Name: _____

Place your answers in the spaces provided. <u>You must show correct work to receive credit</u>.

(8 pts) 1. Multiply and simplify completely.

$$(6x - 5)(x^2 + 4x - 1)$$

$$= 6x(x^2 + 4x - 1) - 5(x^2 + 4x - 1)$$
$$= 6x^3 + 24x^2 - 6x - 5x^2 - 20x + 5$$
$$= 6x^3 + 19x^2 - 26x + 5$$

$$\boxed{6x^3 + 19x^2 - 26x + 5}$$

(6 pts) 2. Rationalize the denominator. Simplify your answer.

$$\frac{\sqrt{x} + 3}{\sqrt{x} - 5}$$

$$\frac{\sqrt{x} + 3}{\sqrt{x} - 5} \cdot \frac{\sqrt{x} + 5}{\sqrt{x} + 5} = \frac{x + 3\sqrt{x} + 5\sqrt{x} + 15}{x - 25}$$
$$= \frac{x + 8\sqrt{x} + 15}{x - 25}$$

$$\boxed{\frac{x + 8\sqrt{x} + 15}{x - 25}}$$

(8 pts) 3. Solve $W = g + \dfrac{xy}{m}$ for y.

$$m(W) = \left(g + \frac{xy}{m}\right)m$$

$$mW = gm + xy$$

$$xy = mW - gm$$

$$y = \frac{mW - gm}{x}$$

$$y = \boxed{\frac{mW - gm}{x}} \text{ or equivalent}$$

Name: _____

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(10 pts) 4. Simplify completely.

$$\frac{\dfrac{5}{x+2}-\dfrac{3}{x}}{\dfrac{x-3}{x}}$$

$$=\frac{\dfrac{5(x)}{x(x+2)}-\dfrac{3(x+2)}{x(x+2)}}{\dfrac{x-3}{x}}$$

or

$$\frac{\dfrac{5}{x+2}-\dfrac{3}{x}}{\dfrac{x-3}{x}}\cdot\frac{x(x+2)}{x(x+2)}$$

$$=\frac{5x-3x-6}{x(x+2)}\cdot\frac{x}{x-3}$$

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

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

$$=\frac{5x-3x-6}{(x-3)(x+2)}=\frac{2(x-3)}{(x-3)(x+2)}$$

$$\boxed{\dfrac{2}{x+2}}$$

(14 pts) 5. Factor completely.

(6 pts) (a) $12x^2+10x-8$

$$=2\left(6x^2+5x-4\right)$$
$$=2(3x+4)(2x-1)$$

$$\boxed{2(3x+4)(2x-1)}$$

(8 pts) (b) $16ax^2-ay^2+48cx^2-3cy^2$

$$=a\left(16x^2-y^2\right)+3c\left(16x^2-y^2\right)$$
$$=\left(16x^2-y^2\right)(a+3c)$$
$$=(4x+y)(4x-y)(a+3c)$$

$$\boxed{(4x+y)(4x-y)(a+3c)}$$

Name: _____

Place your answers in the spaces provided. <u>You must show correct work to receive credit.</u>

(18 pts) 6. Solve for x. Check your answer(s).

(8 pts) (a) $x(x-2) = 35$

$x^2 - 2x = 35$
$x^2 - 2x - 35 = 0$
$(x-7)(x+5) = 0$
$x - 7 = 0, x + 5 = 0$

$x = \boxed{\text{-5, 7}}$

(10 pts) (b) $\dfrac{9}{x-4} + \dfrac{13x}{x^2 - 6x + 8} = \dfrac{15}{x-2}$

$(x-4)(x-2)\dfrac{9}{x-4} + \dfrac{13x}{(x-4)(x-2)} = \dfrac{15}{x-2}(x-4)(x-2)$

$9(x-2) + 13x = 15(x-4)$

$9x - 18 + 13x = 15x - 60$

$22x = 15x - 42$

$7x = -42$

$x = -6$

$x = \boxed{\text{-6}}$

(14 pts) 7. Simplify completely. Do not leave negative exponents in your answer.

(8 pts) (a) $\left(-2a^5 b^{-4}\right)^2 \left(5a^{-11}b^{-3}\right)$

$= \left(4a^{10}b^{-8}\right)\left(5a^{-11}b^{-3}\right)$
$= 20a^{-1}b^{-11}$

$\boxed{\dfrac{20}{ab^{11}}}$

(6 pts) (b) $\sqrt[3]{27a^9 b^{12}}$

$\boxed{3a^3 b^4}$

Name: _____

Place your answers in the spaces provided. <u>You must show correct work to receive credit.</u>

(12 pts) 8. Chicago and Scottsburg are 340 miles apart along a straight road. Sandy left Chicago at 11:30 a.m. traveling towards Scottsburg at a rate of 65 mph. Bob left Scottsburg at 1:30 p.m. traveling towards Chicago at a rate of 75 mph. At what time will they meet each other on the highway?   (Name a variable, set up an equation, and solve.)

Let t= # hours since 11:30 a.m.

	r	t	d
Sandy	65	t	65t
Bob	75	t-2	75(t-2)

65t + 75(t-2)=340
65t+75t-150=340
140t=490
t=3.5

or

Let t= # hours since 1:30 p.m.

	r	t	d
Sandy	65	t+2	65(t+2)
Bob	75	t	75t

65(t+2)+75t=340
65t+130+75t=340
140t=210
t=1.5

$$\boxed{\text{3:00 p.m.}}$$

(10 pts) 9. Shown below is a rectangle with length 28 cm and width 15 cm topped by a triangle where the height has yet to be determined. Find the height of the triangle so that the area of the entire object is 650 square cm. Round your answer to one decimal place. (Label the picture, set up an equation, and solve.)

Area(triangle)+Area(rect.)=Area(whole)

(1/2)(28)(h)+(28)(15)=650

14h+420=650
h=16.4

$$\boxed{\text{16.4 cm}}$$