1. *Chapter 2, Section 2.2, Question 002

If an object is thrown straight up into the air from height H feet at time 0 with initial velocity V feet per second, then at time t seconds the height of the object is

$$-16.1t^2 + Vt + H$$

feet. This formula uses only gravitational force, ignoring air friction. It is valid only until the object hits the ground or some other object.

Suppose a ball is tossed straight up into the air from height 5 feet with initial velocity 40 feet per second.

(a) How long before the ball hits the ground?

Round your answer to two decimal places.

The ball will hit the ground in **2.60** *1 seconds.

(b) How long before the ball reaches its maximum height?

Round your answer to two decimal places.

The ball will reach its maximum height in **1.24** *2 seconds.

(c) What is the ball's maximum height?

Round your answer to one decimal place.

The ball's maximum height is **29.8** *3 feet.

**1 - significant digits not applicable; the absolute tolerance is +/-0.01*
**2 - significant digits not applicable; the absolute tolerance is +/-0.01*
**3 - significant digits not applicable; the absolute tolerance is +/-0.1*

2. *Chapter 2, Section 2.2, Question 006

If an object is thrown straight up into the air from height H feet at time 0 with initial velocity V feet per second, then at time t seconds the height of the object is

$$-16.1t^2 + Vt + H$$

feet. This formula uses only gravitational force, ignoring air friction. It is valid only until the object hits the ground or some other object.

Suppose a ball is tossed straight up into the air from height 7 feet. What should be the initial velocity to have the ball reach its maximum height after 1.0 seconds?

Enter the exact answer.

The initial velocity should be **32.2** *1 feet per second.
Significant digits not applicable; exact number, no tolerance

3. *Chapter 2, Section 2.2, Question 010

If an object is thrown straight up into the air from height H feet at time 0 with initial velocity V feet per second, then at time t seconds the height of the object is

$$-16.1t^2 + Vt + H$$

feet. This formula uses only gravitational force, ignoring air friction. It is valid only until the object hits the ground or some other object.

Some notebook computers have a sensor that detects sudden changes in motion and stops the notebook's hard drive, protecting it from damage.

Suppose a notebook computer is accidentally knocked off a shelf that is seven feet high. How long before the computer hits the ground?

Round your answer to two decimal places.

The computer will hit the ground in **0.66** *1 seconds.
Significant digits not applicable; the absolute tolerance is +/-0.01

4. *Chapter 2, Section 2.2, Question 012

If an object is thrown straight up into the air from height H feet at time 0 with initial velocity V feet per second, then at time t seconds the height of the object is

$$-16.1t^2 + Vt + H$$

feet. This formula uses only gravitational force, ignoring air friction. It is valid only until the object hits the ground or some other object.

Some notebook computers have a sensor that detects sudden changes in motion and stops the notebook's hard drive, protecting it from damage.

Suppose the motion detection/protection mechanism of a notebook computer takes 0.3 seconds to work after the laptop computer starts to fall. What is the minimum height from which the notebook computer can fall and have the protection mechanism work?

Enter the exact answer.

The minimum height from which the notebook computer can fall and have the protection mechanism work is **1.449** *1 feet.
Significant digits not applicable; exact number, no tolerance

5. *Chapter 2, Section 2.2, Question 014

Find all numbers x such that

$$\frac{5x+4}{x-4} = \frac{4x-3}{x-3}.$$

Enter the exact answers in increasing order.

$x =$

$x =$

6. *Chapter 2, Section 2.2, Question 016

Find two numbers r such that the points $(-6, 4)$, $(r, 2r)$, and $(8, r)$ all lie on a straight line.

Enter the exact answers in increasing order.

$r =$

$r =$

7. *Chapter 2, Section 2.2, Question 019

Find the vertex of the graph of the function $f(x) = (x - 2)^2 - 18$.

Vertex $=$

8. *Chapter 2, Section 2.2, Question 022

Find the vertex of the graph of the function $f(x) = (5x + 2)^2 + 15$.

Vertex $=$

9. *Chapter 2, Section 2.2, Question 028

Find a number t such that the distance between $(-3, 4)$ and $(3t, 2t)$ is as small as possible.

Enter the exact answer.

$t =$ **-1/13**

10. *Chapter 2, Section 2.2, Question 032

Consider the function $f(x) = -2x^2 + 4x - 4$.

(a) Write $f(x)$ in the form $a(x-h)^2 + k$.

Enter the exact values of a, h, and k.

$a =$

-2

$h =$

1

$k =$

-2

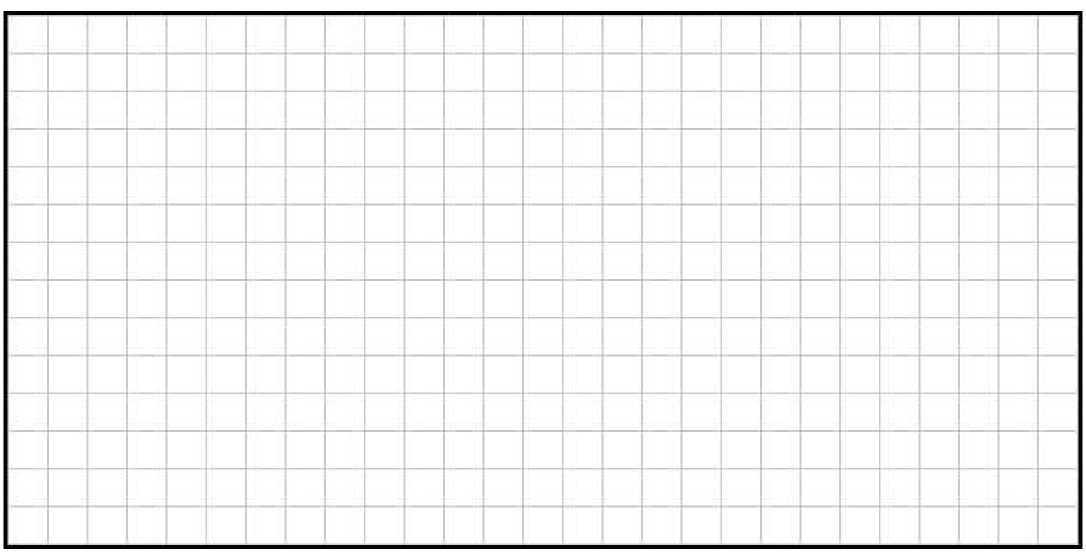
(b) Find the value of x where $f(x)$ attains its minimum value or its maximum value.

Enter the exact answer.

$x =$

1

(c) Sketch the graph of f .



(d) Find the vertex of the graph of f .

Enter the exact answer.

(

1 , -2)

11. *Chapter 2, Section 2.2, Question 036

Find two numbers whose sum equals 10 and whose product equals 22.

Enter the exact answers in increasing order.

12. *Chapter 2, Section 2.2, Question 039

Find the minimum value of the function f defined by $f(x) = x^2 - 12x + 6$.

Minimum value of f = **-30** *1

Significant digits not applicable; exact number, no tolerance

13. *Chapter 2, Section 2.2, Question 042

Find the maximum value of the function f defined by $f(x) = 3 + 11x - 10x^2$.

Enter an exact answer.

Maximum value of f = **241/40**

14. *Chapter 2, Section 2.2, Question 050

Suppose that $h(x) = x^2 + 2x - 3$, with the domain of h being the set of positive numbers. Evaluate $h^{-1}(9)$.

$h^{-1}(9) =$

15. *Chapter 2, Section 2.4, Question 004

Suppose $p(x) = x^2 + 4x + 6$ and $q(x) = 6x^3 - 5x + 4$.

Write the expression $(6p + 4q)(x)$ as a sum of terms, each of which is a constant times a power of x.

$(6p + 4q)(x) =$

16. *Chapter 2, Section 2.4, Question 007

Suppose $p(x) = x^2 + 3x + 4$. Write the expression $(p(x))^2$ as a sum of terms, each of which is a constant times a power of x.

$(p(x))^2 =$

17. *Chapter 2, Section 2.4, Question 011

Suppose $p(x) = x^2 + 4x + 8$ and $q(x) = 8x^3 - 63x + 6$.

Write the expression $(p \circ q)(x)$ as a sum of terms, each of which is a constant times a power of x.

$(p \circ q)(x) =$

18. *Chapter 2, Section 2.4, Question 013

Suppose $p(x) = x^2 + 5x + 16$ and $s(x) = 4x^3 - 2$.

Write the expression $(p \circ s)(x)$ as a sum of terms, each of which is a constant times power of x.

$(p \circ s)(x) =$

19. *Chapter 2, Section 2.4, Question 015

Suppose $p(x) = x^2 + 4x + 5$, $q(x) = 5x^3 - 4x + 3$, and $s(x) = 3x^3 - 5$.

Write the expression $(q \circ (p + s))(x)$ as a sum of terms, each of which is a constant times a power of x.

$(q \circ (p + s))(x) =$

20. *Chapter 2, Section 2.4, Question 022

Find all real numbers x such that $x^6 - 4x^3 - 12 = 0$. Give your answers in increasing order.

$x =$

$x =$

21. *Chapter 2, Section 2.4, Question 027

Find a polynomial p of degree 3 such that -1, 2, and 3 are zeros of p and $p(0) = 1$.

$p(x) =$

22. *Chapter 2, Section 2.4, Question 031

Give an example of two polynomials of degree 9 whose sum has degree $5.$

a. $p(x) = x^9$ and $q(x) = x^9 + x^5$

b. $p(x) = x^9 + x^5$ and $q(x) = -x^9 - x^5$

c. $p(x) = x^9 + x^5$ and $q(x) = x^9 - x^5$

d. $p(x) = x^9 + x^5$ and $q(x) = -x^9$

e. $p(x) = x^9 + x^5$ and $q(x) = x^{-9}$

Answer: d

23. *Chapter 2, Section 2.4, Question 043

Let p be the polynomial defined by

$$p(x) = x^6 - 87x^4 - 93x + 2.$$

(a) Evaluate $p(-2), p(-1), p(0),$ and $p(1).$

$p(-2) =$ **-1140** *1

$p(-1) =$ **9** *2

2 *3

-177 *4

*1 - significant digits not applicable; exact number, no tolerance
*2 - significant digits not applicable; exact number, no tolerance
*3 - significant digits not applicable; exact number, no tolerance
*4 - significant digits not applicable; exact number, no tolerance

(b) Explain why the results from part **(a)** imply that has a zero in the interval and has a zero in the interval

has a zero in the interval because is **negative** ▼ and is **positive.** ▼

has a zero in the interval because is **positive** ▼ and is **negative.** ▼

(c) Show that has at least four zeros in the interval [Hint: We already know from part **(b)** that has at least two zeros in the interval You can show the existence of zeros by finding integers such that one of the numbers is positive and the other is negative.]

a. has at least four zeros in the interval because switches from negative to positve on the intervals and and switches from positive to negative on the intervals and
b. has at least four zeros in the interval because switches from negative to positve on the intervals and and switches from positive to negative on the intervals and
c. has at least four zeros in the interval because switches from negative to positve on the intervals and and switches from positive to negative on the intervals and
d. has at least four zeros in the interval because switches from negative to positve on the intervals and and switches from positive to negative on the interval
e. has at least four zeros in the interval because switches from negative to positve on the intervals and and switches from positive to negative on the intervals and

Answer: b

24. *Chapter 2, Review Exercises, Question 010

Give an example of a quadratic function of the form for which and the function's graph has its vertex at the point .