Math120 Intermediate Algebra – Spring 2008 – DLA – PreTest 1

Name SOLUTIONS

Each of the 19 questions is worth 5 points plus 1 points for each of 5 homework problems for a total of 100

Evaluate the expression for x = –2, y = 3, and a = –4.

1) $\dfrac{\frac{9}{y}-\frac{a}{2}}{\frac{x}{2}+\frac{6}{y}}$

$$= \frac{\frac{9}{(3)} - \frac{(-4)}{2}}{\frac{(-2)}{2} + \frac{6}{(3)}} = \frac{3+2}{-1+2} = \boxed{5}$$

Evaluate the expression.

2) Let x = 3, y = 24. Evaluate $|8y - 3x|$.

$$= |8(24) - 3(3)|$$

$$= |192-9| = |183| = \boxed{183}$$

Write the expression without absolute value bars.

3) $|y - 1|$, if $y < 1$

$y < 1$

$y-1 < 0$ SUBTRACT 1

IF $(y-1)$ IS < 0, THEN $|y-1|$ IS $-(y-1)$ OR $\boxed{1-y}$

Perform the indicated operations.

4) $(-2x^6 + 5x^8 - 8 + 3x^7) - (-4 + 6x^7 + 2x^8 + 4x^6)$

$$= -2x^6 + 5x^8 - 8 + 3x^7 + 4 - 6x^7 - 2x^8 - 4x^6$$

$$= 5x^8 - 2x^8 + 3x^7 - 6x^7 - 2x^6 - 4x^6 - 8 + 4$$

$$= \boxed{3x^8 - 3x^7 - 6x^6 - 4}$$

Find the product.

5) $(-4a - 7b)(-8a - 9b)$

$= 32a^2 + 36ab + 56ab + 63b^2$

$= \boxed{32a^2 + 92ab + 63b^2}$

Divide.

6) $\dfrac{36y^4 + 24y^3 + 4y - 1}{6y^2 + 1}$

$$
\begin{array}{r|l}
 & 6y^2 + 4y - 1 \\
6y^2+1 & 36y^4 + 24y^3 + 0y^2 + 4y - 1 \\
 & 36y^4 \qquad\quad + 6y^2 \\
\hline
 & 24y^3 - 6y^2 + 4y \\
 & 24y^3 \qquad\quad + 4y \\
\hline
 & -6y^2 \qquad - 1 \\
 & -6y^2 \qquad - 1 \\
\hline
 & 0
\end{array}
$$

$\boxed{6y^2 + 4y - 1}$

Factor by grouping.

7) $12a^3 + 16a^2b + 15ab^2 + 20b^3$

$= 4a^2(3a + 4b) + 5b^2(3a + 4b)$

$= \boxed{(4a^2 + 5b^2)(3a + 4b)}$

Factor the trinomial completely.

8) $-24x^2 - 20x + 24$

$= -4(6x^2+5x-6)$ $PR = -36,\ SU = +5 \Rightarrow +9, -4$

$= -4(6x^2+9x-4x-6)$

$= -4[3x(2x+3) - 2(2x+3)]$

$= \boxed{-4(3x-2)(2x+3)}$

Factor.

9) $(t + u)^2 - 16$

$= (t+u)^2 - 4^2$

$= \boxed{(t+u+4)(t+u-4)}$

Factor the polynomial completely.

10) $z^6 + 1$

$= (z^2)^3 + (1)^3$

$= (z^2+1)((z^2)^2 - z^2 + (1)^2)$

$= \boxed{(z^2+1)(z^4 - z^2 + 1)}$

Write the expression in lowest terms.

11) $\dfrac{3y^2 - 13y + 12}{2y^2 - 9y + 9}$ PR = 36, SU = −13 ⇒ −9, −4
PR = 18, SU = −9 ⇒ −6, −3

$$= \frac{3y^2 - 9y - 4y + 12}{2y^2 - 6y - 3y + 9}$$

$$= \frac{3y(y-3) - 4(y-3)}{2y(y-3) - 3(y-3)} = \frac{(3y-4)(y-3)}{(2y-3)(y-3)} = \boxed{\frac{3y-4}{2y-3}}$$

Perform the indicated operations.

12) $\dfrac{2ab}{a^2 - b^2} - \dfrac{b}{a-b} + \dfrac{8}{2}$

$$= \frac{2ab}{(a+b)(a-b)} - \frac{b(a+b)}{(a+b)(a-b)} + \frac{4(a^2-b^2)}{(a+b)(a-b)}$$

$$= \frac{2ab - ab - b^2 + 4a^2 - 4b^2}{(a+b)(a-b)}$$

$$= \frac{4a^2 + ab - 5b^2}{(a+b)(a-b)}$$ PR = −20, SU = +1 ⇒ +5, −4

$$= \frac{4a^2 - 4ab + 5ab - 5b^2}{(a+b)(a-b)}$$

$$= \frac{4a(a-b) + 5b(a-b)}{(a+b)(a-b)}$$

$$= \frac{(4a+5b)(a-b)}{(a+b)(a-b}$$

$$= \boxed{\frac{4a+5b}{a+b}}$$

Simplify.

13) $\dfrac{\dfrac{3}{x-h} + \dfrac{3}{x}}{2x - h}$

$$= \frac{\left[\dfrac{3}{x-H} + \dfrac{3}{x}\right]}{(2x-H)} \cdot \frac{x(x-H)}{x(x-H)}$$

$$= \frac{3x + 3(x-H)}{(2x-H)\,x\,(x-H)} = \frac{3x + 3x - 3H}{(2x-H)\,x\,(x-H)} = \frac{6x - 3H}{(2x-H)\,x\,(x-H)}$$

$$= \frac{3(2x-H)}{(2x-H)\,x\,(x-H)} = \boxed{\frac{3}{x(x-H)}}$$

Perform the indicated operations. Write the result using only positive exponents. Assume all variables represent nonzero real numbers.

14) $\dfrac{56a^{-3}b^{4}}{7a^{-11}b^{8}}$

$$= \frac{56\,a^{11}\,b^{4}}{7\,a^{3}\,b^{8}} = \boxed{\frac{8\,a^{8}}{b^{4}}}$$

Perform the indicated operations. Write the answer using only positive exponents. Assume all variables represent positive real numbers.

15) $\dfrac{(x^{4/3})^{2}}{(x^{3})^{8/3}}$

$$= \frac{x^{\frac{8}{3}}}{x^{8}} = x^{\frac{8}{3}-8} = x^{\frac{8}{3}-\frac{24}{3}} = x^{-\frac{16}{3}} = \boxed{\frac{1}{x^{16/3}}}$$

Perform all indicated operations and write your answer with positive integer exponents.

16) $\dfrac{(mn)^{-1}}{m^{-2}+n^{-2}}$

$$= \frac{\frac{1}{mn}}{\frac{1}{m^{2}}+\frac{1}{n^{2}}} \cdot \frac{m^{2}n^{2}}{m^{2}n^{2}} = \boxed{\frac{mn}{n^{2}+m^{2}}}$$

Simplify the expression. Assume all variables represent positive real numbers.

17) $\sqrt[3]{-64a^8b^5}$

$= \sqrt[3]{-64a^6b^3}\ \sqrt[3]{a^2b^2}$

$= \boxed{-4a^2b\ \sqrt[3]{a^2b^2}}$

Rationalize the denominator. Assume that all variables represent positive real numbers.

18) $\dfrac{6\sqrt{29x}}{\sqrt{x^3}}$

$= \dfrac{6\sqrt{29}\ \sqrt{x}}{\sqrt{x^2}\ \sqrt{x}} = \boxed{\dfrac{6\sqrt{29}}{x}}$

Rationalize the denominator. Assume that all variables represent positive real numbers and that the denominator is not zero.

19) $\dfrac{\sqrt{2}}{2\sqrt{5}-\sqrt{2}}$

$= \dfrac{\sqrt{2}}{(2\sqrt{5}-\sqrt{2})} \cdot \dfrac{(2\sqrt{5}+\sqrt{2})}{(2\sqrt{5}+\sqrt{2})} = \dfrac{2\sqrt{10}+\sqrt{4}}{(2\sqrt{5})^2-(\sqrt{2})^2}$

$= \dfrac{2\sqrt{10}+2}{4\cdot 5-2} = \dfrac{2(\sqrt{10}+1)}{20-2} = \dfrac{2}{18}(\sqrt{10}+1) = \boxed{\dfrac{\sqrt{10}+1}{9}}$