

10) If  $x = 4$  and  $y = -2(5)^x + 7$ , what is the value of  $y$ ?

- a. -1243
- b. -33
- c. 9993
- d. 10007

$$y = -2(5)^4 + 7$$

$$y = -2(625) + 7$$

$$y = -1250 + 7$$

$$y = -1243$$

1	b
2	a
3	d
4	a
5	a
6	d
7	b
8	d
9	b
10	a

PART II: Constructed Response

Students are required to answer all questions in the space provided. All workings should be shown. Submit the answer sheet for Part I and all pages of Part II. Place your name on each page.

1. Solve the following for the indicated variable. Be sure to include factoring techniques in your solution.

a)  $x^2 - 22x = -121$  (2 marks)

$$x^2 - 22x + 121 = -121 + 121$$

$$x^2 - 22x + 121 = 0$$

$$(x-11)(x-11) = 0 \quad \begin{array}{l} -11 \times -11 = 121 \\ -11 + -11 = -22 \end{array}$$

$$x-11 = 0$$

$$x-11+11 = 0+11$$

$$x = 11$$

b)  $3x^2 - 75 = 0$  (2 marks)

$$3(x^2 - 25) = 0$$

$$3(x+5)(x-5) = 0 \quad \begin{array}{l} x-5 = 0 \\ x-5+5 = 0+5 \\ x = 5 \end{array}$$

$$\begin{array}{l} x+5 = 0 \\ x+5-5 = 0-5 \\ x = -5 \end{array}$$

c)  $4w^2 + 8w + 3 = 0$  (3 marks)

$$\underline{6} \times \underline{2} = 12$$

$$\underline{6} + \underline{2} = 8$$

$$4w^2 + 6w + 2w + 3 = 0$$

$$2w(2w+3) + 1(2w+3) = 0$$

$$(2w+3)(2w+1) = 0$$

$$\begin{array}{l} 2w+3 = 0 \\ 2w+3-3 = 0-3 \\ 2w = -3 \\ \frac{2w}{2} = \frac{-3}{2} \\ w = -\frac{3}{2} \end{array} \quad \begin{array}{l} 2w+1 = 0 \\ 2w+1-1 = 0-1 \\ 2w = -1 \\ \frac{2w}{2} = \frac{-1}{2} \\ w = -\frac{1}{2} \end{array}$$

d)  $p^3 - 9p^2 - 22p = 0$  (3 marks)

$$p(p^2 - 9p - 22) = 0$$

$$p(p-11)(p+2) = 0 \quad \begin{array}{l} -11 \times 2 = -22 \\ -11 + 2 = -9 \end{array}$$

$$\begin{array}{l} p = 0 \\ p-11 = 0 \\ p-11+11 = 0+11 \\ p = 11 \end{array} \quad \begin{array}{l} p+2 = 0 \\ p+2+2 = 0+2 \\ p = -2 \end{array}$$

e)  $-4x^2 + 12x + 9 = 0$  (3 marks)

$$-12 \times 3 = -36$$

$$-12 + 3 = -9$$

$$-4x^2 + 12x + 3x + 9 = 0$$

$$-4x(x+3) + 3(x+3) = 0$$

$$(x+3)(-4x+3) = 0$$

$$x+3-3 = 0-3$$

$$x = -3$$

$$-4x+3=0$$

$$-4x+3-3=0-3 \rightarrow x = \frac{3}{4}$$

$$\frac{-4x}{-4} = \frac{-3}{-4}$$

g)  $-4(3^x) + 12 = -960$  (4 marks)

$$-4(3^x) + 12 = -960$$

$$-4(3^x) + 12 + 12 = -960 + 12$$

$$-4(3^x) = -972$$

$$\frac{-4}{-4} \quad \frac{-972}{-4}$$

$$3^x = 243$$

$$3^x = 3^5$$

$$x = 5$$

$$3 \times 3 \times 3 \times 3 \times 3 = 3^5$$

f)  $-21x^2 + 20 = -47x$  (4 marks)

$$-21x^2 + 47x + 20 = -47x + 47x$$

$$-21x^2 + 47x + 20 = 0$$

$$35 \times 12 = 420$$

$$35 + 12 = 47$$

$$(-21x^2 + 35x) + (12x + 20) = 0$$

$$-7x(3x-5) + 4(3x-5) = 0$$

$$(3x-5)(-7x+4) = 0$$

$$3x-5+5 = 0+5$$

$$\frac{3x}{3} = \frac{5}{3}$$

$$x = \frac{5}{3}$$

$$-7x+4=0$$

$$-7x+4-4=0-4$$

$$-7x = -4$$

$$\frac{-7x}{-7} = \frac{-4}{-7}$$

$$x = \frac{4}{7}$$

2. Simplify the following expressions.

a)  $\frac{x^2 + 4x + 4}{x + 2}$  (2 marks)

$$= \frac{\cancel{(x+2)}(x+2)}{x+2}$$

$$= x+2$$

b)  $\frac{x^2 + 9x - 22}{x^2 + x - 6}$  (3 marks)

$$= \frac{(x+11)\cancel{(x-2)}}{(x+3)\cancel{(x-2)}}$$

$$= \frac{x+11}{x+3}$$

c)  $\frac{2x^2 - 13x + 21}{3x^2 - 14x + 15}$  (4 marks)

$$= \frac{(2x+7)\cancel{(x+3)}}{\cancel{(x+3)}(3x+5)}$$

$$= \frac{2x+7}{3x+5}$$

$$\underline{-7} \times \underline{-6} = 42$$

$$\underline{-7} + \underline{-6} = -13$$

$$(2x^2 - 7x) + (6x + 21)$$

$$x(2x+7) + 3(2x+7)$$

$$(2x+7)(x+3)$$

$$\underline{-9} \times \underline{-5} = 45$$

$$\underline{-9} + \underline{-5} = -14$$

$$(3x^2 - 9x) + (-5x + 15)$$

$$3x(x+3) - 5(x+3)$$

$$(x+3)(3x+3)$$

Part I Selected Response: 10 marks

Fill in the answers to the multiple choice questions on the sheet provided. DO NOT SEND YOUR E-TEACHER THE MULTIPLE CHOICE QUESTIONS...JUST THE ANSWERS... 1 sheet!!!!!!!!!!!!!!

1) What is the y-intercept for the equation  $3x - 6y - 9 = 0$ ?

- a. -3
- b.  $-\frac{3}{2}$
- c.  $\frac{3}{2}$
- d. 3

(let  $x=0$ )

$$3(0) - 6y - 9 = 0$$

$$-6y - 9 = 0$$

$$-6y - 9 + 9 = 0 + 9$$

$$-6y = 9$$

$$\frac{-6y}{-6} = \frac{9}{-6}$$

$$y = -\frac{9}{6}$$

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

2) What is the x-intercept for the equation  $9x - 18y + 27 = 0$ ?

- a. -3
- b.  $-\frac{3}{2}$
- c.  $\frac{3}{2}$
- d. 3

(let  $y=0$ )

$$9x - 18(0) + 27 = 0$$

$$9x + 27 = 0$$

$$9x + 27 - 27 = 0 - 27$$

$$\frac{9x}{9} = \frac{-27}{9}$$

$$x = -3$$

3) According to the graph on the right, what are the values of x that will satisfy the equation  $x^2 + 3x - 28 = 0$ ?

- a.  $x=4, x=7$
- b.  $x=-4, x=-7$
- c.  $x=-4, x=7$
- d.  $x=4, x=-7$

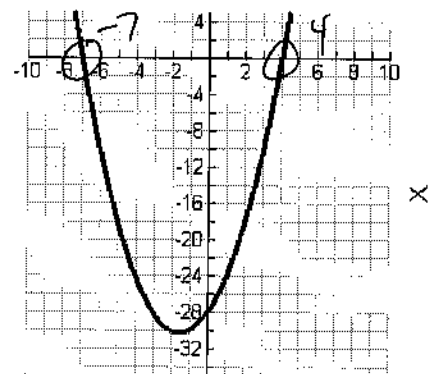
$$-4 \times 7 = -28$$

$$-4 + 7 = 3$$

$$(x-4)(x+7)$$

$$x-4=0 \quad x+7=0$$

$$x=4 \quad x=-7$$



4) What are the x intercepts for the equation  $y = x^2 - 8x + 15$ ?

- a.  $x=5, x=3$
- b.  $x=-5, x=-3$
- c.  $x=5, x=-3$
- d.  $x=-5, x=3$

$$x^2 - 8x + 15 = 0$$

$$(x-5)(x-3) = 0$$

$$x-5=0$$

$$x=5$$

$$x-3=0$$

$$x=3$$

$$-3 \times -5 = 15$$

$$-3 + -5 = -8$$

5) What are the solutions for  $2x^2 - 19x + 42 = 0$ ?

a.  $x = 6, x = \frac{7}{2}$

b.  $x = -6, x = -\frac{7}{2}$

c.  $x = -6, x = \frac{7}{2}$

d.  $x = 6, x = -\frac{7}{2}$

$$-12x - 7 = 84$$

$$-12x - 7 = -19$$

$$(2x^2 - 12x) + (-7x + 42) = 0 \rightarrow x + -6 = 0$$

$$2x(x - 6) + -7(x - 6) = 0$$

$$(x - 6)(2x - 7) = 0$$

$$x = 6$$

$$2x - 7 = 0$$

$$2x + -7 + 7 = 0 + 7$$

$$\frac{2x}{2} = \frac{7}{2}$$

$$x = \frac{7}{2}$$

6) What is  $-3x^4 + -6x^3 + -3x^2$  in completely factored form?

a.  $-3(x^4 + 2x^3 + x^2)$

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

c.  $-3x^2(x^2 + 2x + 1)$

d.  $-3x^2(x+1)^2$

$$-3x^4 : (-1) \cdot (3) \cdot (x) \cdot (x) \cdot x \cdot x$$

$$-6x^3 : (-1) \cdot (3) \cdot 2 \cdot (x) \cdot (x) \cdot x$$

$$-3x^2 : (-1) \cdot (3) \cdot (x) \cdot (x) \cdot 1$$

7) A graph produces x-intercepts of  $x = 4$  and  $x = -2$ . Which answer below indicates the equation for that graph?

a.  $y = x^2 + 2x - 8$

b.  $y = x^2 - 2x - 8$

c.  $y = x^2 - 6x - 8$

d.  $y = x^2 - 6x + 8$

$$x = 4 \quad x = -2$$

$$x - 4 = 4 - 4 \quad x + 2 = -2 + 2$$

$$x - 4 = 0 \quad x + 2 = 0$$

$$(x - 4)(x + 2)$$

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

8) The line  $y = x^2 + kx + 7$  has an x-intercept of  $-7$ . What is the value for  $k$ ?

a.  $-8$

b.  $-6$

c.  $6$

d.  $8$

$$0 = (-7)^2 + k(-7) + 7$$

$$0 = 49 - 7k + 7$$

$$0 = 56 - 7k$$

$$0 - 56 = 56 - 56 - 7k$$

$$-56 = -7k$$

$$\frac{-56}{-7} = \frac{-7k}{-7}$$

$$8 = k$$

9) What is the value for  $x$  if  $7^x = 2401$ ?

a.  $3$

b.  $4$

c.  $5$

d.  $443$

$$\boxed{x} \quad \boxed{4}$$

$$7 = 7$$

$$x = 4$$

$$7 \times 7 \times 7 \times 7 = 2401$$

$$7^4 = 2401$$