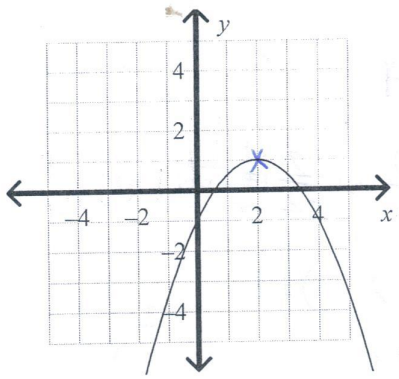
Chapter 2 Review

KEY!

This is ALL you need to know for the TEST!!!

What are the coordinates of the vertex of the graph or table? Is it a maximum or minimum?

1



vertex: (2, 1)

2

X	Y
0	0
–1	3
–2	4
–3	3
–4	0

← vertex: (–2, 4)

3 How is the graph of $y = 5x^2 + 1$ different from the graph of $y = 5x^2$?

↳ it is moved up 1

Graph the function and identify the domain and range.

4 $y = 1.5x^2$

domain: $(-\infty, \infty)$

range: $[0, \infty)$

Order the group of quadratic functions from widest to narrowest graph.

5 $y = -\frac{2}{5}x^2, y = \frac{1}{2}x^2, y = \frac{2}{3}x^2$

widest → smallest fraction

** the sign does NOT matter!

widest narrower narrowest

$f(\frac{1}{2}) = 2(\frac{1}{2})^2 - 2(\frac{1}{2}) + 1 = \frac{1}{2}$

Graph the function. Identify the vertex and axis of symmetry.

6 What is the axis of symmetry and vertex of: $f(x) = 2x^2 - 2x + 1$

$x = \frac{-b}{2a} = \frac{-(-2)}{2(2)} = \frac{2}{4} = \frac{1}{2}$

a b

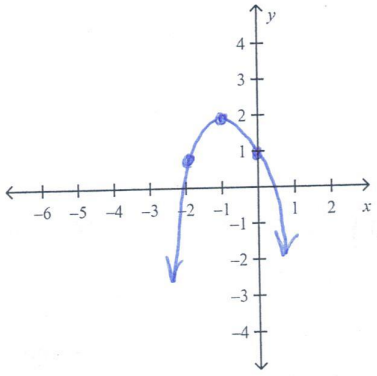
$x = \frac{1}{2}$ $\left(\frac{1}{2}, \frac{1}{2}\right)$

7 $f(x) = -x^2 - 2x + 1$

a b

Vertex: $(-1, 2)$

Axis of Symmetry: $x = -1$



$x = \frac{-b}{2a} = \frac{-(-2)}{2(-1)} = \frac{2}{-2} = -1$

$f(-1) = -(-1)^2 - 2(-1) + 1$

$= -1 + 2 + 1$

$= (-1, 2)$

$f(0) = 1$ so... $f(-2) = 1$

8 If an object is dropped from a height of 400 feet, the function $h(t) = -16t^2 + 400$ gives the height of the object after t seconds. When will the object hit the ground?

$0 = -16t^2 + 400$

$16t^2 = 400$

$t^2 = 25 \rightarrow$ $t = 5$ sec

What is the factored form of the following expressions? Always factor completely.

9 $d^2 + 9d + 18$ $(d+6)(d+3)$

10 $d^2 - 13d + 30$ $(d-10)(d-3)$

11 $x^2 - 2x - 24$ $(x-6)(x+4)$

12 $d^2 + 40d + 400$ $(d+20)(d+20) = (d+20)^2$

perfect squares!

13 $x^2 - 10xy + 25y^2$ $(x-5y)(x-5y) = (x-5y)^2$

perfect squares!

14 $r^2 - 121$ $(r+11)(r-11)$

15 $9x^2 - 64y^2$ $(3x-8y)(3x+8y)$

16 $20g^3 + 24g^2 + 15g + 18$ $(4g^2+3)(5g+6)$

17 $18g^3 + 24g^2 - 15g - 20$ $(6g^2-5)(3g+4)$

18 $12x^2 + 17x + 6 \rightarrow 12x^2+9x+8x+6 = \boxed{(3x+2)(4x+3)}$

72 < 9, 8

19 $9g^2 + 6g - 8 \rightarrow 9g^2+12g-6g-8 = \boxed{(3g-2)(3g+4)}$

72 < +12, −6; +6

20 $30x^2 - 3x - 9$

$3(10x^2-x-3) \rightarrow 3(10x^2-6x+5x-3) = \boxed{3(2x+1)(5x-3)}$

30 < −6, +5; −1

21 $75x^2 + 120x + 48$

$3(25x^2+40x+16) = 3(5x+4)(5x+4) = \boxed{3(5x+4)^2}$

perfect squares!

22 $d^2 - 9d + 14$ $(d-7)(d-2)$

23 $d^2 + d - 90$ $(d+10)(d-9)$

24 $-30q^3r^2 + 25q^2r^2 + 20qr^2$ GCF: $5qr^2$

$\boxed{5qr^2(-6q^2+5q+4)}$

25 $d^2 - 16d + 64$

$(d-8)(d-8) = (d-8)^2$

26 $s^6 - 16$ $(s-4)(s+4)$

27 $49b^2 - 100$ $(7b+10)(7b-10)$

28 $2x^2 + 9x - 35$: $2x^2+14x-5x-35 = (2x-5)(x+7)$

$70 < \begin{matrix}14\\-5\\9\end{matrix}$

29 $112x^2 - 63 = 7(16x^2-9) = 7(4x-3)(4x+3)$

30 $5x^3 + 10x^2 + x + 2 = (5x^2+1)(x+2)$

31 $16x^4 - 24x^3 - 36x^2 + 54x$

GCF: $2x \rightarrow 2x(8x^3-12x^2-18x+27) = 2x(4x^2-9)(2x-3) = 2x(2x+3)(2x-3)^2$

can factor further! → $(2x-3)(2x+3)$

32 The area of a rectangular garden is given by the trinomial $x^2 + 3x - 54$. What are the possible dimensions of the rectangle? Use factoring.

$(x+9)(x-6)$

33 The area of a rectangular painting is given by the trinomial $x^2 + 7x - 18$. What are the possible dimensions of the painting? Use factoring.

$(x+9)(x-2)$

34 A manufacturer produces blankets of different sizes. The length of the blankets is given by the function $l(x) = 5x + 9$ and the width is given by the function $w(x) = 10x$.

What is the function that represents the area that is covered by the blanket?

$A = 10x(5x+9) = 50x^2+90x$

35 Find the radius of a circle with an area of $\pi(81x^2 + 36x + 4)$.

$\pi(9x+2)(9x+2) = \pi(9x+2)^2$ $\therefore r = 9x+2$

36 A box has a volume given by the trinomial $x^3 + 3x^2 - 54x$. What are the possible dimensions of the box? Use factoring.

$x(x^2+3x-54)$

$x(x+9)(x-6)$

37 Factor: $x^3 - 27$ $= (x)^3 - (3)^3 = (x-3)(x^2+3x+9)$

38 Factor: $8x^3 + 125$ $= (2x)^3 + (5)^3 = (2x+5)(4x^2-10x+25)$

39 A ball is thrown into the air with an upward velocity of 48 ft/s. Its height h in feet after t seconds is given by the function $h = -16t^2 + 48t + 7$. How long does it take the ball to reach its maximum height? What is the ball's maximum height? Round to the nearest hundredth, if necessary.

1.5 sec 43 ft.

* use the calc! max: (1.5, 43)

$y_1 = h$ 2nd Trace → calc a max → scroll L, scroll R, enter.

40 The area of a rectangular pool is given by the trinomial $2y^2 + 8y - 90$. What are the possible dimensions of the pool? Use factoring.

$2(y^2+4y-45)$

$2(y+9)(y-5)$

What is the simplified form of each expression?

41 $4j^{10} \cdot j^3 = 4j^{13}$

What is the simplified form of the expression?

42 $(k^{\frac{5}{3}})^{\frac{1}{5}}$ $\frac{5}{3} \cdot \frac{1}{5} = \frac{1}{3}$ so... $k^{1/3}$

What is the simplified form of each expression?

43 $(3g^7)^3 = 3^3 g^{21} = 27g^{21}$

What is the simplified form of each expression?

44 $\frac{g^{10}h^7}{g^{-2}h^{17}} = \frac{g^2 \cdot g^{10} \cdot h^7}{h^{17}} = \frac{g^{12} \cdot h^7}{h^{17}} = \frac{g^{12}}{h^{10}}$

What is the simplified form of the expression?

45 $\left(\frac{t^2}{7c^3}\right)^{-3}$ flip it $= \left(\frac{7c^3}{t^2}\right)^3 = \frac{7^3c^9}{t^6} = \boxed{\frac{343c^9}{t^6}}$

46 Suppose that the AREA of a square lawn is $4x^2 + 20x + 25$. What is the length of one side of the lawn?

$(2x+5)(2x+5)$
$= (2x+5)^2$ $\boxed{\therefore l = 2x+5}$

47 Simplify: $(2i)(-i)(-6i)$ $= 2i(6i^2)$
$= 2i(-6) = \boxed{-12i}$

48 Simplify: $(2+i)(5-3i)$
FOIL! $= 10 - 6i + 5i - 3i^2$
$= 10 - i + 3 = \boxed{13 - i}$

49 Simplify: $\frac{-2i}{3+i}\left(\frac{3-i}{3-i}\right)$
$= \frac{-6i+2i^2}{9-i^2} = \frac{-6i-2}{10} = \frac{-2-6i}{10} = \boxed{\frac{-1}{5} - \frac{3}{5}i}$

50 Simplify: $\frac{(-1+3i)}{(2-5i)}\frac{(2+5i)}{(2+5i)}$

$= \frac{-2-5i+6i+15i^2}{4-25i^2}$

$= \frac{-2+i-15i^2}{29}$

$= \frac{13+i}{29} = \boxed{\frac{13}{29} + \frac{1}{29}i}$