

QUADRATICS CHAPTER REVIEW (F2017)

① WHAT IS THE DEGREE OF  $f(x) = 3x^{\textcircled{3}} + 2x^2 + x - 1$ ? 3

② CLASSIFY  $3x^2 - 9$  BY THE NUMBER OF TERMS.  
 2 TERMS  $\Rightarrow$  BINOMIAL

③ CLASSIFY  $8x^2 + 2x - 1$  BY THE DEGREE.  
 HIGHEST POWER = 2  $\Rightarrow$  QUADRATIC

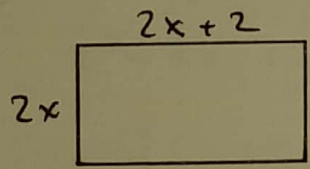
④ SIMPLIFY:

Ⓐ  $(2x^2 + 6x + 4) + (5x^2 + 7) = 2x^2 + 5x^2 + 6x + 4 + 7$   
 $=$   $7x^2 + 6x + 11$

Ⓑ  $(x^2 - 3x) - (2x^2 + 5x) =$   
 $x^2 - 2x^2 - 3x - 5x =$   $-x^2 - 8x$

Ⓒ  $3x^2(2x^3 + 5x - 5) =$   $6x^5 + 15x^3 - 15x^2$

Ⓓ FIND THE AREA OF THE RECTANGLE SHOWN BELOW



$A = lw = bh = (2x + 2)(2x)$   
 $=$   $4x^2 + 4x$

Ⓔ  $(x - 2)(3x + 4) = 3x^2 + 4x - 6x - 8 =$   $3x^2 - 2x - 8$

OR 

	$x$	$-2$
$3x$	$3x^2$	$-6x$
$-2$	$4x$	$-8$

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

Ⓕ  $(3x - 5)(2x^2 + 7x - 8) =$

	$2x^2$	$7x$	$-8$
$3x$	$6x^3$	$21x^2$	$-24x$
$-5$	$-10x^2$	$-35x$	$40$

$6x^3 + 21x^2 - 10x^2 - 24x - 35x + 40 =$   
 $6x^3 + 11x^2 - 59x + 40$

5) FACTOR OUT THE GCF !

$$\textcircled{A} \quad 15x - 3y = \boxed{3(5x - y)} \quad (\text{GCF} = 3)$$

$$\textcircled{B} \quad 21x^2 - 7x + 14 = \boxed{7(3x^2 - x + 2)} \quad (\text{GCF} = 7)$$

$$\textcircled{C} \quad 2x^2 + 4x = \boxed{2x(x + 2)} \quad (\text{GCF} = 2x)$$

6) FACTOR BY GROUPING :

$$\textcircled{A} \quad 4qr + 8r + 3q + 6 = (4qr + 8r) + (3q + 6) = \\ 4r(q + 2) + 3(q + 2) = \boxed{(4r + 3)(q + 2)}$$

$$\textcircled{B} \quad (12a^2 - 15ab) - 16a + 20b = \\ 3a(4a - 5b) - 4(4a - 5b) = \boxed{(3a - 4)(4a - 5b)}$$

7) SOLVE :

$$\textcircled{A} \quad x(x - 8) = 0 \quad \{0, 8\}$$
$$x = 0 \quad | \quad x - 8 = 0$$
$$x = 8$$

$$\textcircled{B} \quad y^2 + 3y = 0 \quad y(y + 3) = 0 \quad \{0, -3\}$$
$$y = 0 \quad | \quad y + 3 = 0$$
$$y = -3$$

$$\textcircled{C} \quad x^2 = 10x$$
$$x^2 - 10x = 0 \quad \{0, 10\}$$
$$x(x - 10) = 0$$
$$x = 0 \quad | \quad x - 10 = 0$$
$$x = 10$$

8) FACTOR:

(A)  $x^2 + 9x + 20 = (x+4)(x+5)$   
 $4 \cdot 5 = 20$   
 $4 + 5 = 9$  ✓

(B)  $x^2 + 13x - 48 = (x-3)(x+16)$   
 $-3(16) = -48$  ✓  
 $-3 + 16 = 13$

(C)  $x^2 - 3x - 10 = (x-5)(x+2)$   
 $-5(2) = -10$  ✓  
 $-5 + 2 = -3$

9) SOLVE:

(A)  $x^2 + 9x + 20 = 0$        $(x+4)(x+5) = 0$   
 $4 \cdot 5 = 20$        $x+4=0$  |  $(x+5)=0$   
 $4 + 5 = 9$        $x = -4$  |  $x = -5$        $\{-4, -5\}$

(B)  $x^2 - 3x = 48$        $(x-3)(x+16) = 0$   
 $x^2 - 3x - 48 = 0$        $x-3=0$  |  $x+16=0$   
     $x = 3$  |  $x = -16$        $\{3, -16\}$

(C)  $x^2 - 3x = 10$        $(x-5)(x+2) = 0$   
 $x^2 - 3x - 10 = 0$        $x-5=0$  |  $x+2=0$   
     $x = 5$  |  $x = -2$        $\{5, -2\}$

10) FACTOR:

(A)  $2x^2 + 5x + 3$        $ac = 2(3) = 6$   
     $2(3) = 6$        $2 + 3 = 5$   
 $2x^2 + 2x + 3x + 3 = (2x^2 + 2x) + (3x + 3) = 2x(x+1) + 3(x+1)$   
     $= (2x+3)(x+1)$

(B)  $3x^2 + 15x + 18$        $ac = 3(18) = 54$   
     $6 \cdot 9 = 54$        $6 + 9 = 15$   
 $3x^2 + 6x + 9x + 18 = (3x^2 + 6x) + (9x + 18) = 3x(x+2) + 9(x+2)$   
     $= (3x+9)(x+2)$

10 (CONTINUED)

$$(2x+3)(x-3)$$

c)  $2x^2 - 3x - 9$   $ac = -18$   
 $-6 + 3 = -3$

$$2x^2 - 6x + 3x - 9 = (2x^2 - 6x) + (3x - 9) = 2x(x-3) + 3(x-3)$$

d)  $2x^2 + 3x + 6$   $ac = 12$  NO FACTORS OF 12 ADD TO 3.

"PRIME" OR NO REAL SOLUTIONS

e)  $16h^2 - 9a^2 = 4h(4h-3a)(4h+3a)$  (DIFFERENCE OF SQUARES)

f)  $27g^3 - 3g = 3g(9g^2 - 1) = 3g(3g-1)(3g+1)$   
↑ GCF      ↑ DIFFERENCE OF SQUARES.

11) DOES THE GRAPH OF  $f(x) = x^2 - 4x + 2$  OPEN UP OR DOWN?  
UP (SINCE  $a = 1 > 0$ )

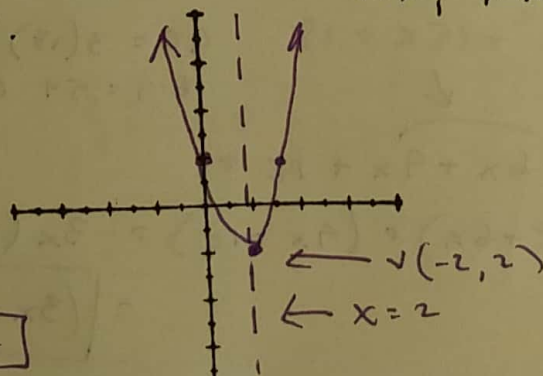
12) WHAT IS THE Y-INTERCEPT OF THE GRAPH OF  $f(x) = x^2 - 4x + 2$ ?  
(0, 2) (SINCE  $c = 2$ )

13) WHAT IS THE EQUATION OF THE AXIS OF SYMMETRY OF THE GRAPH OF  $f(x) = x^2 - 4x + 2$ ?  
 $x = \frac{-b}{2a} = \frac{-(-4)}{2(1)} = \frac{4}{2} = 2$   $x = 2$

14) WHAT ARE THE COORDINATES OF THE VERTEX OF THE GRAPH OF  $f(x) = x^2 - 4x + 2$ ?  
 $f(2) = 2^2 - 4(2) + 2 = 4 - 8 + 2 = -4 + 2 = -2$   $V(2, -2)$

15) GRAPH  $f(x) = x^2 - 4x + 2$ . LABEL THE VERTEX, Y-INTERCEPT, AND AXIS OF SYMMETRY.

16) WHAT ARE THE DOMAIN AND RANGE OF  $f(x) = x^2 - 4x + 2$ ?



D:  $\mathbb{R}$  R:  $y \geq -2$

- 17) USE A GRAPHING CALCULATOR TO FIND THE COORDINATES OF THE VERTEX OF  $g(x) = -3x^2 + 14x - 8$ . (ROUND TO 10TH'S)

$V(2.3, 8.3)$       [2ND] [TRACE] 4: maximum

- 18) USE A GRAPHING CALCULATOR TO FIND THE ZEROS OF  $g(x) = -3x^2 + 14x - 8$ . (ROUND TO 10TH'S)

$(0.7, 0)$  AND  $(4, 0)$       [2ND] [TRACE] 2: zero

- 19) SOLVE USING A GRAPHING CALCULATOR (ROUND TO 10TH'S):

A)  $x^2 - 6x + 3 = 0$

$(0.6, 0)$  AND  $(5.4, 0)$

B)  $4x^2 - 4x + 1 = 0$

$(0.5, 0)$       (ONLY 1 SOLUTION (DOUBLE ROOT))

C)  $x^2 + 2 = 0$

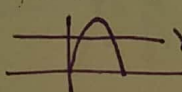
NO REAL SOLUTION

- 20) A FOOTBALL IS KICKED UP FROM GROUND LEVEL AT AN INITIAL UPWARD VELOCITY OF 40 FEET PER SECOND. THE EQUATION  $y = -16x^2 + 40x$  GIVES THE HEIGHT,  $y$ , IN FEET AFTER  $x$  SECONDS.

- A) HOW HIGH IS THE BALL AT 1 SECOND?

$y(1) = -16(1)^2 + 40(1) = -16 + 40 = 24 \text{ ft}$       (OR [2ND] [TRACE] 1: value)

- B) WHEN IS THE BALL 20 FEET HIGH?

  $y = 20$  [2ND] [TRACE] 5: intersect

$(0.7 \text{ SECONDS})$   
 $(1.8 \text{ SECONDS})$

- C) HOW HIGH DOES THE BALL GET? AT WHAT TIME?

$25 \text{ FEET AT } 1.25 \text{ SECONDS}$       [2ND] [TRACE] 4: maximum.

- D) HOW LONG IS THE BALL IN THE AIR?

$2.5 \text{ SECONDS}$       [2ND] [TRACE] 2: zero

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