CHAPTER 11 Test

For each situation, state whether it is *always* true, *sometimes* true, or *never* true.

1. The graph of a quadratic function opens upward in a "u-shape." sometimes
2. You can use the Quadratic Formula to solve quadratic equations. always
3. There are two real solutions to any quadratic equation. sometimes

Write the equation of axis of symmetry and the coordinates of the vertex of the graph of each quadratic function. Then graph the function.

4. $y = x^2 + 6x + 8$ see graph $x=-3$ $(-3,-1)$
5. $y = -x^2 + 3x$ see graph $x=\frac{3}{2}$ $\left(\frac{3}{2}, \frac{9}{4}\right)$

Describe how each graph changes from its parent graph of $y = x^2$. Then name the vertex of each graph.

6. $y = x^2 - 10$ shifts down 10 units $(0,-10)$
7. $y = (x - 9)^2$ shifts right 9 units $(9,0)$
8. $y = (x + 7)^2 + 3$ shifts left 7 and up 3 $(-7,3)$

Solve each equation by graphing the related function. If exact roots cannot be found, state the consecutive integers between which the roots are located.

9. $y = x^2 - 8x + 16$ $x=4$
10. $y = x^2 - 5x - 1$ $-1 < x < 0$ $5 < x < 6$

Solve each equation by factoring. Check your solution.

11. $(r - 3)(r - 8) = 0$ $r=3$ or $r=8$
12. $s^2 - 5s + 4 = 0$ $s=1$ or $s=4$
13. $x^2 + 7x + 10 = 0$ $x=-5$ or $x=-2$

Find the value of c that makes each trinomial a perfect square.

14. $b^2 + 10b + c$ $c=25$
15. $x^2 + 8x + c$ $c=16$
16. $g^2 - 2g + c$ $c=1$

Solve each equation by completing the square.

17. $a^2 + 14a = -45$ $A=-9$ or $A=-5$
18. $v^2 - 6v + 3 = 0$ $v = 3 \pm \sqrt{6}$

Solve each equation by using the Quadratic Formula.

19. $2n^2 - n - 3 = 0$ $n=-1$ or $n=\frac{3}{2}$
20. $3x^2 + x + 5 = 0$ no real solutions

Graph each exponential function. Then state the *y*-intercept.

21. $y = 1.5^x$ $(0,1)$ see graph
22. $y = 2^x - 3$ $(0,-2)$ see graph

23. **Physics** A plane flying 400 feet over Antarctica drops equipment needed by research scientists below. How long will it take the equipment to touch ground? Use the formula $h = -16t^2 + 400$, where the height h is in feet and the time t is in seconds. $t = 5$ seconds

24. **Geometry** The length of a rectangle is 4 inches more than its width. The area of the rectangle is 60 square inches. Find the dimensions of the rectangle. 6in by 10in

25. **Finance** A school district has a \$64 million budget. The school board has voted to increase the budget by only 1% each year. After how many years will the budget be over \$70 million? Use the function $B(t) = 64(1.01)^t$, where $B(t)$ is the budget and t is the time in years. $t = 10$ years

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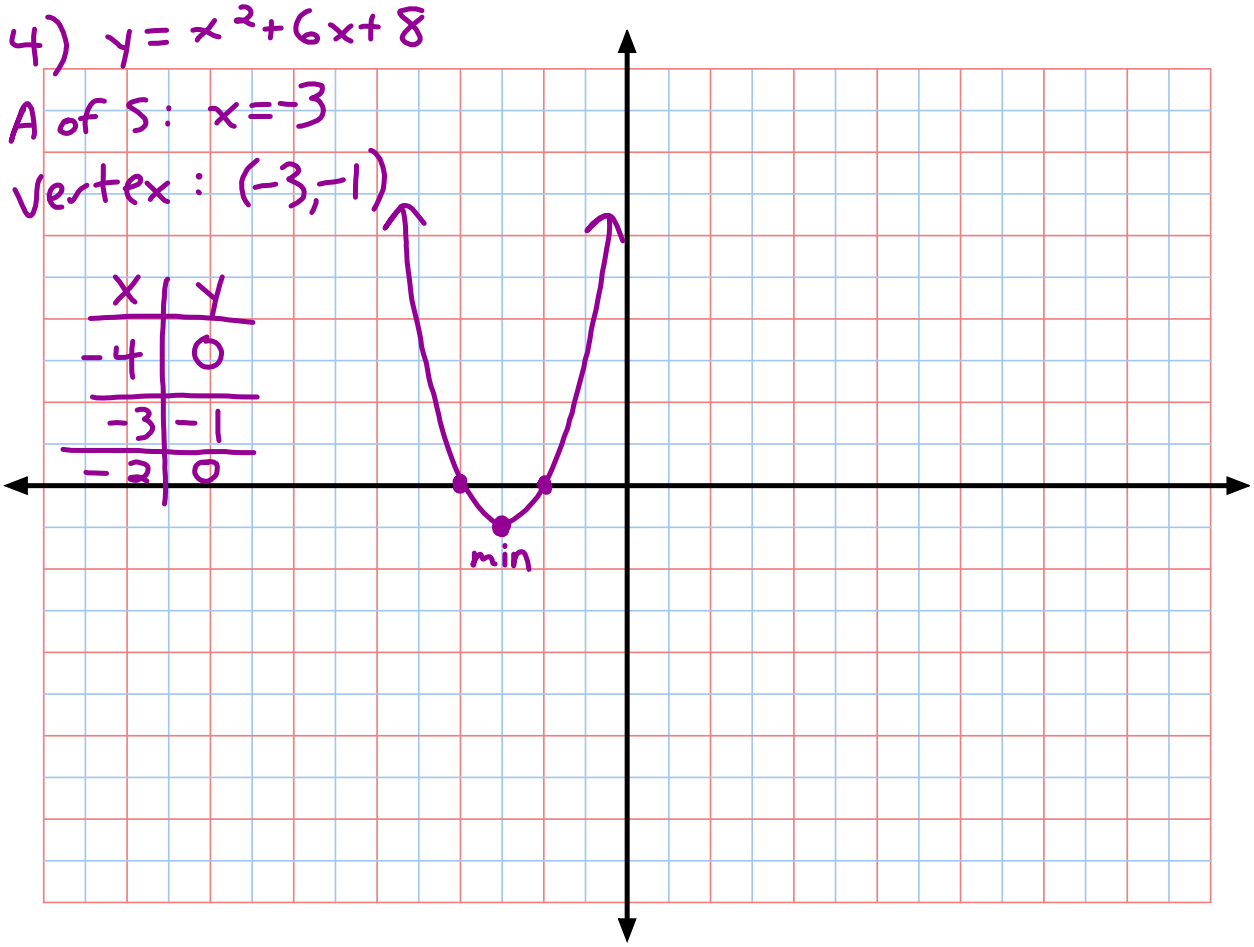
4) $y = x^2 + 6x + 8$

A of S: $x = -3$

Vertex: $(-3, -1)$

x	y
-4	0
-3	-1
-2	0



5) $y = -x^2 + 3x$

A of S: $x = \frac{3}{2}$

vertex: $(\frac{3}{2}, \frac{9}{4})$

$-x^2 + 3x = 0$

$x(-x + 3) = 0$

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

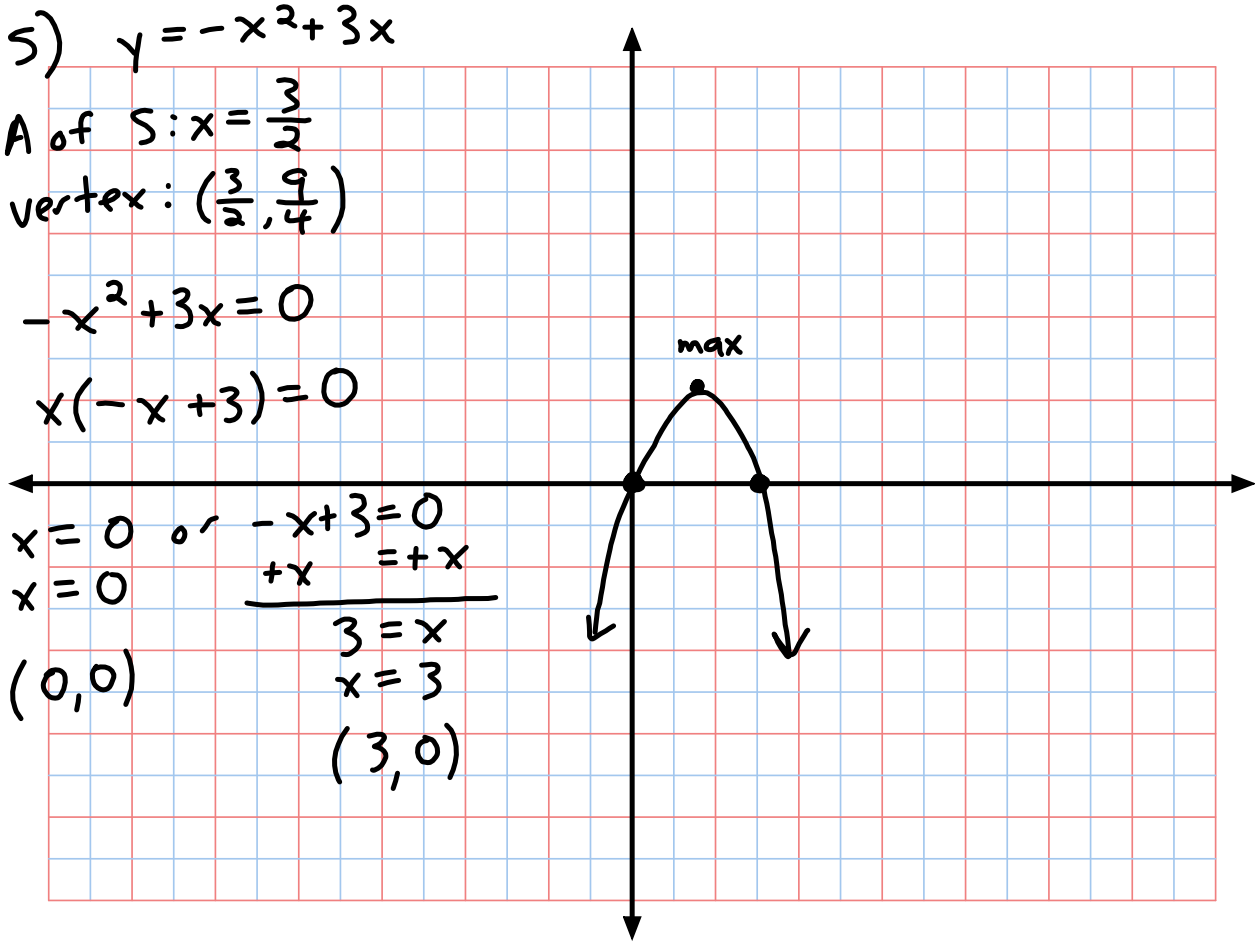
$x = 0$ $\quad +x \quad = +x$

$3 = x$

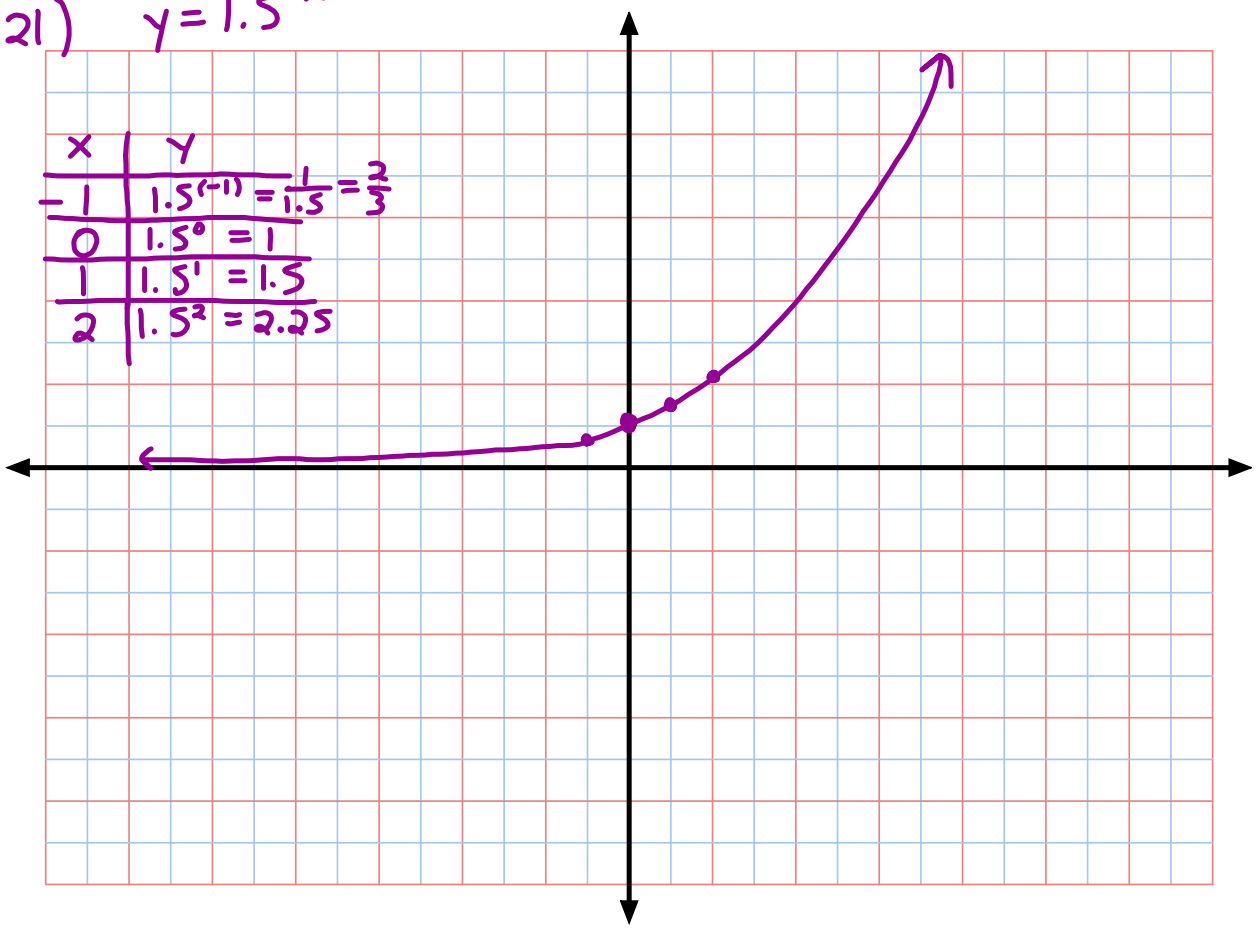
$x = 3$

$(0, 0)$

$(3, 0)$



21) $y = 1.5^x$



22) $y = 2^x - 3$

x	y
-1	$-2\frac{1}{2}$
0	-2
1	-1
2	1