

Name: _____

Date: _____

1. This table shows the relationship between n , the number of consecutive hits made in a video game, and number of points scored.

Points Scored in Video Game

| Number of Consecutive Hits | Points Scored |
|----------------------------|---------------|
| 1 | 2 |
| 2 | 5 |
| 3 | 10 |
| 4 | 17 |
| ... | |

Which function best represents this relationship?

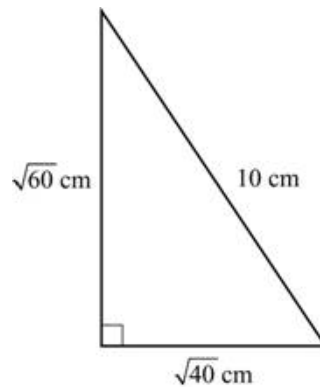
A. $f(n) = n^2 + n$, for $n = 1, 2, 3, \dots$

B. $f(n) = n^2 + 1$, for $n = 1, 2, 3, \dots$

C. $f(n) = 4n + 1$, for $n = 1, 2, 3, \dots$

D. $f(n) = 2n + 1$, for $n = 1, 2, 3, \dots$

2. A right triangle and its dimensions are shown in this diagram.



What is the area of the triangle in simplified form?

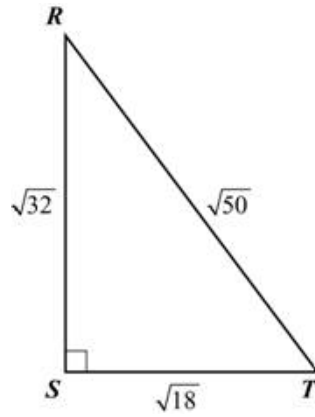
- A. $3\sqrt{20}$ cm²
- B. $6\sqrt{10}$ cm²
- C. $10\sqrt{6}$ cm²
- D. $20\sqrt{3}$ cm²

3. Two bicyclists leave a shop at the same time. One travels north and the other travels east. Both bicyclists average 15 miles per hour.

How far apart, in miles, will they be after x hours?

- A. $30x$
 - B. $2x\sqrt{15}$
 - C. $15x$
 - D. $15x\sqrt{2}$
-

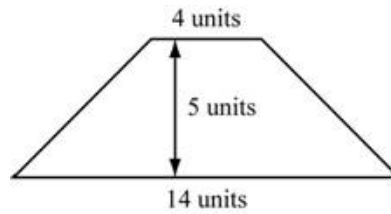
4. Right triangle RST and its dimensions are shown in this diagram.



What is the perimeter of triangle RST ?

- A. 10
 - B. $10\sqrt{2}$
 - C. $12\sqrt{2}$
 - D. $25\sqrt{2}$
-

5. An isosceles trapezoid and some of its dimensions are shown in this diagram.



What is the perimeter, in units, of the trapezoid?

- A. $18 + 10\sqrt{2}$
- B. 28
- C. $18 + 4\sqrt{5}$
- D. 43

6. An 8-inch by 10-inch photograph is being reduced proportionally. The 10-inch side is reduced by x inches. What is the CHANGE in the area in terms of x ?

- A. $(-0.8x^2 + 16x)$ sq. in.
 - B. $(-0.8x^2 - 16x)$ sq. in.
 - C. $(0.8x^2 + 16x)$ sq. in.
 - D. $(0.8x^2 - 16x)$ sq. in.
-

7. A box is in the shape of a rectangular prism.

Two faces each have an area of $2x^2 + 6x$ square units.

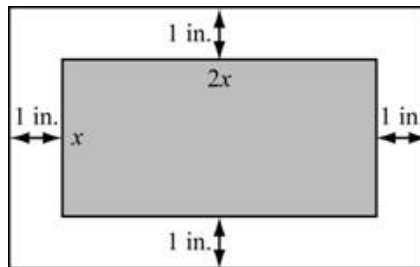
Two faces each have an area of $2x^2 + 8x$ square units.

Two faces each have an area of $x^2 + 7x + 12$ square units.

What is the surface area, in square units, of the box?

- A. $10x^2 + 21x + 12$
- B. $10x^2 + 42x + 24$
- C. $10x^4 + 21x^2 + 24$
- D. $10x^6 + 42x^3 + 24$

8. A picture with a frame and its dimensions are shown in this diagram.



What is the area, in square inches, of the frame?

- A. $4x + 4$
- B. $6x + 2$
- C. $6x + 4$
- D. $8x + 4$

9. The area, in square units, of a rectangle is represented by this polynomial.

$$6x^2 + 13x + 6$$

One dimension is $2x + 3$ units. What is the other dimension, in units, of the rectangle?

- A. $3x + 2$
 - B. $4x + 3$
 - C. $6x^2 + 15x + 9$
 - D. $6x^2 + 11x + 3$
-

10. The edge of a cube is 10 inches. Each edge of the cube is shortened by d inches to make a smaller cube. What is the volume of the smaller cube in terms of d ?

- A. $(100 - d^3)$ cubic inches
 - B. $(1000 - d^3)$ cubic inches
 - C. $(1000 - 300d + 30d^2 - d^3)$ cubic inches
 - D. $(1000 - 300d + 10d^2 + d^3)$ cubic inches
-

11. A shipping company uses cube-shaped boxes with edges that are e centimeters long. The inside of each face of the box is padded with foam that is 2 centimeters thick. What is the usable volume of the inside of the box?

- A. $e^3 - 4e^2 - 16e + 64 \text{ cm}^3$
 - B. $e^3 - 12e^2 + 12e - 64 \text{ cm}^3$
 - C. $e^3 - 12e^2 + 48e - 64 \text{ cm}^3$
 - D. $e^3 + 12e^2 + 12e - 64 \text{ cm}^3$
-

12. Use this expression to answer the question.

$$\frac{x^2 - 16}{4x} \cdot \frac{x + 4}{x - 4}$$

Which of the following is equivalent to the expression?

A. $\frac{4x}{(x - 4)^2}$

B. $\frac{(x + 4)^2}{4x}$

C. $\frac{(x - 4)^2}{4x}$

D. $\frac{4x}{(x + 4)^2}$

13. One painter can paint a house with a sprayer in p hours. It takes a painter twice as long to paint the house with a brush.

Which expression represents the fraction of the house that can be painted in one hour by two painters, one using a brush and the other using a sprayer?

A. $\frac{2}{3p}$

B. $\frac{3}{2p}$

C. $\frac{3}{p}$

D. $\frac{2}{p}$

14. A chef cuts the lasagna in a rectangular pan into servings. He makes x equally spaced horizontal cuts and y equally spaced vertical cuts.

Which expression represents the size of a serving as a part of the whole pan?

A. $\frac{1}{xy+1}$

B. $\frac{1}{xy+x+1}$

C. $\frac{1}{xy+x+y+1}$

D. $\frac{1}{xy+y+1}$

15. In a parallel circuit with two branches, the total resistance, T , can be determined by using this equation.

$$\frac{1}{T} = \frac{1}{x} + \frac{1}{y}$$

In the equation, x and y represent the resistance in each branch of the circuit.

Which expression represents the total resistance, T ?

A. $\frac{x+y}{2}$

B. $\frac{x+y}{xy}$

C. $\frac{xy}{2}$

D. $\frac{xy}{x+y}$

Answer Key

1. B) $f(n) = n^2 + 1$, for $n = 1, 2, 3, \dots$

2. C) $10\sqrt{6} \text{ cm}^2$

3. D) $15x\sqrt{2}$

4. C) $12\sqrt{2}$

5. A) $18 + 10\sqrt{2}$

6. D) $(0.8x^2 - 16x) \text{ sq. in.}$

7. B) $10x^2 + 42x + 24$

8. C) $6x + 4$

9. A) $3x + 2$

10. C) $(1000 - 300d + 30d^2 - d^3) \text{ cubic inches}$

11. C) $e^3 - 12e^2 + 48e - 64 \text{ cm}^3$

12. C) $\frac{(x-4)^2}{4x}$

13. B) $\frac{3}{2p}$

14. C) $\frac{1}{xy + x + y + 1}$

15. D) $\frac{xy}{x + y}$