

Name: KEY

Class: _____ Date: _____

103A

Chapter 4 Part 1 Practice Test - Calculator allowed

Factor the expression.

1. $6x^2 - x - 15$

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

2. $12x^2 + 17x + 6$

$(3x + 2)(4x + 3)$

3. $81x^2 - 25$

$(9x - 5)(9x + 5)$

4. $5x^2 - 33x - 14$

$(5x + 2)(x - 7)$

Solve the quadratic equation by factoring.

5. $x^2 + 6x = 0$

$x(x + 6) = 0$

$x = 0$ $x + 6 = 0$
 $x = -6$

-6 and 0

6. $2x^2 - 9x - 18 = 0$

$(2x + 3)(x - 6) = 0$

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

$-\frac{3}{2}$ and 6

7. $x^2 - 2x - 63 = 0$

$(x - 9)(x + 7) = 0$

$x - 9 = 0$ $x + 7 = 0$
 $x = 9$ $x = -7$

9 and -7

8. $2x^2 + 3x - 5 = 0$

$(2x + 5)(x - 1) = 0$

$2x + 5 = 0$ $x - 1 = 0$
 $2x = -5$ $x = 1$
 $x = -\frac{5}{2}$

$-\frac{5}{2}$ and 1

Solve for x.

$$9. \begin{array}{r} 2x^2 + 9 = 59 \\ -9 \quad -9 \\ \hline 2x^2 = 50 \\ \frac{2x^2}{2} = \frac{50}{2} \end{array}$$

$$\begin{array}{l} \rightarrow x^2 = 25 \\ \sqrt{x^2} = \sqrt{25} \\ \boxed{x = \pm 5} \end{array}$$

$$10. \begin{array}{r} -5(x-8)^2 = -110 \\ -5 \quad -5 \\ \hline (x-8)^2 = 22 \\ \sqrt{(x-8)^2} = \sqrt{22} \\ x-8 = \pm \sqrt{22} \end{array}$$

$$\begin{array}{l} \rightarrow x-8 = \pm \sqrt{22} \\ +8 \quad +8 \\ \boxed{x = 8 \pm \sqrt{22}} \end{array}$$

11. How would you translate the graph of $y = x^2$ to produce the graph of $y = (x+3)^2$?
Slide 3 units left.

12. How would you translate the graph of $y = x^2$ to produce the graph of $y = x^2 + 4$?
Slide 4 units up.

13. An online magazine currently charges \$12 a month to its subscribers, but is considering raising their price. The company found that the monthly revenue y can be modeled by the function $y = -700(x - 50)(x + 10)$ where x is the number of \$.10 increases in the monthly price.

a. Explain how to find the price that will maximize monthly revenue. What is the price?

Find the x-value of the vertex.
Multiply by #0.10.

b. What is the maximum monthly revenue?

vertex: $\frac{50 + (-10)}{2} = \frac{40}{2} = 20$

$20 \times \$0.10 = \2.00 price increase

Revenue: $-700(20-50)(20+10) = -700(-30)(30) = 630,000$

14. The base of a triangle is four feet longer than the height. The area of the triangle is 30 square feet. Find the height and base of the triangle.

$b = 4 + h$ $h = \text{height}$ $b = \text{base}$

Area = $\frac{1}{2}(\text{base})(\text{height})$

$30 = \frac{1}{2}(4+h)(h)$

$30 = \frac{1}{2}h(4+h)$

$60 = h(4+h)$

$60 = 4h + h^2$

$0 = h^2 + 4h - 60$

$0 = (h-6)(h+10)$

$h-6=0$ $h+10=0$

$h=6$

$h=-10$

$\boxed{\begin{array}{l} \text{height} = 6 \text{ Ft} \\ \text{base} = 10 \text{ Ft} \end{array}}$

↑ height cannot be negative

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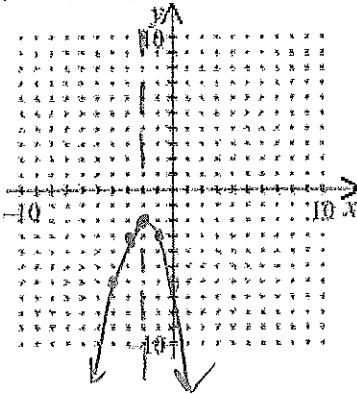
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Practice

Chapter 4 Test - Part One - Practice - No graphing calculator on this part

Graph. Clearly label the vertex and axis of symmetry. Clearly plot at least 4 other points.

1. $y = -(x+2)^2 - 2$



vertex: $(-2, -2)$

$x = 0 \quad (0, ?)$

$$\begin{aligned} x = -1 \quad y &= -(-1+2)^2 - 2 \\ (-1, ?) &= -(1)^2 - 2 \\ &= -1 - 2 = -3 \end{aligned}$$

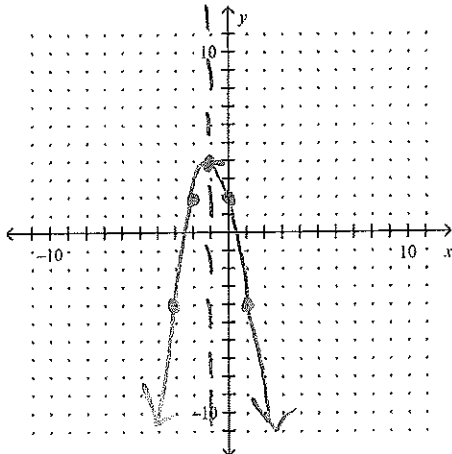
$$\begin{aligned} x = 0 \quad y &= -(0+2)^2 - 2 \\ &= -(2)^2 - 2 \\ &= -4 - 2 = -6 \end{aligned}$$

$(-1, -3)$

$(0, -6)$

2.

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



x-coord of vertex

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

$$\begin{aligned} (-1, ?) \quad y &= -2(-1)^2 - 4(-1) + 2 \\ &= -2(1) + 4 + 2 = -2 + 4 + 2 = 4 \end{aligned}$$

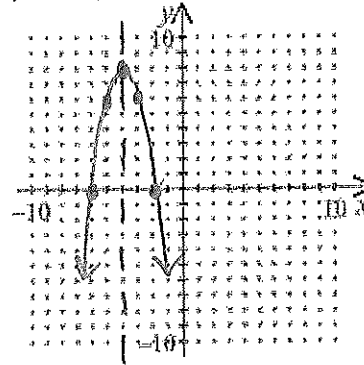
$(-1, 4)$

y-int = 2

3.

$y = -2(x+2)(x+6)$

$$\begin{aligned} p &= -2 \\ q &= -6 \end{aligned}$$



x-intercepts are -2 and -6

$$\begin{aligned} \text{vertex } x\text{-coord} &: \frac{-2 + -6}{2} = \frac{-8}{2} = -4 \end{aligned}$$

$$\begin{aligned} (-4, ?) \quad y &= -2(-4+2)(-4+6) \\ &= -2(-2)(2) = 8 \end{aligned}$$

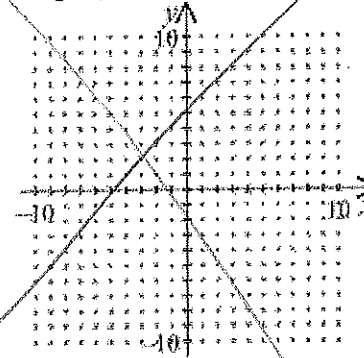
$(-4, 8)$

$x = -3 \quad (-3, ?)$

$$\begin{aligned} y &= -2(-3+2)(-3+6) = -2(-1)(3) \\ &= 6 \end{aligned}$$

$(-3, 6)$

4. Graph: $y \leq -x^2 + 2x$



$x = 1 \quad (1, ?)$

$$\begin{aligned} y &= -2(1)^2 - 4(1) + 2 \\ &= -2 - 4 + 2 = -4 \end{aligned}$$

$(1, -4)$