Name: KEY Class: _____ Date: _____ A

Unit 6 Practice Exam 2017

Multiple Choice

Identify the choice that best completes the statement or answers the question.

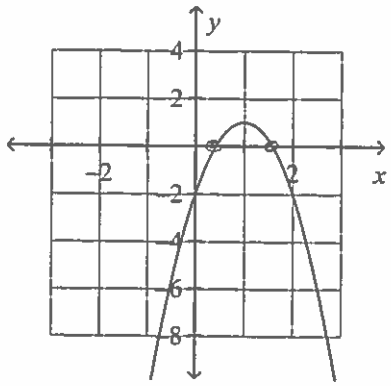
A 1. Which of the quadratic functions has the widest graph?

a. $y = \frac{1}{2}x^2$ b. $y = -5x^2$ c. $y = -3x^2$ d. $y = -\frac{7}{8}x^2$

A 2. A parabola _____ has an axis of symmetry.

a. always b. sometimes c. never

B 3. For which discriminant is the graph possible?



2 roots $\Rightarrow$ pos #

a. $b^2 - 4ac = 0$ b. $b^2 - 4ac = 10$ c. $b^2 - 4ac = -8$

Name: _____ (a=-1, b=-1, c=-1)

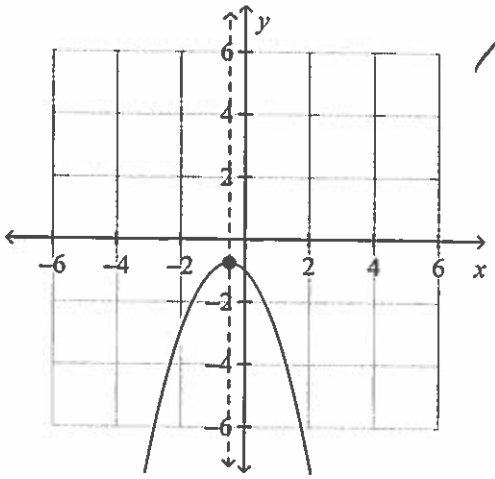
AOS: $x = \frac{-(-1)}{2(-1)} = \frac{1}{-2} = -\frac{1}{2} = -0.5$

B

4. Graph $f(x) = -x^2 - x - 1$. Label the axis of symmetry and vertex.

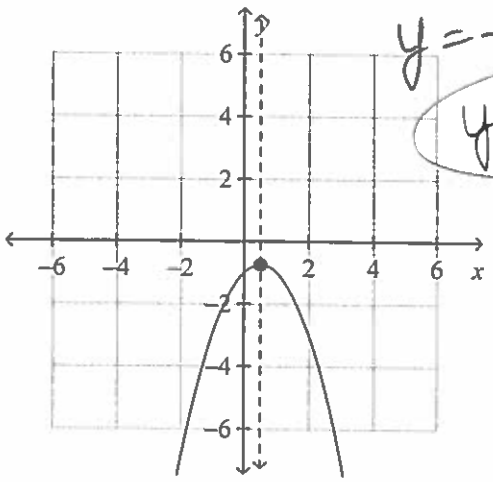
(-0.5, -0.75)

a.



Axis of symmetry: $x = -0.5$
Vertex: $(-0.5, 0.75)$

c.

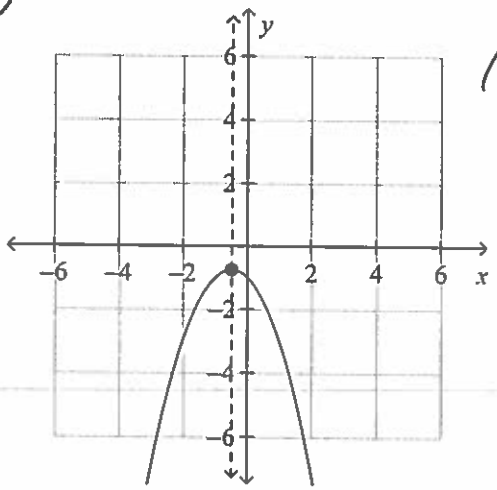


$y = -(-0.5)^2 - (-0.5)$

$y = -0.75$

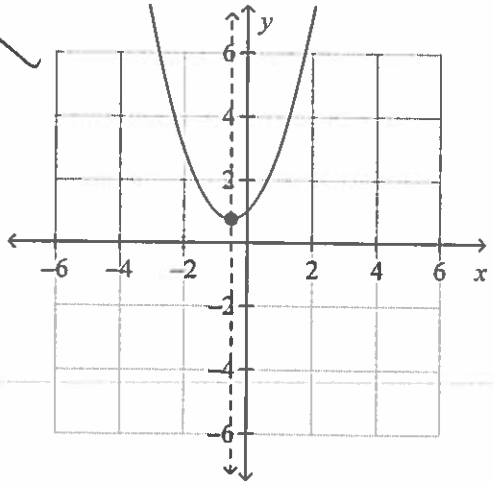
Axis of symmetry: $x = 0.5$
Vertex: $(0.5, -0.75)$

b.



Axis of symmetry: $x = -0.5$
Vertex: $(-0.5, -0.75)$

d.

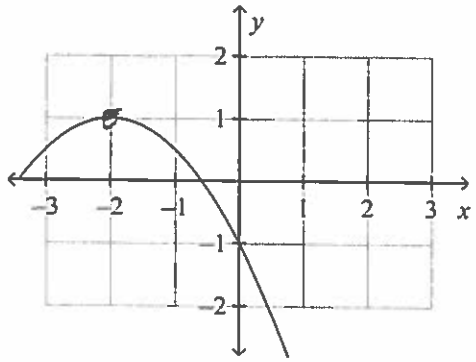


Axis of symmetry: $x = -0.5$
Vertex: $(-0.5, 0.75)$

Name: _____ A

Short Answer

5. Identify the vertex of the graph. Tell whether it is a minimum or maximum.



V (−2, 1)
Maximum

6. Order the group of quadratic functions from widest to narrowest graph.
$y = -2x^2, y = \frac{2}{3}x^2, y = -\frac{1}{4}x^2$

Widest Middle Narrowest
$y = -\frac{1}{4}x^2$, $y = \frac{2}{3}x^2$, $y = -2x^2$

Solve the equation using square roots.

7. $x^2 + 30 = 5$
$-30 \quad -30$
$x^2 = -25$

0 roots — no solution

Use any method to solve the equation. If necessary, round to the nearest hundredth.

8. $6x^2 - 31 = 0$

$\frac{6x^2}{6} = \frac{31}{6}$
$\sqrt{x^2} = \sqrt{5.16}$
$x = \pm 2.27$

Using the discriminant, find the number of real number solutions for the equation.

9. $x^2 + 3x + 3 = 0$

$b^2 - 4ac$
$(3)^2 - 4(1)(3)$
$9 - 12 = -3$

0 roots

10. Find the equation of the axis of symmetry and the coordinates of the vertex of the graph of the function.

$y = 2x^2 + 4x - 3$

AXIS OF SYMMETRY: X = -1 VERTEX: $(-1, -5)$

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

$y = 2(-1)^2 + 4(-1) - 3$
$= 2 - 4 - 3$
$y = -5$

y_3

Name: _____ A

11. Solve the equation using square roots. $x^2 - 14 = -10$

$+14 \quad +14$

$\sqrt{x^2} = \sqrt{4}$

$x = \pm 2$

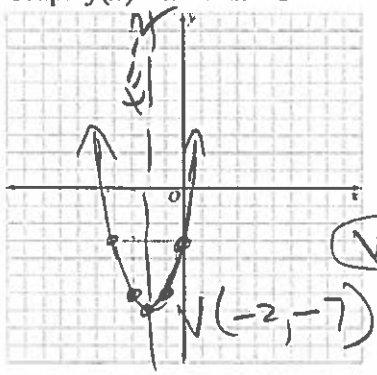
12. Solve the equation using square roots. $3x^2 = 54$

$\frac{3}{3} \quad \frac{54}{3}$

$\sqrt{x^2} = \sqrt{18}$

$x = \pm 4.24$

13. Graph $f(x) = x^2 + 4x - 3$



AOS: $x = \frac{-4}{2(1)} = \frac{-4}{2} = -2$ $\quad x = -2$

x	$(x)^2+4(x)-3$	y
-4	$(-4)^2+4(-4)-3$	-3
-3	$(-3)^2+4(-3)-3$	-6
V -2	$(-2)^2+4(-2)-3$	-7
-1	$(-1)^2+4(-1)-3$	-6
0	$(0)^2+4(0)-3$	-3

14. Solve the equation by quadratic formula or factoring. $z^2 + 2z - 8 = 0$

$x = \frac{-2 \pm \sqrt{(2)^2-4(1)(-8)}}{2(1)} = \frac{-2 \pm \sqrt{4+32}}{2} = \frac{-2 \pm \sqrt{36}}{2} = \frac{-2 \pm 6}{2}$

$\frac{-2+6}{2} = \frac{4}{2} = 2$ $\quad \frac{-2-6}{2} = \frac{-8}{2} = -4$

$(z+4)(z-2) = 0$

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

$-4 \quad -4 \quad +2 \quad +2$

$z = -4 \quad z = 2$

15. Solve the equation by quadratic formula or factoring. $2x^2 + 7x - 15 = 0$

	$2x$	-3
x	$2x^2$	$-3x$
$+5$	$+10x$	-15

$-30x^2$ $\quad +10x \quad -3x$

$(2x-3)(x+5) = 0$

$2x-3=0 \quad x+5=0$

$+3 \quad +3 \quad -5 \quad -5$

$\frac{2x}{2} = \frac{3}{2} \quad x = -5$

$x = 1.5$

$a=2 \quad b=7 \quad c=-15$

$x = \frac{-7 \pm \sqrt{(7)^2-4(2)(-15)}}{2(2)} = \frac{-7 \pm \sqrt{49+120}}{4} = \frac{-7 \pm \sqrt{169}}{4} = \frac{-7 \pm 13}{4}$

$\frac{6}{4}$ or $\frac{3}{2} \quad \frac{-20}{4} \quad -5$

16. Use the discriminant to find the number of solutions for the equation. $x^2 + 15 = 0$
(YOU DO NOT HAVE TO SOLVE.)

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

$a=1 \quad b=0 \quad c=15$

$b^2-4ac \quad (0)^2-4(1)(15) = 0-60 = -60$ 0 roots

17. Use the discriminant to find the number of solutions for the equation. ~~$x^2 - 16x + 60 = 0$~~
(YOU DO NOT HAVE TO SOLVE.)

$a=1$

$b=-16$

$c=60$

$(-16)^2-4(1)(60)$

$256 - 240$

$+16$

2 roots

Name: _____ A

18. Use the Quadratic Formula to solve the equation. $9x^2 + 4x - 16 = 0$

$a=9$, $b=4$, $c=-16$

$x = \frac{-4 \pm \sqrt{(4)^2-4(9)(-16)}}{2(9)} = \frac{-4 \pm \sqrt{16+576}}{18} = \frac{-4 \pm \sqrt{592}}{18} = \frac{-4 \pm 24.33}{18}$

$\frac{20.33}{18} = 1.13$

$\frac{-28.33}{18} = -1.57$

19. Use quadratic formula or factoring to solve the equation. $x^2 - 3x - 4 = 0$

$x=1$, $b=-3$, $c=-4$

$x = \frac{-(-3) \pm \sqrt{(-3)^2-4(1)(-4)}}{2(1)} = \frac{3 \pm \sqrt{9+16}}{2} = \frac{3 \pm \sqrt{25}}{2} = \frac{3 \pm 5}{2}$

$\frac{3+5}{2} = \frac{8}{2} = 4$

$\frac{3-5}{2} = \frac{-2}{2} = -1$

$(x-4)(x+1)=0$

$x-4=0$ $\quad x+1=0$

$x=4$ $\quad x=-1$

20. Use quadratic formula or factoring to solve the equation. $3x^2 - 6x - 24 = 0$

$\frac{3x^2-6x-24}{3} = \frac{0}{3}$

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

$(x-4)(x+2)=0$

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

$+4 \quad +4 \quad -2 \quad -2$

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

$a=3$, $b=-6$, $c=-24$

$x = \frac{-(-6) \pm \sqrt{(-6)^2-4(3)(-24)}}{2(3)} = \frac{6 \pm \sqrt{36+288}}{6} = \frac{6 \pm \sqrt{324}}{6} = \frac{6 \pm 18}{6}$

$\frac{24}{6} = 4$

$\frac{-12}{6} =$

21. Use quadratic formula or factoring to solve the equation. $-3y^2 - 5y = 8$

$-3y^2-5y+8=0$

$a=-3$, $b=-5$, $c=8$

$y = \frac{-(-5) \pm \sqrt{(-5)^2-4(-3)(8)}}{2(-3)} = \frac{5 \pm \sqrt{25+96}}{-6}$

$= \frac{5 \pm \sqrt{121}}{-6} = \frac{5 \pm 11}{-6}$

$\frac{5+11}{-6} = \frac{16}{-6} = -2.67$ or $-2\frac{2}{3}$

$\frac{5-11}{-6} = \frac{-6}{-6} = 1$

Solve the equation by quadratic formula or factoring.

22. $-12 = -3x^2 + 9x$

$+12 \quad +12$

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

$-3 \quad -3 \quad -3$

$x^2-3x-4=0$

$(x-4)(x+1)=0$

$x-4=0$ $\quad x+1=0$

$x=4$ $\quad x=-1$

$a=-3$, $b=9$, $c=12$

$x = \frac{-9 \pm \sqrt{(9)^2-4(-3)(12)}}{2(-3)} = \frac{-9 \pm \sqrt{81+14}}{-6}$

$= \frac{-9 \pm \sqrt{225}}{-6} = \frac{-9 \pm 15}{-6}$

$\frac{-9+15}{-6} = \frac{6}{-6} = -1$

$\frac{-9-15}{-6} = \frac{-24}{-6} = 4$

Solve the equation by quadratic formula. Round to the nearest hundredth if necessary.

23. $x^2 + 6x - 10 = 0$

$a=1$, $b=6$, $c=-10$

$x = \frac{-6 \pm \sqrt{(6)^2-4(1)(-10)}}{2(1)} = \frac{-6 \pm \sqrt{36+40}}{2} = \frac{-6 \pm \sqrt{76}}{2}$

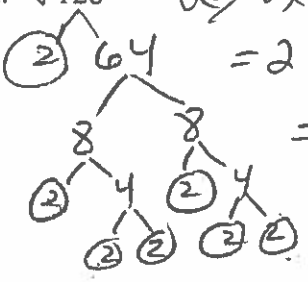
$= \frac{-6 \pm 8.72}{2}$

$\frac{-6+8.72}{2} = \frac{2.72}{2} = 1.36$

$\frac{-6-8.72}{2} = \frac{-14.72}{2} = -7.36$

Name: _____ A

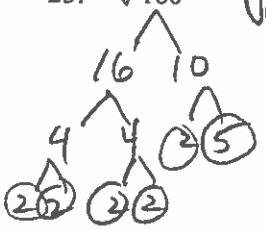
24. Simplify the radical expression. $\sqrt{128}$ $= \sqrt{2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2}$ $= 2\cdot2\cdot2\sqrt{2}$ $= 8\sqrt{2}$



OR $\sqrt{64\cdot2}$ $8\sqrt{2}$

Simplify the radical expression.

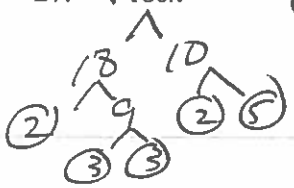
25. $\sqrt{160}$ $= \sqrt{2\cdot2\cdot2\cdot2\cdot2\cdot5}$ $2\cdot2\sqrt{2\cdot5}$ $4\sqrt{10}$



OR $\sqrt{16\cdot10}$ $4\sqrt{10}$

26. $\sqrt{144}$ $= 12$

27. $\sqrt{180h^5}$ $= \sqrt{2\cdot2\cdot3\cdot3\cdot5\cdot h\cdot h\cdot h\cdot h\cdot h}$ $2\cdot3\cdot h\cdot h\sqrt{5\cdot h}$ $6h^2\sqrt{5h}$



OR $\sqrt{36\cdot5\cdot h^4\cdot h^1}$ $6h^2\sqrt{5h}$

Simplify the radical expression.

28. $\sqrt{36g^6}$ $= 6g^3$