^2 - 2ma - a^2 \)

Objective: (5.5) Multiply Two Binomials Using FOIL Method

Square using special products.
65) \((x + 3)^2\)
   A) \( x^2 + 6x + 9 \) B) \( 9x^2 + 6x + 9 \) C) \( x^2 + 9 \) D) \( x + 9 \)

Objective: (5.5) Square Binomial

66) \((9a - 11)^2\)
   A) \( 9a^2 + 121 \) B) \( 81a^2 + 121 \)
   C) \( 81a^2 - 198a + 121 \) D) \( 9a^2 - 198a + 121 \)

Objective: (5.5) Square Binomial
67) \((4b + 5)^2\)
   - A) \(16b^2 + 40b + 25\)
   - B) \(4b^2 + 40b + 25\)
   - C) \(4b^2 + 25\)
   - D) \(16b^2 + 25\)

Objective: (5.5) Square Binomial

68) \((4x - 11y)^2\)
   - A) \(16x^2 - 88xy + 121y^2\)
   - B) \(4x^2 - 88xy + 121y^2\)
   - C) \(4x^2 + 121y^2\)
   - D) \(16x^2 + 121y^2\)

Objective: (5.5) Square Binomial

Use the special product of a sum and difference of two terms to multiply the binomials.

69) \((x + 5)(x - 5)\)
   - A) \(x^2 + 10x - 25\)
   - B) \(x^2 - 25\)
   - C) \(x^2 - 10\)
   - D) \(x^2 - 10x - 25\)

Objective: (5.5) Multiply Sum and Difference of Two Terms

70) \((x + 8y)(x - 8y)\)
   - A) \(x^2 - 64y^2\)
   - B) \(x^2 - 64y^2\)
   - C) \(x^2 - 16xy - 64y^2\)
   - D) \(x^2 + 16xy - 64y^2\)

Objective: (5.5) Multiply Sum and Difference of Two Terms

71) \((10a + 3b)(10a - 3b)\)
   - A) \(100a^2 - 60ab - 9b^2\)
   - B) \(10a^2 - 3b^2\)
   - C) \(100a^2 + 60ab - 9b^2\)
   - D) \(100a^2 - 9b^2\)

Objective: (5.5) Multiply Sum and Difference of Two Terms

Find the area of the geometric figure using special products.

72) \[
\begin{array}{c}
3x + 3 \\
\hline
3x + 3
\end{array}
\]
   - A) \(9x^2 + 9\)
   - B) \(6x^2 + 18x + 6\)
   - C) \(9x^2 + 9x + 9\)
   - D) \(9x^2 + 18x + 9\)

Objective: (5.5) Solve Application
A) 18x^2 \cdot 6x + \frac{1}{2} \quad B) 36x^2 \cdot 12x - 1 \quad C) 18x^2 + 6x - \frac{1}{2} \quad D) 36x^2 - 12x + 1

Objective: (5.5) Solve Application

Divide. Write answer in lowest terms using positive powers only.

74) \frac{-42x^9y^{13}z^6}{7x^6y^8z^5} \quad A) -6x^2y^4z \quad B) x^3y^5z \quad C) -6x^3y^5z \quad D) -6x^3y^5

Objective: (5.6) Divide Using Exponent Rules

Divide. Do not use long division.

75) \frac{12a^3 - 9a^5 + 15a}{3a} \quad A) 4a^2 - 3a^4 - 5 \quad B) 4a^2 - 9a^5 + 15a \quad C) 12a^3 - 3a^5 + 5 \quad D) 4a^2 - 3a^4 + 5

Objective: (5.6) Divide Polynomial by Monomial

Divide using long division.

76) \frac{(x^2 + 7x - 18)}{(x + 9)} \quad A) x^2 - 2 \quad B) x - 2 \quad C) x^2 + 8x - 9 \quad D) x + 2

Objective: (5.6) Divide Using Long Division (No Remainder)

Factor out the GCF using the Distributive Property.

77) 3x^2y^6 + 15x^2y^5 \quad A) 3x^3y^2(y + 5) \quad B) y + 5 \quad C) 3x^2y^5(y + 5) \quad D) x^2y^5(3y + 5)

Objective: (6.1) Factor Out GCF

78) 5x(3x + 4) - 4(3x + 4) \quad A) (5x - 4)(3x + 4) \quad B) (15x + 4)(x - 4) \quad C) (15x - 4)(x + 4) \quad D) (5x + 4)(3x - 4)

Objective: (6.1) Factor Out GCF (Binomial Factor)

Factor by grouping.

79) x^2 + 5x + xy + 5y \quad A) (x - 5)(x + y) \quad B) (x + 5)(x + y) \quad C) (x + 5)(x - y) \quad D) (x - 5)(x - y)

Objective: (6.1) Factor by Grouping
80) \( yx - 9x - 5y + 45 \)
   A) \((y - 9)(x - 5)\)  
   B) \((y + 9)(x + 5)\)  
   C) \((y + 9)(x - 5)\)  
   D) \((y - 9)(x + 5)\)  

Objective: (6.1) Factor by Grouping

Factor, if possible, using the difference or sum of squares. If a polynomial is not factorable, write "prime."

81) \( 16k^2 - 81m^2 \)
   A) \((4k + 9m)^2\)  
   B) Prime  
   C) \((4k - 9m)^2\)  
   D) \((4k + 9m)(4k - 9m)\)  

Objective: (6.2) Factor Sum or Difference of Squares

82) \( x^3 - 512y^3 \)
   A) \((x + 8y)(x^2 - 8xy + 64y^2)\)  
   B) \((x - 8y)(x^2 + 8xy + 64y^2)\)  
   C) \((x + 512y)(x^2 + y^2)\)  
   D) \((x - 8y)(x^2 + 64y^2)\)  

Objective: (6.2) Factor Sum or Difference of Cubes

Using the general factoring strategy, factor completely. If a polynomial is not factorable, write "prime."

83) \( 4x^2 - 196 \)
   A) \((4x - 7)^2\)  
   B) \((2x + 28)(x - 7)\)  
   C) \((4x + 7)(x - 7)\)  
   D) \((4x + 7)(x - 28)\)  

Objective: (6.2) Factor Using General Strategy

84) \( \frac{25}{121} m^2 - \frac{9}{4} \)
   A) \(\left(\frac{5m}{11} + \frac{3}{2}\right)^2\)  
   B) \(\left(\frac{5m}{11} + \frac{3}{2}\right)\left(\frac{5m}{11} - \frac{3}{2}\right)\)  
   C) \(\left(\frac{5m}{11} - \frac{3}{2}\right)^2\)  
   D) Prime  

Objective: (6.2) Solve Challenge Problem

Factor the trinomial using the AC Method. If a trinomial is not factorable, write "prime."

85) \( 4x^2 + 12x + 9 \)
   A) \((4x + 3)(x + 3)\)  
   B) \((2x - 3)(2x - 3)\)  
   C) Prime  
   D) \((2x + 3)(2x + 3)\)  

Objective: (6.3) Factor Using AC Method

86) \( 15x^2 - 14x - 8 \)
   A) \((3x - 4)(5x + 2)\)  
   B) \((x - 4)(15x + 2)\)  
   C) \((3x + 4)(5x - 2)\)  
   D) \((5x - 4)(3x + 2)\)  

Objective: (6.3) Factor Using AC Method

Factor the trinomial using the Educated Guess-and-Test Method. If a trinomial is not factorable, write "prime."

87) \( 15x^2 + 16xy + 4y^2 \)
   A) \((3x + 2y)(5x + 2y)\)  
   B) \((3x - 2y)(5x - 2y)\)  
   C) \((15x + y)(x + 4y)\)  
   D) \((15x + 2y)(x + 2y)\)  

Objective: (6.3) Factor Using Educated Guess-and-Test Method
Factor the trinomial using the Modified Guess–and–Test Method. If the trinomial is not factorable, write "prime."

88) \( x^2 - x - 30 \)  
A) prime  
B) \((x + 5)(x - 6)\)  
C) \((x + 1)(x - 30)\)  
D) \((x + 6)(x - 5)\)

88) ______

Objective: (6.4) Factor Using Modified Guess–and–Test Method

89) \( x^2 + 7x - 44 \)  
A) \((x + 11)(x - 4)\)  
B) \((x - 11)(x + 4)\)  
C) prime  
D) \((x - 11)(x + 1)\)

89) ______

Objective: (6.4) Factor Using Modified Guess–and–Test Method

90) \( u^2 - 2uv - 48v^2 \)  
A) \((u - 6v)(u + v)\)  
B) \((u + 6v)(u - 8v)\)  
C) \((u - 6v)(u + 8v)\)  
D) \((u - v)(u + 8v)\)

90) ______

Objective: (6.4) Factor Using Modified Guess–and–Test Method

Determine if the trinomial is a perfect square trinomial. If it is, factor it. If it is not, write "prime."

91) \( x^2 + 16x + 64 \)  
A) \((x + 8)^2\)  
B) \((x + 8)(x - 8)\)  
C) \((x - 8)^2\)  
D) prime

91) ______

Objective: (6.4) Factor Perfect Square Trinomial

92) \( b^2 - 36b + 324 \)  
A) \((b + 18)(b - 18)\)  
B) \((b - 18)^2\)  
C) prime  
D) \((b + 18)^2\)

92) ______

Objective: (6.4) Factor Perfect Square Trinomial

93) \( 64x^2 - 48xy + 9y^2 \)  
A) prime  
B) \((8x - y)^2\)  
C) \((8x - 3y)^2\)  
D) \((8x + 3y)^2\)

93) ______

Objective: (6.4) Factor Perfect Square Trinomial

Factor the trinomial using the general factoring strategy. If a trinomial is not factorable, write "prime."

94) \( 5x^2 - 5x - 30 \)  
A) \((5x + 10)(x - 3)\)  
B) prime  
C) \(5(x - 2)(x + 3)\)  
D) \(5(x + 2)(x - 3)\)

94) ______

Objective: (6.4) Factor Using General Strategy

95) \( y^3 + 12y^2 + 36y \)  
A) \((y^2 + 36)(y + 1)\)  
B) \(y(y + 6)(y - 6)\)  
C) \(y(y + 36)(y + 1)\)  
D) \(y(y + 6)^2\)

95) ______

Objective: (6.4) Factor Using General Strategy

Factor the polynomial completely using the general factoring strategy. If the polynomial is not factorable, write "prime."

96) \( 3(x - 2) - a(x - 2) \)  
A) \((3x + 2)(x - a)\)  
B) \((3 - a)(x - 2)\)  
C) \(3a(x - 2)\)  
D) \((3x - 2)(x - a)\)

96) ______

Objective: (6.5) Factor Out Common Factor

Solve the equation using the Zero Factor Property and state the solution set.

97) \( (9y + 20)(2y + 25) = 0 \)  
A) \(\left\{-\frac{20}{9}, -\frac{25}{2}\right\}\)  
B) \(\left\{-\frac{9}{11}, -\frac{2}{25}\right\}\)  
C) \{11, 23\}  
D) \(\left\{\frac{20}{9}, \frac{25}{2}\right\}\)

97) ______

Objective: (6.6) Solve Equation Using Zero Factor Property (Equation = 0)
98) \(56n^2 + 16n = 0\)

A) \(\left\{ \frac{2}{7} \right\}\)  
B) \(\left\{ \frac{2}{7}, 16 \right\}\)  
C) \(\{-2\}\)  
D) \{0\}

Objective: (6.6) Solve Equation Using Zero Factor Property (Equation = 0)

99) \(x^2 - x = 20\)

A) \{-4, -5\}  
B) \{4, 5\}  
C) \{1, 20\}  
D) \{-4, 5\}

Objective: (6.6) Solve Equation Using Zero Factor Property (Equation ≠ 0)

100) \(x(x - 3) = 54\)

A) \{-6, -9\}  
B) \{6, 9\}  
C) \{-6, 9\}  
D) \{6, -9\}

Objective: (6.6) Solve Equation Using Zero Factor Property (Equation ≠ 0)

Simplify the rational expression.

101) \(\frac{3x - 15}{x^2 - 25}\)

A) \(-\frac{3}{x + 5}\)  
B) \(\frac{3}{x - 5}\)  
C) \(-\frac{12}{x - 25}\)  
D) \(\frac{3}{x + 5}\)

Objective: (7.1) Simplify Rational Expression

102) \(\frac{y^2 - 2y - 8}{y^2 + 8y + 12}\)

A) \(\frac{y - 4}{y + 6}\)  
B) \(-\frac{y^2 - 2y - 8}{y^2 + 8y + 12}\)  
C) \(-\frac{2y + 8}{8y - 8}\)  
D) \(-\frac{2y - 8}{8y + 12}\)

Objective: (7.1) Simplify Rational Expression

Multiply the rational expressions and write the answer in lowest terms.

103) \(\frac{8y^4x}{30} \cdot \frac{10}{32x^3y^2}\)

A) \(\frac{y^2}{12x^2}\)  
B) \(\frac{x^2y^2}{12}\)  
C) \(\frac{1}{12x^2y^2}\)  
D) \(\frac{12y^2}{x^2}\)

Objective: (7.2) Multiply Rational Expressions

104) \(\frac{6y^4x}{27} \cdot \frac{9}{24x^3y^2}\)

A) \(\frac{1}{12x^2y^2}\)  
B) \(\frac{12y^2}{x^2}\)  
C) \(\frac{x^2y^2}{12}\)  
D) \(\frac{y^2}{12x^2}\)

Objective: (7.2) Multiply Rational Expressions

105) \(\frac{a^2 - 9b^2}{25ab^2} \cdot \frac{5a^2b}{a - 3b}\)

A) \(\frac{a^2 + 3ab}{5}\)  
B) \(\frac{a^2 + 3ab}{5b}\)  
C) \(\frac{a + 3b}{5ab}\)  
D) \(\frac{a^2 - 3ab}{5b}\)

Objective: (7.2) Multiply Rational Expressions
Divide the rational expressions and write the answer in lowest terms.

106) \[
\frac{m^2 - 4}{m^2 + 4m - 12} \div \frac{m^2 - 4m - 12}{m - 2}
\]

A) \(\frac{m + 2}{(m + 6)(m - 6)}\)  
B) \(\frac{m - 2}{(m + 6)(m - 6)}\)  
C) \(\frac{m - 2}{m - 6}\)  
D) \(\frac{m - 2}{m^2}\)

Objective: (7.2) Divide Rational Expressions

Add or subtract the rational expressions with common denominators. Write the answer in lowest terms.

107) \[
\frac{7x + 10}{2} - \frac{5x}{2}
\]

A) \(x + 10\)  
B) \(2x + 5\)  
C) \(x + 5\)  
D) \(5x\)

Objective: (7.3) Add or Subtract with Common Denominator

Perform the indicated operations and write the answer in lowest terms.

108) \[
\frac{4}{x} + \frac{7}{x - 3}
\]

A) \(\frac{11x - 12}{x(x - 3)}\)  
B) \(\frac{11x - 12}{x(3 - x)}\)  
C) \(\frac{12x - 11}{x(3 - x)}\)  
D) \(\frac{12x - 11}{x(x - 3)}\)

Objective: (7.3) Add or Subtract with Unlike Denominators I

109) \[
\frac{4}{x + 5} - \frac{6}{x - 5}
\]

A) \(\frac{-2x + 50}{(x + 5)(x - 5)}\)  
B) \(\frac{-2}{(x + 5)(x - 5)}\)  
C) \(\frac{-2x + 10}{(x + 5)(x - 5)}\)  
D) \(\frac{-2x - 50}{(x + 5)(x - 5)}\)

Objective: (7.3) Add or Subtract with Unlike Denominators I

110) \[
\frac{5w}{w + 9} + \frac{5}{w}
\]

A) \(\frac{5w^2 + 5w + 5}{w(w + 9)}\)  
B) \(\frac{5w^2 + 5}{w(w + 9)}\)  
C) \(\frac{5w^2 + 5w + 45}{w(w + 9)}\)  
D) \(\frac{5w + 5}{w(w + 9)}\)

Objective: (7.3) Add or Subtract with Unlike Denominators I

111) \[
\frac{16}{x^2 - 64} + \frac{1}{x + 8}
\]

A) \(\frac{1}{x + 8}\)  
B) \(\frac{17}{x^2 - 64}\)  
C) \(\frac{1}{8 - x}\)  
D) \(\frac{1}{x - 8}\)

Objective: (7.3) Add or Subtract with Unlike Denominators I
Simplify the complex fraction.

112) \( \frac{14}{y^2 - 49} \frac{35}{y - 7} \)

A) \( \frac{5}{2(y + 7)} \)  
B) \( \frac{2}{5(y + 7)} \)  
C) \( \frac{2}{5(y - 7)} \)  
D) \( \frac{2(y + 7)}{5} \)

Objective: (7.4) Simplify Complex Fractions by Multiplying by Reciprocal

113) \( \frac{64 - 8z}{8 - \frac{1}{z}} \)

A) 8  
B) 8z  
C) \( \frac{1}{8} \)  
D) \( \frac{8}{z} \)

Objective: (7.4) Simplify Complex Fractions by Multiplying by Reciprocal

114) \( \frac{\frac{3}{x} + \frac{2}{x^2}}{\frac{9}{x^2} - \frac{4}{x}} \)

A) \( \frac{1}{3 - 2x} \)  
B) \( \frac{1}{3x - 2} \)  
C) \( \frac{3x^2 + 2}{9 - 4x} \)  
D) \( \frac{3x + 2}{9 - 4x} \)

Objective: (7.4) Simplify Complex Fractions by Multiplying by LCD/LCD

115) \( \frac{\frac{5}{x} - \frac{4}{y}}{\frac{2 + 3}{x} \frac{y}{y}} \)

A) \( \frac{5x - 4y}{2x + 3y} \)  
B) \( \frac{5y + 4x}{2y - 3x} \)  
C) \( \frac{5y - 4x}{2y + 3x} \)  
D) \( \frac{x + y}{5(x - y)} \)

Objective: (7.4) Simplify Complex Fractions by Multiplying by LCD/LCD

116) \( \frac{x - \frac{1}{x}}{\frac{1}{36} + \frac{6}{x}} \)

A) \( \frac{36}{x - 6} \)  
B) \( \frac{x + 6}{36} \)  
C) \( \frac{x - 6}{36} \)  
D) \( \frac{36}{x + 6} \)

Objective: (7.4) Simplify Complex Fractions by Multiplying by LCD/LCD
117) \[
\frac{9 + \frac{3}{x}}{\frac{1}{4} + \frac{1}{12}}
\]

A) 1 B) \(\frac{x}{36}\) C) \(\frac{36}{x}\) D) 36

Objective: (7.4) Simplify Complex Fractions by Multiplying by LCD/LCD

118) \[
\frac{36t^2 - 16u^2}{tu} - \frac{6}{u} - \frac{4}{t}
\]

A) 6t + 4u B) 4t + 6u C) \(\frac{tu}{6t + 4u}\) D) \(\frac{4t + 6u}{tu}\)

Objective: (7.4) Simplify Complex Fractions by Multiplying by LCD/LCD

Find any excluded values and state the domain of the rational function using interval notation or set-builder notation as appropriate.

119) \(f(x) = 8 + \frac{6}{x + 4}\)

A) \(D = (-\infty, \infty)\) B) \(D = \{x | x \neq -4 \text{ and } x \neq 4\}\)

C) \(D = \{x | x \neq -4\}\) D) \(D = \{x | x \neq -6\}\)

Objective: (7.5) State Domain of Rational Function

120) \(f(y) = \frac{y^2 - 24y}{6y}\)

A) \(D = \{y | y \neq 6\}\) B) \(D = \left\{y | y \neq \frac{1}{6}\right\}\)

C) \(D = \{y | y \neq 0\}\) D) \(D = \{y | y \neq 0 \text{ and } y \neq 24\}\)

Objective: (7.5) State Domain of Rational Function

121) \(f(x) = \frac{x^2 - 36}{x^2 - 11x + 30}\)

A) \(D = \{x | x \neq -5 \text{ and } x \neq -6\}\) B) \(D = \{x | x \neq 6 \text{ and } x \neq -6\}\)

C) \(D = \{x | x \neq 0\}\) D) \(D = \{x | x \neq 5 \text{ and } x \neq 6\}\)

Objective: (7.5) State Domain of Rational Function

Solve the equation.

122) \(\frac{6}{x} - \frac{1}{4} = \frac{4}{x}\)

A) \{-8\} B) \{-2\} C) \{8\} D) \left\{\frac{2}{3}\right\}

Objective: (7.5) Solve Equation Involving Rational Expression
123) \( \frac{2}{y + 2} - \frac{5}{y - 2} = \frac{10}{y^2 - 4} \)

A) \{8\} B) \( \sqrt[4]{4} \) C) \{-8\} D) \{24\}

Objective: (7.5) Solve Equation Involving Rational Expression

Solve the formula for the indicated variable.

124) \( L = \frac{P}{2} - W \) for \( P \)

A) \( P = 2L + 2W \) B) \( P = 2LW \) C) \( P = 2L + W \) D) \( P = 2L - 2W \)

Objective: (7.5) Solve Formula for Indicated Variable

125) \( \frac{1}{a} + \frac{1}{b} = c \) for \( a \)

A) \( a = \frac{c}{1 - b} \) B) \( a = \frac{b}{bc - 1} \) C) \( a = \frac{1}{bc} \) D) \( a = bc - \frac{1}{b} \)

Objective: (7.5) Solve Formula for Indicated Variable

Translate the statement and find the variation constant, \( k \).

126) \( y \) varies directly with \( x \) and \( y = 15 \) when \( x = 12 \).

A) \( \frac{4}{5} \) B) 3 C) \( \frac{1}{3} \) D) \( \frac{5}{4} \)

Objective: (7.6) Find Variation Constant

Solve the variation problem.

127) \( C \) varies directly with \( v \). If \( C = 225 \) when \( v = 9 \), find \( C \) if \( v = 14 \).

A) 126 B) 336 C) 350 D) 375

Objective: (7.6) Solve Direct, Indirect, or Joint Variation Problems

Simplify using the product rule for radicals.

128) \( \sqrt{180} \)

A) \( 5\sqrt{6} \) B) 30 C) \( 6\sqrt{5} \) D) 13

Objective: (8.1) Simplify Using Product Rule

Write in simplified radical form. Assume that all variables represent positive real numbers.

129) \( \sqrt[4]{169x^6yz^9} \)

A) \( 13x^4z^2\sqrt[4]{y} \) B) \( 6.5x^3z^4\sqrt[4]{xyz} \) C) \( 6.5x^3yz^4 \) D) \( 13x^3z^4\sqrt{yz} \)

Objective: (8.1) Write in Simplified Radical Form

Perform the indicated operations. Write the answer in simplified radical form. Assume that all variables represent positive real numbers.

130) \( 12\sqrt{2} - 8\sqrt{2} - \sqrt{2} \)

A) \(-5\sqrt{2}\) B) \(3\sqrt{2}\) C) \(4\sqrt{2}\) D) \(5\sqrt{2}\)

Objective: (8.1) Add/Subtract Square Roots
Using the Pythagorean Theorem, $a^2 + b^2 = c^2$, find the missing length of the side of the triangle. Write your answer in simplified radical form.

131) 

Using the Pythagorean Theorem, $a^2 + b^2 = c^2$, find the missing length of the side of the triangle. Write your answer in simplified radical form.

131) 

A) 145 B) $\sqrt{145}$ C) 17 D) $\sqrt{17}$

Objective: (8.1) Solve Application

Multiply. Write the answer in simplified radical form. Assume that all variables represent positive real numbers.

132) $(1 + 3\sqrt{7})(1 - 3\sqrt{7})$

A) -62 B) $1 + 6\sqrt{7}$ C) $1 - 6\sqrt{7}$ D) 64

Objective: (8.2) Multiply Square Roots (Distribute/FOIL/Special Product)

Solve the problem by utilizing the 4P’s: Prepare, Plan, Process, and Ponder. Find the speed, $S$, of the accident vehicle using the formula $S = \frac{D}{\sqrt{d}}$, where $s$ is the speed of the test vehicle, $D$ is the length of the skid marks at the accident scene, and $d$ is the length of the skid marks left by the test vehicle.

133) Skid marks at an accident scene are 125 feet in length. If the speed of the test vehicle was 36 mph and it left 48 feet of skid marks, how fast was the other car traveling before the accident?

A) $5\sqrt{10}$ mph B) $5\sqrt{15}$ mph C) $15\sqrt{10}$ mph D) $15\sqrt{15}$ mph

Objective: (8.2) Solve 4Ps Application

Solve and write the solution using set notation.

134) $\sqrt{7} - x = x - 1$

A) $\{\}$ B) $\{-2, 3\}$ C) $\{-2\}$ D) $\{3\}$

Objective: (8.3) Solve Equation Containing Square Root (Square Binomial)

Solve the problem by utilizing the 4P’s: Prepare, Plan, Process, and Ponder. The formula $t = 2\pi\sqrt{\frac{L}{g}}$ represents the time (in seconds) for a pendulum of length $L$ (in feet) to complete one cycle, where $g$ is the gravitational constant of approximately 32 feet per second squared. Use the formula to find the exact and approximate lengths in the following application.

135) Find the length of the pendulum in a clock tower if it takes 5 seconds for the pendulum to complete one cycle.

A) $L = \frac{200}{\pi}$ ft., or approximately 63.65 ft. B) $L = \frac{100}{\pi^2}$ ft., or approximately 10.13 ft.

C) $L = \frac{200}{\pi^2}$ ft., or approximately 20.26 ft. D) $L = \frac{40}{\pi^2}$ ft., or approximately 4.05 ft.

Objective: (8.3) Solve 4Ps Application
Solve the problem by utilizing the 4P’s: Prepare, Plan, Process, and Ponder.

136) The radius of a sphere is given by the formula \( r = \sqrt[4]{\frac{5}{4\pi}} \), where \( S \) is the surface area of the sphere. Use the formula to solve the application. Joan Lone is an astronomy student at a local community college. As part of her final project she has designed a model of the solar system. In this model, the sphere representing the planet Jupiter has a surface area of approximately 180 square centimeters. Find the radius of this sphere. Give your answer in exact form and as a decimal rounded to the nearest tenth of a centimeter.

\[
\frac{6\sqrt{5\pi}}{\pi} \text{ cm or } 7.6 \text{ cm} \\
\frac{3\sqrt{5\pi}}{\pi} \text{ cm or } 3.8 \text{ cm} \\
\frac{3\sqrt{5}}{\pi} \text{ cm or } 2.1 \text{ cm} \\
\frac{18\sqrt{5\pi}}{\pi} \text{ cm or } 22.7 \text{ cm}
\]

Objective: (8.4) Solve 4Ps Application

Simplify using the product rule or quotient rule for radicals. Write the answer in simplified radical form. Assume that all variables represent positive real numbers.

137) \( \sqrt[3]{-27a^{11}b^{13}} \)

A) \(-3ab\sqrt[a^5b^4]{b^3}\)  
B) \(3\sqrt[a^{13}b^{11}]{b}\)  
C) \(-3a^{3b^4}\sqrt[a^2b]{b}\)  
D) \(-3a^2b\sqrt[a^3b^4]{b}\)

Objective: (8.5) Simplify Radical Using Product Rule or Quotient Rule

Solve and write the solution using set notation.

138) \( \sqrt[4]{2x - 4} + 3 = 7 \)

A) \{260\}  
B) \{10\}  
C) \{130\}  
D) \{-38\}

Objective: (8.6) Solve Equation Containing Higher Root

Find the functional value and write the answer as an ordered pair.

139) \( h(x) = 3x^2 - 7x - 4, \) \( h(-5) \)

A) \((-5, -114)\)  
B) \((-5, -44)\)  
C) \((-5, 36)\)  
D) \((-5, 106)\)

Objective: (9.1) Find Functional Value (Number)

140) \( g(t) = 8t^2 - 5t, \) \( g\left(\frac{1}{2}\right) \)

A) \(\left(\frac{1}{2}, \frac{1}{2}\right)\)  
B) \(\left(\frac{1}{2}, -\frac{1}{2}\right)\)  
C) \(\left(\frac{1}{2}, \frac{3}{2}\right)\)  
D) \(\left(\frac{1}{2}, -\frac{3}{2}\right)\)

Objective: (9.1) Find Functional Value (Number)

141) \( f(x) = |5x - 4|, \) \( f(-3) \)

A) \((-3, 11)\)  
B) \((-3, -19)\)  
C) \((-3, -11)\)  
D) \((-3, 19)\)

Objective: (9.1) Find Functional Value (Number)
Find the following function and its domain.

142) Let \( f(x) = 4 - 9x \) and \( g(x) = -2x + 9 \). Find \((f + g)(x)\).

A) \(-7x + 13, D = \{x \mid x \neq \frac{13}{7}\}\)  
B) \(-2x + 4, D = \{x \mid x \neq 2\}\)

C) \(2x, D = (-\infty, \infty)\)  
D) \(-11x + 13, D = (-\infty, \infty)\)

Objective: (9.2) Find Sum, Difference, Product, or Quotient of Functions

143) Let \( f(x) = 2x^2 - 3 \) and \( g(x) = 7x - 4 \). Find \((f - g)(x)\).

A) \(2x^2 - 7x + 1, D = (-\infty, \infty)\)  
B) \(-5x - 7, D = \{x \mid x \neq -\frac{7}{5}\}\)

C) \(2x^2 - 7x - 7, D = (-\infty, \infty)\)  
D) \(9x + 1, D = \{x \mid x \neq 1\}\)

Objective: (9.2) Find Sum, Difference, Product, or Quotient of Functions

144) Let \( f(x) = 5x + 1 \) and \( g(x) = 2x - 5 \). Find \( \left(\frac{f}{g}\right)(x)\).

A) \(\frac{2x - 5}{5x + 1}, D = \{x \mid x \neq -\frac{1}{5}\}\)  
B) \(\frac{5x + 1}{2x - 5}, D = \{x \mid x \neq \frac{5}{2}\}\)

C) \(\frac{2x - 5}{5x + 1}, D = \{x \mid x \neq -\frac{5}{2}\}\)  
D) \(\frac{5x + 1}{2x - 5}, D = \{x \mid x \neq -\frac{1}{5}\}\)

Objective: (9.2) Find Sum, Difference, Product, or Quotient of Functions

145) Let \( f(x) = 5x^2 - 2 \) and \( g(x) = 4x + 1 \). Find \((f \cdot g)(x)\).

A) \(20x^3 + 5x^2 - 8x - 2, D = (-\infty, \infty)\)  
B) \(5x^2 + 4x - 2, D = (-\infty, \infty)\)

C) \(20x^3 - 8x - 2, D = \{x \mid x \neq 0\}\)  
D) \(20x^3 + 5x^2 - 2, D = (-\infty, \infty)\)

Objective: (9.2) Find Sum, Difference, Product, or Quotient of Functions

Graph the function by plotting points. State the domain and range.

146) \( f(x) = 5 \)
A) $D = \{5\}$
$R = (-\infty, \infty)$

B) $D = (-\infty, \infty)$
$R = \{5\}$

C) $D = \{5\}$
$R = (-\infty, \infty)$

D) $D = (-\infty, \infty)$
$R = (-\infty, \infty)$

Objective: (9.3) Graph Function

147) $g(x) = \sqrt{x - 1}$
A) \( D = [0, \infty) \)
\( R = [1, \infty) \)

B) \( D = [-1, \infty) \)
\( R = [0, \infty) \)

C) \( D = [0, \infty) \)
\( R = [-1, \infty) \)

D) \( D = [1, \infty) \)
\( R = [0, \infty) \)

Objective: (9.3) Graph Function

148) \( f(x) = \sqrt{5 - x} \)

148) _____
A) $D = (-\infty, 5]$
$R = (-\infty, 0]$

B) $D = [5, \infty)$
$R = [0, \infty)$

C) $D = [0, \infty)$
$R = [-5, \infty)$

D) $D = (-\infty, 5]$  
$\hspace{1cm} R = [0, \infty)$

Objective: (9.3) Graph Function
Match the function with the appropriate graph of the transformation of the function $g(x) = x^2$.

149) $f(x) = (x - 3)^2$

A) [Graph A]

B) [Graph B]

C) [Graph C]

D) [Graph D]

Objective: (9.4) Match Function to Its Graph
150) $f(x) = -x^2 + 2$

Objective: (9.4) Match Function to Its Graph
151) \(f(x) = (x + 4)^2 - 5\)

A) 

B) 

C) 

D) 

Objective: (9.4) Match Function to Its Graph

Using transformations and/or reflections and one of the basic graphs, state the transformation and/or reflection and sketch the function.

152) \(g(x) = (x - 3)^2\)
A) This is the graph of $f(x) = x^2$ shifted to the left 3 units.

B) This is the graph of $f(x) = x^2$ shifted to the right 3 units.

C) This is the graph of $f(x) = x^2$ shifted up 3 units.

D) This is the graph of $f(x) = x^2$ shifted down 3 units.

Objective: (9.4) Use Transformations to Graph Function

153) $f(x) = |x + 3|$
A) This is the graph of $f(x) = |x|$ shifted to the left 3 units.

B) This is the graph of $f(x) = |x|$ shifted up 3 units.

C) This is the graph of $f(x) = |x|$ shifted down 3 units.

D) This is the graph of $f(x) = |x|$ shifted to the right 3 units.

Objective: (9.4) Use Transformations to Graph Function

154) $g(x) = (x + 3)^2 - 1$
A) This is the graph of $f(x) = x^2$ shifted to the right 3 units and then shifted down 1 unit.

B) This is the graph of $f(x) = x^2$ shifted to the left 1 unit and then shifted up 3 units.

C) This is the graph of $f(x) = x^2$ shifted to the right 1 unit and then shifted up 3 units.

D) This is the graph of $f(x) = x^2$ shifted to the left 3 units and then shifted down 1 unit.

Objective: (9.4) Use Transformations to Graph Function

155) $f(x) = \sqrt{x + 2} - 7$
A) This is the graph of \( f(x) = \sqrt{x} \) shifted 7 units to the left and then shifted up 2 units.

B) This is the graph of \( f(x) = \sqrt{x} \) shifted 7 units to the right and then shifted up 2 units.

C) This is the graph of \( f(x) = \sqrt{x} \) shifted to the right 2 units and then shifted down 7 units.

D) This is the graph of \( f(x) = \sqrt{x} \) shifted to the left 2 units and then shifted down 7 units.

Objective: (9.4) Use Transformations to Graph Function

156) \( f(x) = -\sqrt{x - 6} \)
A) This is the graph of \( f(x) = \sqrt{x} \) shifted right 6 units and then reflected about the x-axis.

B) This is the graph of \( f(x) = \sqrt{x} \) shifted left 6 units and then reflected about the y-axis.

C) This is the graph of \( f(x) = \sqrt{x} \) shifted left 6 units and then reflected about the x-axis.

D) This is the graph of \( f(x) = \sqrt{x} \) shifted right 6 units and then reflected about the y-axis.

Objective: (9.4) Use Transformations and Reflections to Graph Function

157) \( h(x) = -\sqrt{x} + 3 - 5 \)
A) This is the graph of \( f(x) = \sqrt{x} \) shifted to the right 3 units, reflected about the x-axis and then shifted down 5 units.

B) This is the graph of \( f(x) = \sqrt{x} \) shifted to the left 3 units, reflected about the x-axis and then shifted down 5 units.

C) This is the graph of \( f(x) = \sqrt{x} \) shifted to the right 3 units, reflected about the y-axis and then shifted down 5 units.

D) This is the graph of \( f(x) = \sqrt{x} \) shifted to the left 3 units, reflected about the y-axis and then shifted down 5 units.

Objective: (9.4) Use Transformations and Reflections to Graph Function

Perform the indicated operations and write the answer in the standard form \( a + bi \).

158) \( \frac{7i}{2 - 14i} \)

A) \( -\frac{49}{100} + \frac{7}{100}i \)  
B) \( \frac{7}{100} + \frac{49}{100}i \)  
C) \( \frac{49}{100} + \frac{7}{100}i \)  
D) \( \frac{7}{100} - \frac{49}{100}i \)  

Objective: (10.1) Multiply or Divide Complex Numbers

159) \( \frac{5 - i}{-9 + 4i} \)

A) \( \frac{49}{97} - \frac{11}{97}i \)  
B) \( \frac{1}{97} - \frac{11}{97}i \)  
C) \( \frac{11}{97}i \)  
D) \( \frac{49}{97} - \frac{11}{97}i \)  

Objective: (10.1) Multiply or Divide Complex Numbers
Solve using the Zero Factor Property.

160) \(7x^2 + 19x - 6 = 0\)
A) \(\left\{ \frac{1}{3}, -\frac{2}{7} \right\}\)  
B) \(\left\{ -\frac{7}{2}, -\frac{1}{3} \right\}\)  
C) \(\left\{ -\frac{2}{7}, 3 \right\}\)  
D) \(\left\{ -3, \frac{2}{7} \right\}\)

Objective: (10.2) Solve Using Zero Factor Property

161) \(4x^2 + 7x - 15 = 0\)
A) \(\left\{ -\frac{5}{4}, 3 \right\}\)  
B) \(\left\{ -\frac{4}{5}, \frac{1}{3} \right\}\)  
C) \(\left\{ -3, \frac{5}{4} \right\}\)  
D) \(\left\{ -\frac{1}{3}, \frac{4}{5} \right\}\)

Objective: (10.2) Solve Using Zero Factor Property

162) \(8x^2 + 17x - 21 = 0\)
A) \(\left\{ -\frac{3}{7}, \frac{8}{3} \right\}\)  
B) \(\left\{ -\frac{1}{3}, \frac{7}{8} \right\}\)  
C) \(\left\{ -\frac{7}{8}, 3 \right\}\)  
D) \(\left\{ -\frac{8}{7}, \frac{1}{3} \right\}\)

Objective: (10.2) Solve Using Zero Factor Property

Solve using the Square Root Property.

163) \(x^2 = 25\)
A) \([5]\)  
B) \([-5, 5]\)  
C) \([625]\)  
D) \(\left\{ -\frac{1}{5}, \frac{1}{5} \right\}\)

Objective: (10.2) Solve Using Square Root Property

164) \(x^2 = 18\)
A) \([-\sqrt{18}, \sqrt{18}]\)  
B) \([-3\sqrt{2}, 3\sqrt{2}]\)  
C) \([3\sqrt{2}]\)  
D) \([9\sqrt{2}]\)

Objective: (10.2) Solve Using Square Root Property

165) \((x - 7)^2 = 25\)
A) \([32]\)  
B) \([5, -5]\)  
C) \([12, 2]\)  
D) \([2, -12]\)

Objective: (10.2) Solve Using Square Root Property

166) \((4x + 3)^2 - 7 = 0\)
A) \(\left\{ \frac{3 - \sqrt{7}}{4}, \frac{3 + \sqrt{7}}{4} \right\}\)  
B) \(\left\{ -\frac{3 - \sqrt{7}}{4}, -\frac{3 + \sqrt{7}}{4} \right\}\)  
C) \(\left\{ -\frac{5}{2}, 1 \right\}\)  
D) \(\left\{ \frac{\sqrt{7} - 3}{4}, \frac{\sqrt{7} + 3}{4} \right\}\)

Objective: (10.2) Solve Using Square Root Property

Solve by completing the square.

167) \(x^2 - 6x + 18 = 0\)
A) \([0, 6]\)  
B) \([3 - 3i, 3 + 3i]\)  
C) \([3 - 9i, 3 + 9i]\)  
D) \([3 + 3i]\)

Objective: (10.2) Solve By Completing The Square

168) \(3x^2 + 15x = -18\)
A) \([-3, 2]\)  
B) \([-3, -2]\)  
C) \(\left\{ -\frac{1}{2}, \frac{3}{2} \right\}\)  
D) \([2, 3]\)

Objective: (10.2) Solve By Completing The Square
Solve using the Quadratic Formula.

169) \(5x^2 + 8x = 4\)

A) \(\left\{ \frac{5}{2}, 2 \right\}\)  
B) \(\left\{ 0, \frac{8}{5} \right\}\)  
C) \(\left\{ -\frac{8}{5}, 0 \right\}\)  
D) \(\left\{ -2, \frac{2}{5} \right\}\)

Objective: (10.3) Solve Using Quadratic Formula

Solve by the method of your choice.

170) \(x^2 + 2x - 24 = 0\)

A) \([-6, 4]\)  
B) \([6, -4]\)  
C) \([-24, 0]\)  
D) \([6, 4]\)

Objective: (10.3) Solve Quadratic Equation by Any Method

171) \(x^2 + 14x + 74 = 0\)

A) \([-7 - 5i, -7 + 5i]\)  
B) \([-7 + 5i]\)  
C) \([-7 - 25i, -7 + 25i]\)  
D) \([-12, -2]\)

Objective: (10.3) Solve Quadratic Equation by Any Method

Solve the application using the Pythagorean theorem.

172) A bird flies 36 meters in a straight line from the top of a vertical cliff to a point on the ground 23 meters from the base of the cliff. Find the height of the cliff. Round to the nearest hundredth of a meter.

A) Approximately 42.72 meters  
B) Approximately 27.15 meters  
C) Approximately 13 meters  
D) Approximately 27.69 meters

Objective: (10.3) Solve Application

173) One end of a guy wire is attached to the top of a 13-foot pole and the other end is anchored into the ground 9 feet from the base of the pole. Find the length of the guy wire. Round to the nearest tenth of a foot.

A) Approximately 15.8 feet  
B) Approximately 22.5 feet  
C) Approximately 22 feet  
D) Approximately 15.3 feet

Objective: (10.3) Solve Application
Solve the formula for the indicated variable.

174) \( V = \frac{1}{3}s^2h \) for \( s \) (volume of a square pyramid)

A) \( s = \sqrt[3]{3Vh} \)  
B) \( s = \frac{\sqrt{3Vh}}{h} \)  
C) \( s = \frac{\sqrt{3Vh}}{3h} \)  
D) \( s = \frac{\sqrt{3Vh}}{h} \)

Objective: (10.4) Solve Application

Determine a) if the parabola opens up/down or left/right, b) the axis of symmetry, c) the vertex, and d) the intercepts. Then graph the parabola given by the quadratic equation.

175) \( y = x^2 - 9 \)

A) a. up, b. \( x = 0 \), c. \((0, -9)\), d. \((-3, 0)\) and \((3, 0)\)

B) a. down, b. \( x = 0 \), c. \((0, -9)\), d. none
Objective: (11.1) Graph Parabola and State Characteristics

Graph the quadratic equation.

176) \( y = (x - 3)^2 + 6 \)
Objective: (11.1) Graph Parabola

177) \( y = (x + 4)^2 + 5 \)
Objective: (11.1) Graph Parabola

178) \( y = (x - 3)^2 \)
Objective: (11.1) Graph Parabola

179) \( y = 3(x - 4)^2 + 6 \)
Objective: (11.1) Graph Parabola

180) \( y = 3(x - 1)^2 - 5 \)
Objective: (11.1) Graph Parabola

Solve the application.

181) An arrow is fired into the air with an initial velocity of 64 feet per second. The height in feet of the arrow t seconds after it was shot into the air is given by the function \( h(t) = -16t^2 + 64t \). Find the maximum height of the arrow.
   A) 64 feet
   B) 96 feet
   C) 32 feet
   D) 192 feet

Objective: (11.1) Solve Application

182) A person is standing on the top of a building 50 feet above the ground. They project an object upward with an initial velocity of 40 feet per second. The object’s distance above the ground, \( d \), after t seconds may be found by the formula \( d = -16t^2 + 40t + 50 \). What is the maximum height the object will reach and how much time does it take to reach that height?
   A) maximum height = 75 ft; time = 1.25 seconds
   B) maximum height = 50 ft; time = 2.5 seconds
   C) maximum height = 75 ft; time = 2.5 seconds
   D) maximum height = 50 ft; time = 1.25 seconds

Objective: (11.1) Solve Application
Answer Key
Testname: AT9210ACCUPLACER2B

1) B
2) C
3) A
4) C
5) D
6) C
7) B
8) A
9) D
10) B
11) B
12) C
13) C
14) C
15) A
16) D
17) A
18) B
19) A
20) D
21) B
22) D
23) A
24) D
25) D
26) B
27) B
28) A
29) C
30) B
31) D
32) A
33) A
34) A
35) B
36) C
37) C
38) A
39) C
40) C
41) B
42) C
43) D
44) B
45) B
46) C
47) A
48) C
49) D
50) D
Answer Key
Testname: AT9210ACCUPLACER2B

51) B
52) D
53) C
54) B
55) D
56) D
57) C
58) C
59) A
60) B
61) B
62) D
63) D
64) B
65) A
66) C
67) A
68) A
69) B
70) B
71) D
72) D
73) A
74) C
75) D
76) B
77) C
78) A
79) B
80) A
81) D
82) B
83) C
84) B
85) D
86) A
87) A
88) B
89) A
90) B
91) A
92) B
93) C
94) D
95) D
96) B
97) A
98) A
99) D
100) C
Answer Key
Testname: AT9210ACCUPLACER2B

101) D
102) A
103) A
104) D
105) B
106) B
107) C
108) A
109) D
110) C
111) D
112) B
113) A
114) D
115) C
116) C
117) C
118) A
119) C
120) C
121) D
122) C
123) C
124) A
125) B
126) D
127) C
128) C
129) D
130) B
131) B
132) A
133) D
134) D
135) C
136) B
137) C
138) C
139) D
140) B
141) D
142) D
143) A
144) B
145) A
146) B
147) D
148) D
149) A
150) C
Answer Key
Testname: AT9210ACCUPLACER2B

151) B
152) B
153) A
154) D
155) D
156) A
157) B
158) A
159) D
160) D
161) C
162) A
163) B
164) B
165) C
166) B
167) B
168) B
169) D
170) A
171) A
172) D
173) A
174) B
175) A
176) C
177) B
178) C
179) A
180) C
181) A
182) A