

Please show all work on the test paper for partial credit.

(5 points)

1. Simplify:  $\left(\frac{1}{3} - \frac{3}{5}\right)^2 \div \left(\frac{2}{3} - \frac{1}{4}\right)^2$

$$= \frac{16}{225} \cdot \frac{25}{144}$$
$$= \left(\frac{5}{15} - \frac{9}{15}\right)^2 \div \left(\frac{8}{12} - \frac{3}{12}\right)^2$$
$$= \frac{16}{225} \cdot \frac{144}{25}$$
$$= \left(\frac{-4}{15}\right)^2 \div \left(\frac{5}{12}\right)^2$$
$$= \frac{256}{625}$$

(8 points)

2. Simplify and write the answer using only positive exponents:

a)  $x^{-6} \cdot x^{-3} = x^{-9} = \frac{1}{x^9}$

b)  $\frac{x^{-7}}{x^{11}} = \frac{1}{x^{11}x^7} = \frac{1}{x^{18}}$

c)  $(x^{-2}y^3)^{-2} = x^4y^{-6} = \frac{x^4}{y^6}$

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

(15 points)

3. Factor completely:

a)  $4x^3y + 32x^2y^2 + 64xy^3$       GCF =  $4xy$

$$4xy(x^2 + 8xy + 16y^2) = \boxed{4xy(x+4y)(x+4y)}$$

b)  $2x^3 + x^2 + 8x + 4$

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

c)  $x^3 + 8x^2 + 16x$

$$x(x^2 + 8x + 16) = \boxed{x(x+4)(x+4)}$$

$\uparrow$   
 mult to 16  
 $\rightarrow$  add to 8

d)  $2x^2 - 9x + 10$

$$2(10) = 20$$

$$-4(-5)$$

$$-4x - 5x = -9x$$

$$\boxed{2x^2 - 4x - 5x + 10}$$

$$2x(x-2) - 5(x-2)$$

$$\boxed{(x-2)(2x-5)}$$

e)  $4x^2 - 9y^2$

$$(2x)^2 - (3y)^2$$

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

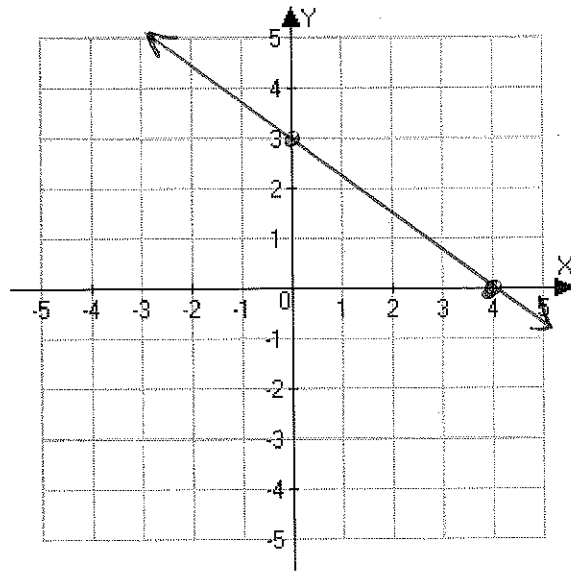
**(8 points)**

4. a. Graph:  $3x + 4y = 12$

b. The x-intercept is  $(4, 0)$

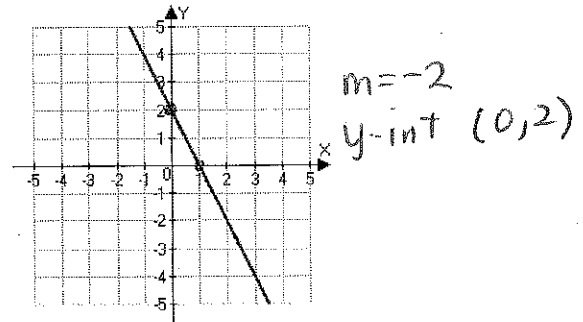
c. The y-intercept is  $(0, 3)$

d. The slope of the line is  $-\frac{3}{4}$

**(4 points)**

5. Find the equation of the line whose graph is shown.

$$y = -2x + 2$$

**(3 points)**6. For the polynomial:  $\frac{2}{3}x^6 + 2x^5 + 3x^4 + 4x^3 + 6x^2 - 7$ . Find the following:

a) The leading term  $\frac{2}{3}x^6$

b) The leading coefficient  $\frac{2}{3}$

c) The degree of the polynomial  $6+n$

(6 points)

7.

- a) Find the slope of the line containing the pair of points  $(-3, -5)$  and  $(2, 3)$ .

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - (-5)}{2 - (-3)} = \boxed{\frac{8}{5}}$$

- b) Find the point-slope equation of this line.

$$y - y_1 = m(x - x_1)$$

$$\boxed{y + 5 = \frac{8}{5}(x + 3)}$$

(4 points)

8. Solve the equation:  $4(x - 3) - [2x - (3x + 1)] = 7$

$$4x - 12 - [2x - 3x - 1] = 7$$

$$4x - 12 - [-x - 1] = 7$$

$$4x - 12 + x + 1 = 7$$

$$5x - 11 = 7$$

$$5x = 18$$

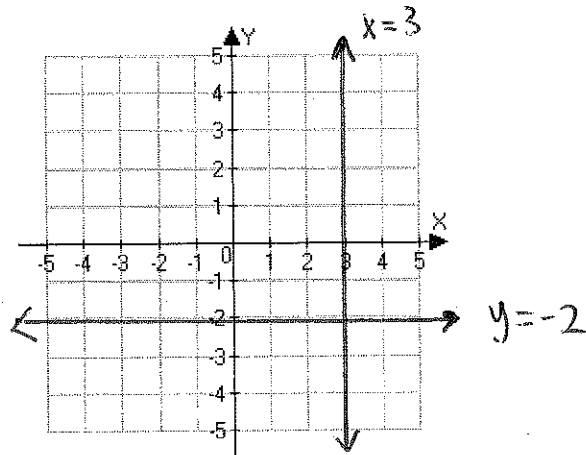
$$\boxed{x = \frac{18}{5}}$$

(4 points)

9. Graph the following lines:

a.  $x = 3$

b.  $y = -2$



(6 points)

10. Perform the indicated operation:

$$\begin{aligned} \text{a. } & (-3x^3 + 5x^2 + 7x - 1) + (-6x^3 - 5x^2 + 4x + 3) \\ & -3x^3 - 6x^3 + 5x^2 - 5x^2 + 7x + 4x - 1 + 3 \end{aligned}$$

$$\boxed{-9x^3 + 11x + 2}$$

$$\begin{aligned} \text{b. } & (-2x^3 + 3x^2 + 4x - 5) - (-6x^3 - 7x^2 + 8x + 9) \\ & -2x^3 + 3x^2 + 4x - 5 + 6x^3 + 7x^2 - 8x - 9 \end{aligned}$$

$$\boxed{4x^3 + 10x^2 - 4x - 14}$$

(9 points)

11. Multiply the following polynomials:

$$\text{a. } -3x^3(-3x^3 - 2x^2 - 3x + 1) = \boxed{9x^6 + 6x^5 + 9x^4 - 3x^3}$$

$$\text{b. } (x + 4)(x - 7) = \boxed{x^2 - 3x - 28}$$

$$x^2 - 7x + 4x - 28$$

$$\text{c. } (2x^2 + 3x - 5)(2x + 3)$$

$$4x^3 + 6x^2$$

$$+ 6x^2 + 9x$$

$$- 10x - 15$$

$$\boxed{4x^3 + 12x^2 - x - 15}$$

(4 points)

12. Divide:  $(25x^3y^4 + 5x^2y^2 - 10xy) \div (-5xy)$ 

$$\frac{25x^3y^4}{5xy} - \frac{5x^2y^2}{5xy} + \frac{10xy}{5xy}$$

$$\boxed{-5x^2y^3 - xy + 2}$$

(4 points)

13. Lisa's bill for computer supplies came to \$129.60. If the bill included 8% sales tax, what was the cost of the merchandise that Lisa purchased?

Let  $x =$  cost of merchandise

$$\text{cost} + \text{tax} = \text{total cost}$$

$$x + .08x = 129.60$$

$$1.08x = 129.60$$

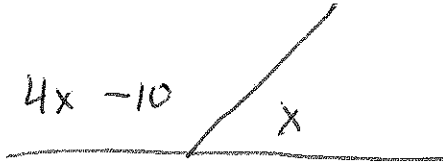
$$x = \frac{129.60}{1.08}$$

$$x = \$120$$

She paid \$120 for the merchandise.

(4 points)

14. Two angles are supplementary. Find the measures of the angles if the larger of the two angles is  $10^\circ$  less than four times the smaller angle.



$$x + 4x - 10 = 180$$

$$5x - 10 = 180$$

$$5x = 190$$

$$x = \frac{190}{5}$$

$$x = 38^\circ$$

$$4x - 10 = 4(38) - 10 = 142^\circ$$

The angles are  $38^\circ$  and  $142^\circ$ .

(4 points)

15. After a 30% discount, a new car stereo was selling for \$462.00. What was the original price of the car stereo?

Let  $x$  = original price of car stereo.

original price - discount = sale price

$$x - .30x = 462$$

$$0.7x = 462$$

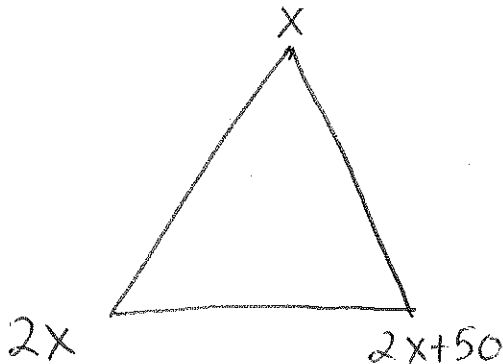
$$x = \frac{462}{0.7}$$

$$x = 660$$

The original price was \$660.

(4 points)

16. The second angle of a triangle is twice as large as the first. The third angle is  $50^\circ$  more than the second angle. What is the measure of each angle?



$$x + 2x + 2x + 50 = 180$$

$$5x + 50 = 180$$

$$5x = 130$$

$$x = 26^\circ$$

$$2x = 52^\circ$$

$$2x + 50 = 102^\circ$$

The angles are  $26^\circ$ ,  $52^\circ$ , and  $102^\circ$

(4 points)

17. Solve  $x^2 - 9x - 36 = 0$

Factor:

$$(x - 12)(x + 3) = 0$$

Set each factor equal to 0.

$$x - 12 = 0 \text{ or } x + 3 = 0$$

$$x = 12 \text{ or } x = -3$$

The solutions are  $x = -3$  and  $x = 12$ .

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**(4 points)**18. Solve  $x^2 - 6x + 9 = 0$ 

$$(x - 3)(x - 3) = 0$$

$x = 3$  is the only solution