# Intermediate Algebra Sample Test

## *Simplifying and Evaluating Expressions*

1. Simplify: $8x-4(2x-5)-2$

   a) $6x+18$ b) $-22$ c) $6x-7$ d) $18$

2. Simplify: $|9-17|-|8-12|$

   a) $-12$ b) $-4$ c) $4$ d) $1$

3. Combine similar terms: $4x^3-3x^2+6x^3+x^2$

   a) $10x^6-2x^4$ b) $8x^6$ c) $x+7x^5$ d) $10x^3-2x^2$

4. Write as a power of 2: $(2^3)^2(2)^4$

   a) $2^{24}$ b) $2^9$ c) $2^{10}$ d) $2^{13}$

5. Simplify: $(3x^3y)^2(xy^3)$

   a) $9x^7y^5$ b) $9x^6y^5$ c) $9x^6y^6$ d) $9x^7y^6$

6. Simplify: $\dfrac{6.9\times10^4}{2.3\times10^7}$

   a) $4.6x10^{3}$ b) $3.0x10^{3}$ c) $3.0x10^{-3}$ d) $4.6x10^{-3}$

7. Simplify: $\dfrac{x^{-2}y^{-3}}{x^5y^{-4}}$

   a) $x^3y^{-7}$ b) $x^{-7}y^{-1}$ c) $x^7y^7$ d) $x^{-7}y$

8. Combine: $9a^2b-5ab^2+a^2b-2ab^2$

   a) $a^2b-4ab^2$ b) $4a^2b-ab^2$
   c) $10a^2b-7ab^2$ d) $10a^2b-10ab^2$

9. Simplify: $-4^{-1}$

   a) $4$ b) $\dfrac{1}{4}$ c) $-4$ d) $-\dfrac{1}{4}$

10. Evaluate: $7-(2x-y)^2$ for $x=-3, y=4$

    a) $107$ b) $-93$ c) $3$ d) $11$

11. If $f(x)=x^2+2x+1$, find $f(-4)$

    a) $-23$ b) $9$ c) $25$ d) $-15$

12. If $g(x)=4-5x$, find $g(a-4)$.

    a) $-a-4$ b) $-5a-16$ c) $-5a+24$ d) $-a+4$

## *Polynomials*

1. Multiply: $(5a+6)(a-1)$

   a) $5a^2+11a-6$ b) $5a^2+a-6$
   c) $5a^2-a-6$ d) $5a^2+a+6$

2. Multiply: $(3x^3-2y)^2$

   a) $9x^9+4y^2$ b) $9x^6-12x^3y+4y^2$
   c) $9x^9-12x^3y+4y^2$ d) $9x^6+4y^2$

3. Subtract: $(4x^2y^2-2xy+8y^2)-(-2x^2y^2+3xy-8y^2)$

   a) $2x^2y^2+xy$ b) $6x^2y^2-5xy+16y^2$
   c) $6x^2y^2+5xy$ d) $8x^4y^4+6x^2y^2+64y^2$

4. Factor completely: $16x^2-25$

   a) $(4x-5)^2$ b) $(4x+5)^2$
   c) $(8x-5)^2$ d) $(4x-5)(4x+5)$

5. Factor completely: $2x^3y-30x^2y+108xy$

   a) $2xy(x-9)(x-6)$ b) $2xy(x^2-15x+54)$
   c) $2xy(x+9)(x+6)$ d) $2(x^2-9y)(x-6y)$

## *Linear Equations, Inequalities, Systems*

1. Solve for x: $8-2(3-2x)=3(x-1)$

   a) $\dfrac{7}{5}$ b) $-3$ c) $\dfrac{19}{15}$ d) $-5$

2. Solve for x: $2-\frac{2x}{5}=\frac{x}{3}-4$ a) $\frac{90}{11}$ b) $\frac{90}{17}$ c) $-\frac{2}{17}\frac{90}{}$ d) $\frac{30}{7}$

3. Solve this inequality for x: $-2x+6\geq 4$ a) $x\geq 1$ b) $x\leq 1$ c) $x\geq -5$ d) $x\leq -5$

4. Find the y-value of the solution of $\begin{cases}5x-y=1\\-2x+3y=10\end{cases}$ a) $-6$ b) $-4$ c) 4 d) 1

5. Solve for $h$: $V=\frac{1}{3}\pi r^2 h$ a) $\frac{3V}{\pi r^2}=h$ b) $3\pi r^2 V=h$ c) $\frac{1}{3}V-\pi r^2=h$ d) $3V-\pi r^2=h$

***Rational Expressions and Equations***

1. Combine. Leave answer simplified: $\frac{6-x}{x^4}+\frac{2+7x}{x^4}$ a) $\frac{2(4+3x)}{x^4}$ b) $\frac{2(4+3x)}{x^8}$ c) $\frac{2(4x+3)}{x^4}$ d) $\frac{2+3x}{x^2}$

2. Simplify: $\frac{15x}{5x+5}\cdot\frac{x^2+3x+2}{x^2+2x}$ a) $\frac{3(3x+2)}{5(2x)}$ b) $\frac{3x(x+2)}{x^2+2x}$ c) $\frac{3(x+2)}{5}$ d) 3

3. Reduce, if possible: $\frac{x^2-2x-15}{x^2-25}$ a) $\frac{x+3}{x-5}$ b) $\frac{x+3}{x+5}$ c) $\frac{3}{5}$ d) Cannot reduce

4. Simplify: $\frac{\frac{1}{x}+\frac{1}{x^2}}{\frac{1}{x}}$ a) $\frac{1}{x^2}$ b) 1 c) 2 d) $\frac{x+1}{x}$

5. Combine and simplify: $\frac{3}{x-1}-\frac{2}{x-3}$ a) $\frac{x-11}{(x-1)(x-3)}$ b) $\frac{1}{2}$ c) $\frac{1}{(x-1)(x-3)}$ d) $\frac{x-7}{(x-1)(x-3)}$

6. List restrictions for this function: $f(x)=\frac{x+5}{x-7}$ a) $x\neq 5, x\neq 7$ b) $x\neq -5, x\neq 7$ c) $x\neq 7$ d) $x\neq -5$

7. Solve for x: $\frac{1}{x}-\frac{1}{x-1}=\frac{x-5}{3x}$ a) 2, 4 b) $-4,-2$ c) 4 d) No solution

***Quadratic Equations, Inequalities, Complex Numbers***

1. Solve for x: $(x-2)(2x+3)=0$ a) $-2,3$ b) $-2,\frac{-2}{3}$ c) $2,\frac{-3}{2}$ d) $2,\frac{3}{2}$

2. Solve for x: $x^2-4x-21=0$ a) $-1,21$ b) $1,-21$ c) $3,-7$ d) $7,-3$

3. Solve for x: $3x(x-1)=36$ a) 4,13 b) $4,-3$ c) 4,11 d) $-4,3$

4. Solve for x: $(x-15)^2=28$ a) $\pm 2\sqrt{7}$ b) $15\pm 2\sqrt{7}$ c) $-15\pm\sqrt{28}$ d) 15

5. Solve for x: $x^2-3x-1=0$ a) $\frac{-3\pm\sqrt{5}}{2}$ b) $\frac{3\pm\sqrt{13}}{2}$ c) $\frac{3\pm\sqrt{5}}{2}$ d) $\frac{-3\pm\sqrt{13}}{2}$

6. What number must be added to complete the square? $x^2-3x$ a) $\frac{3}{2}$ b) 9 c) $\frac{-9}{4}$ d) $\frac{9}{4}$

7. Multiply: $(2-\sqrt{-2})(3-\sqrt{-2})$ a) 4 b) $8-5i\sqrt{2}$ c) $4-5i\sqrt{2}$ d) 8

8. Solve: $x^2-2x-3<0$

$a)(-\infty,-1)\cup(3,\infty)$ $b)(-1,3)$ $c)(-\infty,-3)\cup(1,\infty)$ $d)(-3,1)$

9. Solve: $x^4-10x^2+9=0$ $a)1,3$ $b)\pm i,\pm 3i$ $c)1,-3$ $d)\pm 1,\pm 3$

10. Solve for x: $\frac{x-9}{x+2}=\frac{x+7}{x+3}$ $a)\frac{41}{3}$ $b)-\frac{41}{15}$ $c)\frac{-13}{3}$ $d)$No solution

***Logarithm and Exponential Expressions***

1. Simplify: $9^{\frac{3}{2}}$ $a)\frac{1}{27}$ $b)27$ $c)\frac{27}{2}$ $d)\frac{27}{18}$

2. Write this equation in logarithmic form: $5^3=125$ $a)\log_{125}5=3$ $b)\log_3 125=5$ $c)\log_5 125=3$ $d)\log_{\frac{1}{3}}125=5$

3. Solve for x: $\log_2(x+7)-\log_2 x=3$ $a)-7$ $b)-7,1$ $c)8$ $d)1$

4. Solve for x: $9^{5x}=27^{2x-4}$ $a)-5$ $b)-3$ $c)-2$ $d)3$

5. Evaluate: $\log_3 27$ $a)3$ $b)5$ $c)4$ $d)7$

***Radical Expressions and Equations***

1. Simplify: $\sqrt{32}$ $a)2\sqrt{2}$ $b)4\sqrt{2}$ $c)\sqrt{8}$ $d)2\sqrt{8}$

2. Multiply: $(5-\sqrt{3})(5+\sqrt{3})$ $a)22$ $b)28-10\sqrt{3}$ $c)22-10\sqrt{3}$ $d)16$

3. Multiply: $(\sqrt{3}+\sqrt{2})^2$ $a)5$ $b)121$ $c)5+2\sqrt{6}$ $d)7\sqrt{6}$

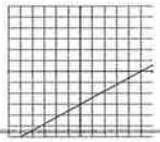
4. Combine, if possible: $\sqrt{8}-\sqrt{2}$ $a)\sqrt{6}$ $b)\sqrt{2}$ $c)3\sqrt{2}$ $d)2$

5. Rationalize the denominator: $\frac{4}{\sqrt{7}-2}$ $a)\frac{4(\sqrt{7}+2)}{3}$ $b)\frac{4(\sqrt{7}-2)}{3}$ $c)\frac{4(\sqrt{7}+2)}{45}$ $d)\frac{4(\sqrt{7}-2)}{9}$

6. Solve this equation: $\sqrt{5x+6}=x$ $a)-1,6$ $b)-1$ $c)6$ $d)$No solution

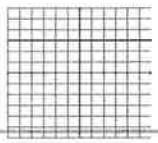
***Graphing***

1. Which equation might describe this line:



$a)y=\frac{3}{5}x-3$ $b)y=\frac{-3}{5}x-5$ $c)y=\frac{5}{3}x-3$ $d)y=\frac{-5}{3}x-3$

2. Write the equation of this line:



$a)x=3$ $b)y=3$ $c)y=-3$ $d)y=3x$

3. What is the midpoint the segment connecting (-2,0) and (3,3)

$a)(1,3)$ $b)(\frac{5}{2},\frac{3}{2})$ $c)(\frac{1}{2},\frac{3}{2})$ $d)(-\frac{1}{2},\frac{3}{2})$

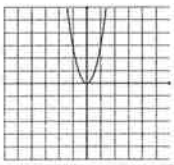
4. Write the equation of the line with slope $\frac{3}{2}$ and y-intercept -2

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

$c)2y=3x+2$ $d)y=\frac{3}{2}x-2$

5. If the parabola with the equation $y = 3x^2$

is translated 3 units to the left and 4 units up, the equation will be:



$a) y-4=3(x-3)^2$ $b) y+4=3(x-3)^2$

$c) y-4=3(x+3)^2$ $d) y+4=3(x+3)^2$

4

6. The graph of a line is given by $4x-3y=5$.

The slope of the line is:

$a) -4$ $b) \frac{4}{3}$ $c) -\frac{4}{3}$ $d) \frac{5}{3}$

***Applications***

1. Find the length of the diagonal of a rectangle with a width of 3 inches and length of 2 inches.

*a*)6 in *b*)5 in *c*)$\sqrt{13}$ in *d*)13 in

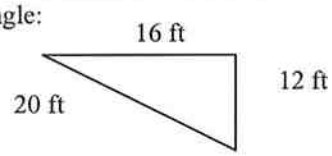
2. The right triangles are similar. Find x.

*a*)30m *b*)15m *c*)7m *d*)21m


3. The cost of 5 feet of chain is $2.00.
What length of chain may be purchased with $7.50?

*a*)15ft *b*)18.75ft *c*)37.50ft *d*)17.50ft

4. Find the area of this right triangle:




*a*)48sq ft *b*)192sq ft *c*)96sq ft *d*)160sq ft

5. The sum of two numbers is 38. One number is ten less than the other. Find the larger number.

*a*)14 *b*)18 *c*)24 *d*)28

6. The length of a rectangle is 2 m more than the width. If the perimeter is 9.2 m, how long is the length?

*a*)1.2m *b*)2.3m *c*)3.3m *d*)4.3m

## IR - Intermediate Algebra Sample Test Evaluation
## (Places into Math 103 or above)

| Problem # | Your Answer | Correct Answer | Topic |
|---|---|---|---|
| ***Simplifying & Evaluating Expressions*** | | | |
| 1 | | d | Simplify Algebraic Expression |
| 2 | | c | Absolute Value |
| 3 | | d | Combine Similar Terms |
| 4 | | c | Exponents |
| 5 | | a | Exponents |
| 6 | | c | Scientific Notation |
| 7 | | d | Exponents |
| 8 | | c | Combine Similar Terms |
| 9 | | d | Exponents |
| 10 | | b | Evaluate Algebraic Expression |
| 11 | | b | Function Notation |
| 12 | | c | Function Notation |
| ***Polynomials*** | | | |
| 1 | | b | Multiply Binomials (FOIL) |
| 2 | | b | Multiply Binomials (FOIL) |
| 3 | | b | Operations with Polynomials |
| 4 | | d | Factor Quadratic Expression |
| 5 | | a | Factor GCD and Quadratic |
| ***Linear Equations, Inequalities, Systems*** | | | |
| 1 | | d | Solve Linear Equation |
| 2 | | a | Solve Linear Equation |
| 3 | | b | Solve Inequality |
| 4 | | c | Solve System of Equations |
| 5 | | a | Solve Literal Equation |
| ***Rational Expressions and Equations*** | | | |
| 1 | | a | Operations with Rational Expressions |
| 2 | | d | Operations with Rational Expressions |
| 3 | | b | Simplify Rational Expression |
| 4 | | d | Simpify Rational Expression |
| 5 | | d | Operations with Rational Expressions |
| 6 | | c | Domain of a Rational Function |
| 7 | | a | Solve Rational Equation |
| ***Quadratic Equations, Inequalities, Complex Numbers*** | | | |
| 1 | | c | Solve Quadratic Equation |
| 2 | | d | Solve Quadratic Equation |
| 3 | | b | Solve Quadratic Equation |
| 4 | | b | Solve Quadratic Equation |
| 5 | | b | Solve Quadratic Equation |
| 6 | | d | Complete the Square |
| 7 | | c | Multiply Complex Numbers |
| 8 | | b | Solve Quadratic Inequality |
| 9 | | d | $u$-substitution |
| 10 | | b | Solve Rational Equation |

| Problem # | Your Answer | Correct Answer | Topic |
|---|---|---|---|
| ***Logarithms and Exponential Expressions*** | | | |
| 1 | | b | Rational Exponents |
| 2 | | c | Logarithmic Form |
| 3 | | d | Solve Logarithmic Equation |
| 4 | | b | Solve Exponential Equation |
| 5 | | a | Evaluate Logarithm |
| ***Radical Expressions and Equations*** | | | |
| 1 | | b | Simply Square Root |
| 2 | | a | Multiply Conjugates |
| 3 | | c | Multiply Radical Expressions |
| 4 | | b | Operations with Radical Expressions |
| 5 | | a | Rationalize the Denominator |
| 6 | | c | Solve Radical Equation |
| ***Graphing*** | | | |
| 1 | | a | Determine Linear Equation from Graph |
| 2 | | b | Determine Linear Equation from Graph |
| 3 | | c | Midpoint |
| 4 | | d | Slope-Intercept Formula |
| 5 | | c | Translate Graphs |
| 6 | | b | Determine Slope from a Linear Equation |
| ***Applications*** | | | |
| 1 | | c | Word Problem |
| 2 | | d | Similar Shapes |
| 3 | | b | Proportion Word Problem |
| 4 | | c | Area |
| 5 | | c | Word Problem |
| 6 | | c | Perimeter Word Problem |

| Problem # | 1) What concepts, formulas, definitions, etc. does one need to have at hand when successfully solving this problem?<br>2) Where did you find this information? |
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