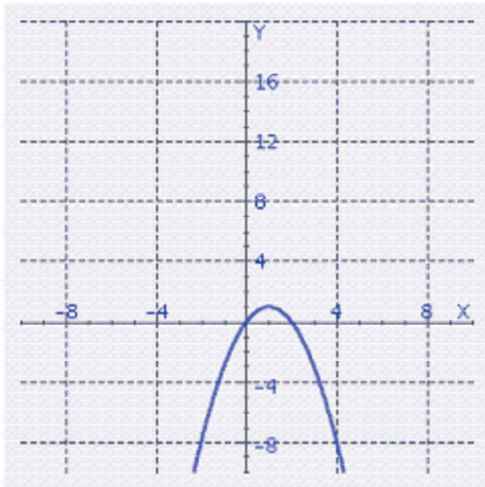


Polynomial Functions Test

Multiple Choice

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

- _____ 1. The graph of the function $y = -x^2 + 2x$ is:



Find its maximum or minimum value.

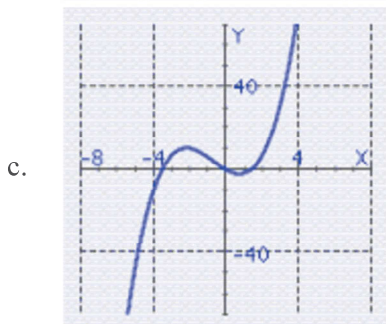
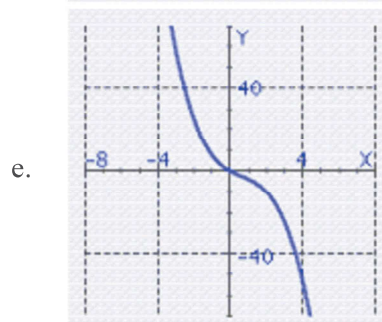
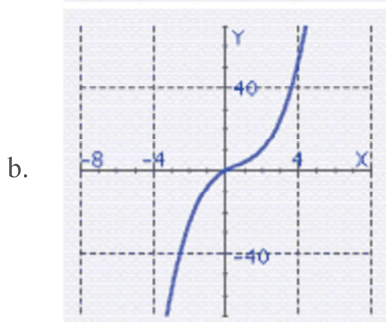
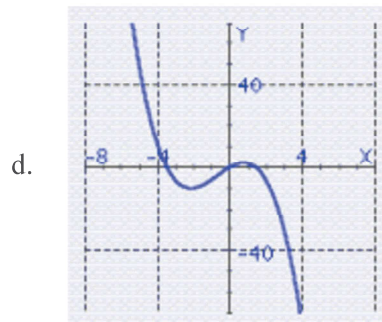
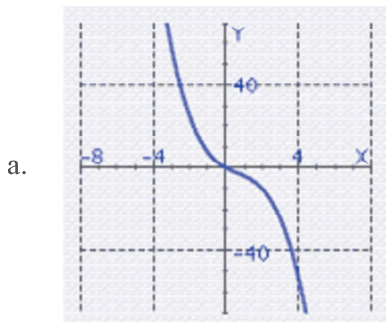
- a. $\max = 3$
 - b. $\min = -1$
 - c. $\min = -2$
 - d. $\max = 1$
 - e. $\min = 1$
- _____ 2. Find the vertex of the given parabola.

$$y = x^2 + 6x - 6$$

- a. $(-3, -15)$
- b. $(-6, 6)$
- c. $(-3, 3)$
- d. $(3, -15)$
- e. $(-3, 6)$

_____ 3. Sketch the graph of the function.

$$P(x) = -x^3 - 2x^2 + 5x$$



_____ 4. Determine the end behavior of the graph of the function.

$$y = 8x^3 - 7x^2 + 3x + 7$$

- $y \rightarrow \infty$ as $x \rightarrow -\infty$, and $y \rightarrow -\infty$ as $x \rightarrow \infty$
- $y \rightarrow -\infty$ as $x \rightarrow -\infty$, and $y \rightarrow \infty$ as $x \rightarrow -\infty$
- $y \rightarrow \infty$ as $x \rightarrow -\infty$, and $y \rightarrow \infty$ as $x \rightarrow \infty$
- $y \rightarrow -\infty$ as $x \rightarrow -\infty$, and $y \rightarrow \infty$ as $x \rightarrow \infty$
- $y \rightarrow -\infty$ as $x \rightarrow \infty$, and $y \rightarrow \infty$ as $x \rightarrow \infty$

- _____ 5. Find the quotient and remainder using long division.

$$\frac{x^2 + 11x - 2}{x + 5}$$

- The quotient is $x + 6$; the remainder is 6.
 - The quotient is $x + 6$; the remainder is -32 .
 - The quotient is $x + 6$; the remainder is 11.
 - The quotient is $x + 6$; the remainder is -35 .
 - no solution given
- _____ 6. Use synthetic division and the Remainder Theorem to evaluate $P(5)$, for $P(x) = 6x^2 + 7x + 4$.
- 168
 - 146
 - 198
 - 189
 - 222

- _____ 7. Use the Factor Theorem to choose a factor of $P(x) = x^3 + 10x^2 + 32x + 32$.

- $x - 2$
- $x - 4$
- $x + 2$
- $x + 4$
- $x + \frac{1}{2}$

- _____ 8. List all possible rational zeros given by the Rational Zeros Theorem (but don't check to see which actually are zeros).

$$Q(x) = x^4 - 4x^3 - 5x + 8$$

- $\pm 1, \pm 8$
- 1, 2, 4, 8
- 1, 8
- $\pm 1, \pm 2, \pm 4, \pm 8$
- $-1, -2, -4, -8$

- _____ 9. Find all rational zeros of the polynomial.

$$P(x) = x^4 - 29x^2 + 100$$

- $x = -21, x = 21, x = -2, x = 2$
- $x = -5, x = 5, x = -2, x = 2$
- $x = -5, x = 5, x = 2$
- $x = 5, x = -2, x = 2$
- $x = -4, x = 4, x = -2, x = 2$

_____ 10. Find all rational zeros of the polynomial.

$$P(x) = 25x^3 + 50x^2 - x - 2$$

a. $x = -2, x = -\frac{1}{5}, x = \frac{1}{5}$

b. $x = -\frac{1}{5}, x = \frac{1}{5}$

c. $x = -2, x = \frac{1}{5}$

d. $x = -5, x = -\frac{1}{5}, x = \frac{1}{5}$

e. $x = 2, x = -\frac{1}{5}, x = \frac{1}{5}$

_____ 11. Find all the real zeros of the polynomial. Use the quadratic formula if necessary.

$$P(x) = x^3 + 7x^2 + 4x - 30$$

a. $x = -1, x = -1 \pm \sqrt{7}$

b. $x = -5, x = -1 \pm \sqrt{7}$

c. $x = 5, x = -5 \pm \sqrt{7}$

d. $x = -1, x = -5 \pm \sqrt{7}$

e. $x = -5, x = 5 \pm \sqrt{7}$

Multiple Response

Identify one or more choices that best complete the statement or answer the question.

_____ 1. Given that $x=6$ is a zero of $P(x) = x^3 - 3x^2 - 22x + 24$, find **ALL** other zeros of $P(x)$.

a. $x = -6$

b. $x = 1$

c. $x = -1$

d. $x = -4$

e. $x = 4$