Math 31

Number and Algebra Review

Name Key

Date _____

1. Evaluate.

a) $(-5)+16+(-10)-(-4)$

$= -5+16-10+4$

$= 20-15$

$= 5$

b) $-9-12\div(-3)$

$= -9+4$

$= -5$

c) $(-8+4)\times(-5-2)$

$= (-4)(-7)$

$= 28$

d) $-25+5^2\times 4$

$= -25+25\times 4$

$= -25+100$

$= 75$

2. Express your answers as fractions in lowest terms. Show some work, not just your final answer.

a) $\frac{3}{8}+\frac{1}{8} = \frac{4}{8}$

$= \frac{1}{2}$

b) $\frac{3}{10}+\frac{3}{4}-\frac{4}{5} = \frac{6}{20}+\frac{15}{20}-\frac{16}{20}$

$= \frac{5}{20}$

$= \frac{1}{4}$

3. Express your answers as fractions in lowest terms. Show some work, not just your final answer.

a) $\frac{2}{15}\times\frac{3}{5} = \frac{2}{5}\times\frac{1}{5}$

$= \frac{2}{25}$

b) $\frac{8}{25}\div\frac{16}{10} = \frac{8}{25}\times\frac{10}{16}$

$= \frac{1}{5}$

4. Simplify.

a) $(3ab^3)^2 = 9a^2b^6$

b) $\left(\frac{x^2}{y}\right)^3 = \frac{x^6}{y^3}$

5. Expand and evaluate.

a) $(-2)^3 = -8$

b) $5^{-2} = \frac{1}{5^2} = \frac{1}{25}$

6. Simplify. Answer with positive exponents.

a) $(2x^4y^2)(4x^3y)$

$= 8x^7y^3$

b) $\frac{16a^2b^5}{4a^2b^8} = \frac{4}{b^3}$

c) $(3a^2b)^3(2ab^4)$

$= (27a^6b^3)(2ab^4)$

$= 54a^7b^7$

d) $(x^2y^{-1})^3$

$= x^6y^{-3}$

$= \frac{x^6}{y^3}$

e) $\left(\frac{3x^3}{y^2}\right)^{-2} \cdot \frac{(6x^4y^{-2})^2}{2^{-1}x^{-3}y^{-1}}$

$= \left(\frac{y^2}{3x^3}\right)^2 \frac{36x^8y^{-4}}{2^{-1}x^{-3}y^{-1}}$

$= \frac{y^4}{9x^6} \cdot \frac{72x^{11}}{y^3}$

$= 8x^5y$

7. Solve.

a) $3x+7=19$

$3x=12$

$x=4$

b) $24-3x=9x$

$24=12x$

$x=2$

c) $3(x-4)=2x-3$

$3x-12=2x-3$

$x=9$

d) $4-2(x+6)=3x-(x-4)$

$4-2x-12=3x-x+4$

$-2x-8=2x+4$

$-12=4x$

$x=-3$

e) $\left[\frac{2}{3}x+\frac{1}{2}=\frac{3}{4}x\right]12$

$8x+6=9x$

$x=6$

8. At the concert on Friday night there were 30 more students than adults in attendance. The admission price for a student was \$5.00 and for an adult was \$8.00. If the total revenue from the attendance at the concert on Friday night was \$1060, how many students and adults were at the concert?

students = s

adults = a

$s-a=30 \xrightarrow{\times 8} 8s-8a=240$

$5s+8a=1060 \longrightarrow 5s+8a=1060$

$13s=1300$

$s=100$

$100-a=30$

$a=70$

100 students, 70 adults

9. The length of a rectangular garden plot is 4 m shorter than twice the width. The perimeter of the garden plot is 28 m. What are the dimensions of the garden plot?

length = ℓ
width = w

$2w - \ell = 4$
$2w + 2\ell = 28$

subtract

$-3\ell = -24$

$\ell = 8$

$2w - \ell = 4$
$2w - 8 = 4$
$2w = 12$
$w = 6$

6 by 8 m

11. Multiply and simplify.

a) $5(3x+2)(x+4)$

$= 5(3x^2 + 12x + 2x + 8)$

$= 15x^2 + 70x + 40$

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

$= 6x^3 - 4x^2 + 6x$
$\quad - 15x^2 + 10x - 15$

$= 6x^3 - 19x^2 + 16x - 15$

12. Simplify.

a) $\dfrac{18x^3 - 12x^2 + 6x}{6x}$

$= \dfrac{18x^3}{6x} - \dfrac{12x^2}{6x} + \dfrac{6x}{6x}$

$= 3x^2 - 2x + 1$

b) $(x+5)^2 - (x+2)(x+4)$

$= (x^2 + 5x + 5x + 25) - (x^2 + 4x + 2x + 8)$

$= x^2 + 10x + 25 - x^2 - 6x - 8$

$= 4x + 17$

13. Factor.

a) $x^2 + 8x + 12$

$m = 12$: 6, 2
$A = 8$: 6, 2

$= (x+6)(x+2)$

b) $3x^2 - 2x - 8 = (3x+4)(x-2)$

$m = -24$: -6, 4
$a = -2$: 4

c) $5x^2 + 23x - 10$

$m = -50$: $+25$, -2
$A = +23$: -2

$= (5x-2)(x+5)$

d) $x^2 - 16 = (x+4)(x-4)$

e) $30x^2 + 42x + 12$

$= 6(5x^2 + 7x + 2)$

$= 6(5x+2)(x+1)$

$m = 7$: 5, 2
$A = 10$: 2

f) $4x^2 - 11x + 6 = (4x-3)(x-2)$

$m = 24$: -8, -3
$A = -11$: -3