Algebra Test Practice pt 2

Part 2 will focus on:

5. Linear Equations in One Variable
6. Exponents and Radicals
7. Rational Expressions
8. Linear Equations in Two Variables

Solve for x in the equation: $2(x - 3) = 7$

A. 5

B. $\frac{11}{2}$

C. 13

D. $\frac{13}{2}$

First, we multiply or distribute the coefficient 2 on the left hand side of the equation $2(x - 3) = 7$.

Thus: $2x - 6 = 7$

Second, we add 6 to both sides of the equation

$$\begin{array}{rcl} 2x - \cancel{6} & = & 7 \\ +\cancel{6} & & +6 \\ \hline 2x & = & 13 \end{array}$$

Finally, We divide both sides of the equation by 2

$$\frac{\cancel{2}x}{\cancel{2}} = \frac{13}{2}$$

Thus, $x = \frac{13}{2}$

Linear Equations in One Variable 3-7

Hint:
Undo with opposite of PEMDAS
Easier to distribute first.

2.

Solve for x in the equation: $3(x + 5) - 4(x + 1) = 18$

A. -7

B. 7

C. 12

D. 1

HINT:
Distribute first.

First, we multiply or distribute the coefficient of the binomial terms to clear the parentheses.

Thus: $3x + 15 - 4x - 4 = 18$

Then, we combine like terms. $-x + 11 = 18$

Then, we subtract 7 from both sides.

$$\begin{array}{r} -x + \cancel{11} = 18 \\ -\cancel{11} \quad -11 \\ \hline -x = 7 \end{array}$$

Finally, We multiply both sides by -1 $(-1)(-x) = (-1)(7)$

Thus: $x = -7$

3.

Solve for x in the equation: $\frac{x}{2} - 1 = \frac{x}{3} + 2\frac{1}{6}$

A. $3\frac{1}{6}$

C. -19

B. 14

D. 19

HINT 1:

Turn 2 and ⅙ into an improper fraction.

HINT 2:

Get rid of fractions by multiplying LCD to all terms

Multiplying both sides by LCD = 6: $\frac{6}{1}\left(\frac{x}{2} - \frac{1}{1}\right) = \frac{6}{1}\left(\frac{x}{3} + \frac{13}{6}\right)$

$3x - 6 = \cancel{2x} + 13$

Subtracting 2x from both sides: $-2x \quad -\cancel{2x}$

$x - \cancel{6} = 13$

Adding 6 to both sides: $+\cancel{6} \quad +6$

Thus: $x = 19$

4.

Which of the following is equivalent to: $\frac{1}{x} - 1 = \frac{-1}{4}$

A. $\frac{1}{x} = -1\frac{1}{4}$

B. $x = \frac{3}{4}$

C. $\frac{1}{x} = 1\frac{1}{4}$

D. $x = 1\frac{1}{3}$

Multiply each term by 4x.

$4 - 4x = -1x$

$4 = -1x + 4x$

$4 = 3x$

$4/3 = x$

HINT:

Get rid of fractions by multiplying LCD to all terms

5.

If $y = 2x - 5$ then solve for x in terms of y

A. $x = \frac{y-5}{2}$

C. $x = y + \frac{5}{2}$

B. $x = \frac{1}{2}y + 5$

D. $x = \frac{y+5}{2}$

Solve for x in terms of y means:

Get x on one side alone.

First, we solve for 2x by adding 5 to both sides of the equation

$$\begin{array}{rcl} y & = & 2x - 5 \\ +5 & & +5 \\ \hline y + 5 & = & 2x \end{array}$$

Then, we divide both sides of the equation by 2

$$\frac{y+5}{2} = \frac{\cancel{2}x}{\cancel{2}}$$

Thus: $\frac{y+5}{2} = x$

Exponents: 8 squared and then cube root.
So 8 x 8 = 64. The cube root of 64 is 4 (remember that 4x4x4 = 64)

$8^{-\frac{2}{3}}$?

You aren't finished because a negative as an exponent means take the reciprocal.
So, 4 becomes: ¼

Exponents and Radicals 9 - 15

1.

Which of the following is equivalent to $27^{-\frac{2}{3}}$?

A. -9

B. -18

C. $\frac{-1}{9}$

D. $\frac{1}{9}$

The cube root of 27 is 3.

3 squared is 9.
Negative in the exponent means reciprocal so answer is:

1/9.

2.

Which of the following is equivalent to: $\sqrt{2}\,(\sqrt{50} - \sqrt{8}\,)$

A. 6

B. $\sqrt{2}\sqrt{42}$

C. $\sqrt{84}$

D. $3\sqrt{2}$

HINT 1:

Distribute or factor to make perfect squares if possible.

$$\sqrt{2}\,(\sqrt{50} - \sqrt{8}\,) = \sqrt{100} - \sqrt{16}$$

$$= 10 - 4$$

$$= 6$$

2b.

Which of the following is equivalent to: $\sqrt{2}\,(\sqrt{18} - \sqrt{2})$

A. 4	C. 2
B. $4\sqrt{2}$	D. $\sqrt{32}$

$$= \sqrt{36} - \sqrt{4}$$

$$= 6 - 2$$

$$= 4$$

3.

Which of the following is equivalent to $(2 - \sqrt{3})^2$?

A. $7 - 4\sqrt{3}$

B. 7

C. $1 - 4\sqrt{3}$

D. $7 + 4\sqrt{3}$

HINT:

FOIL

$= (2 - \sqrt{3})(2 - \sqrt{3})$

$= 4 - 2\sqrt{3} - 2\sqrt{3} + \sqrt{9}$

$= 4 - 2\sqrt{3} - 2\sqrt{3} + 3$

$= 7 - 4\sqrt{3}$

4.

Simplify: $\sqrt{27} + \sqrt{75}$

THINK: Can I make perfect squares?

$$= \sqrt{9}\sqrt{3} + \sqrt{25}\sqrt{3}$$

$$= 3\sqrt{3} + 5\sqrt{3}$$

$$= 8\sqrt{3}$$

4b.

Simplify: $\sqrt{18} + \sqrt{12}$

A. $9\sqrt{2} + 4\sqrt{3}$	C. $5\sqrt{5}$
B. $3\sqrt{2} + 2\sqrt{3}$	D. $\sqrt{30}$

$$= \sqrt{9}\sqrt{2} + \sqrt{4}\sqrt{3}$$

$$= 3\sqrt{2} + 2\sqrt{3}$$

5.

Simplify: $\frac{\sqrt{18}}{4}+\frac{\sqrt{32}}{3}$

A. $\frac{7\sqrt{2}}{12}$

B. $\frac{25\sqrt{2}}{12}$

C. $\frac{\sqrt{18}+\sqrt{32}}{7}$

D. $\frac{\sqrt{18}+\sqrt{32}}{12}$

HINT:

USE LCD to eliminate denominator.

Then can you find perfect squares?

LCD = 12, thus: $\frac{\sqrt{18}}{4}+\frac{\sqrt{32}}{3}=\frac{3\sqrt{18}}{12}+\frac{4\sqrt{32}}{12}$

Simplifying the radical we have: $=\frac{3\sqrt{9}\sqrt{2}}{12}+\frac{4\sqrt{16}\sqrt{2}}{12}$ Detail

$=\frac{3(3)\sqrt{2}}{12}+\frac{4(4)\sqrt{2}}{12}$

$=\frac{9\sqrt{2}}{12}+\frac{16\sqrt{2}}{12}$ Detail

$=\frac{25\sqrt{2}}{12}$

Rational Expressions 17-19

1.

For all $x \neq 4$; $\dfrac{x^2 - 9x + 20}{x - 4}$ is equal to which of the following expressions?

A. $\dfrac{(x + 5)(x + 4)}{(x - 4)}$

B. $x - 5$

C. $\dfrac{(x - 5)(x + 4)}{x - 4}$

D. $x + 5$

To do this we look for two factors of 20 whose sum is -9. These factors are -4 and -5.

Therefore for all $x \neq 4$: $\dfrac{x^2 - 9x + 20}{x - 4} = \dfrac{(x - 5)\cancel{(x - 4)}}{\cancel{(x - 4)}}$

$= x - 5$

2.

For all $x \neq \pm 6$; $\dfrac{x^2 - x - 42}{x^2 - 36} = ?$

A. $\dfrac{x - 7}{x - 6}$

B. $\dfrac{x + 7}{x - 6}$

C. $\dfrac{x - 7}{x + 6}$

D. $\dfrac{x + 7}{x + 6}$

We factor the numerator and the denominator and then we cancel any common factor.

To factor $x^2 - x - 42$, we look for factors of -42 whose sum is -1. These factors are -7 and 6.

To factor $x^2 - 36$, we use $a^2 - b^2 = (a + b)(a - b)$.

Therefore, for all $x \neq \pm 6$: $\dfrac{x^2 - x - 42}{x^2 - 36} = \dfrac{(x - 7)\cancel{(x + 6)}}{(x - 6)\cancel{(x + 6)}}$

$= \dfrac{x - 7}{x - 6}$

3.

The following rational expression $\dfrac{\frac{6a^2}{a-b}}{\frac{a-b}{2a}}$ is equivalent to which of the following? $(a \neq b)$ $(a \neq 0)$

A. $\dfrac{12a^3}{a^2 - 2ab - b^2}$

B. $\dfrac{12a^3}{(a-b)^2}$

C. $\dfrac{12a^3}{a^2 - ab + b^2}$

D. $3a$

Keep Divide Flip:

$$= \frac{6a^2}{a-b} \div \frac{a-b}{2a}$$

$$= \frac{6a^2}{a-b} \cdot \frac{2a}{a-b}$$

$$= \frac{12a^3}{(a-b)^2}$$

$Y = Mx + b$

LINEAR EQUATIONS:

1.

What is the slope of the following linear equation:
3x + 2y = 5 ?

A. $\frac{3}{2}$

B. $\frac{-3}{2}$

C. 3

D. -3

Isolate the y:

$$2y = -3x + 5$$

Second, we solve for y (divide both sides by 2)

$$\frac{\cancel{2}y}{\cancel{2}} = \frac{-3x + 5}{2}$$

$$y = \frac{-3}{2}x + \frac{5}{2}$$

Then, we identify the slope as the coefficient of the x term.

Thus, the slope is: $\frac{-3}{2}$

2.

Given the following table of points that all lie on the same line, which of the following expresses the linear relationship between x and y?

x	0	10	20	30
y	25	45	65	85

A. $x + y = 25$

B. $y = \frac{1}{2}x + 25$

C. $y = 2x + 25$

D. $2x + y = 25$

HINT:

Plug in x and y. What works?

x	2x + 25	y
0	2(0) + 25	25
10	2(10) + 25	45
20	2(20) + 25	65
30	2(30) + 25	85

ANS is C

3.

Find the slope 'm' and the y-intercept 'b' of the line
$2x + 3y = 6$

A. ○ $m = \frac{2}{3}$ $b = 2$	C. ○ $m = 2$ $b = 6$
B. ○ $m = -2$ $b = 6$	D. ○ $m = \frac{-2}{3}$ $b = 2$

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

Third we identify the slope as the coefficient of the x term and the y-intercept as the constant.

Thus: $m = \frac{-2}{3}$ and $b = 2$

4.

Which of the following is the equation of the line through the points (1,-1) and (-2,5)?

A. $y = -2x + 1$

B. $y = -2x - 1$

C. $y - 1 = -2(x - 1)$

D. $y - 5 = \frac{-4}{3}(x + 2)$

HINT:

Use the point slope formula

OR you can plug points into the solutions.

Using the **point-slope form** $y - y_0 = m(x - x_0)$ where *m* is the slope and (x_0,y_0) is any point on the line.

To find the slope we use the formula:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

where (x_1,y_1) and (x_2,y_2) are any two points on the line.

Let $(x_1,y_1) = (1,-1)$ and $(x_2,y_2) = (-2,5)$

Thus: $$m = \frac{5 - (-1)}{-2 - 1}$$

$$m = -\frac{6}{3}$$

$$m = -2$$

Taking $(x_0,y_0) = (-2,5)$ and $m = -2$ and substituting into the point-slope form we have:

$$y - 5 = -2(x + 2)$$
$$y - 5 = -2x - 4$$
$$y = -2x + 1$$

MISC

Marcia has taken three out of the four tests in her English class. She received grades of 85, 94 and 88. What grade will she need on the fourth test to have a 90 average for the four tests?

A. 93	C. 89
B. 89.25	D. 91

$$\frac{85 + 94 + 88 + x}{4} = 90$$

Second, we cross multiply: $85 + 94 + 88 + x = 4(90)$

$$\cancel{257} + x = 360$$

Finally, we subtract 257 from both sides:

$$\begin{array}{rcl} -\cancel{257} & & -257 \\ \hline x & = & 93 \end{array}$$

Thus, Marcia will have to earn a grade of 93 on her fourth test to obtain an average grade of 90.

Find the third of three consecutive integers such that the sum of the second and the third is 39 more than the first

A. 20

C. 14

B. 38

D. 36

Consecutive:

N

N+1

N + 2

We can represent the three consecutive integers as:

- First = n
- Second = n+1
- Third = n+2

The statement that, the sum of the second and third is 39 more than the first, results in the following equation:

$$(n+1) + (n+2) = n + 39$$

Simplifying:

$$2n + 3 = n + 39$$

$$2n - n = 39 - 3$$

$$n = 36$$

The three consecutive numbers are 36,37,38 and thus, the third is 38.

NOW… thank you ago into:

http://www.hostos.cuny.edu/oaa/compass/algebra.htm

For more practice…

http://www.highlands.edu/site/tutorial-center-compass-test-practice

REMEMBER: Don't leave any blank. Try to eliminate answers.