SAT Math Practice Questions

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Contents

1 Algebra

Question 1: (Multiple Choice) Solve the equation:

$$2x + 3 = 11.$$

(A) 3

(B) 4

(C) 5

(D) 6

Question 2: (Multiple Choice) Solve for x:

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

(A) 7

(B) 8

(C) 11

(D) 13

Question 3: (Multiple Choice) If $2x - 7 = 3$, what is the value of $4x + 5$?

(A) 20

(B) 25

(C) 30

(D) 35

Question 4: (Multiple Choice) Solve the system of equations:

$$\begin{cases} x + y = 7, \\ 2x - y = 3. \end{cases}$$

(A) $(3, 4)$

(B) $\left(\frac{10}{3}, \frac{11}{3}\right)$

(C) $(2, 5)$

(D) $\left(\frac{11}{3}, \frac{10}{3}\right)$

Question 5: (Multiple Choice) Given $f(x) = 3x + 2$, find $f(4)$.

(A) 12

(B) 14

(C) 16

(D) 18

Question 6: (Multiple Choice) Factor the quadratic expression:

$$x^2 - 5x + 6.$$

(A) $(x-1)(x-6)$
(B) $(x-2)(x-3)$
(C) $(x+2)(x-3)$
(D) $(x-2)(x+3)$

Question 7: (Multiple Choice) Solve the quadratic equation:

$$x^2 - 4x - 5 = 0.$$

(A) 1 and -5
(B) 5 and -1
(C) 1 and 5
(D) -5 and -1

Question 8: (Multiple Choice) Solve for x:

$$\frac{3}{x} = 6.$$

(A) $\frac{1}{2}$
(B) 2
(C) 3
(D) 6

Question 9: (Free Response) Solve the equation:

$$\frac{2x}{3} - \frac{1}{2} = \frac{3}{4}.$$

Provide your answer in simplest form.

Question 10: (Free Response) Simplify the expression:

$$\frac{2}{3}x - \frac{1}{4}(6x - 8).$$

Express your answer in simplest form.

item (Multiple Choice) Simplify the expression:

$$2(3x - 4) - 5(x - 1).$$

(A) $x - 3$
(B) $x - 2$

(C) $2x - 3$

(D) $2x - 2$

Question 11: (Multiple Choice) If

$$x^2 - 4x + 3 = 0,$$

what are the solutions for x?

(A) $x = 1$ and 3

(B) $x = -1$ and -3

(C) $x = 1$ and -3

(D) $x = -1$ and 3

Question 12: (Multiple Choice) Which of the following is the correct expansion of $(x + 2)^2$?

(A) $x^2 + 4$

(B) $x^2 + 4x + 4$

(C) $x^2 + 2x + 4$

(D) $x^2 + 2x$

Question 13: (Free Response) Solve for x:

$$\frac{x}{2} + \frac{x}{3} = 5.$$

Provide your answer in simplest form.

Question 14: (Free Response) Factor completely:

$$4x^2 - 12x + 9.$$

Question 15: (Multiple Choice) Simplify the expression:

$$\frac{x^2 - 9}{x - 3}.$$

(A) $x + 3$

(B) $x - 3$

(C) $\frac{x+3}{2}$

(D) $x^2 - 3$

Question 16: (Multiple Choice) Solve the equation:

$$|2x - 5| = 3.$$

(A) $x = 4$ or $x = 1$

(B) $x = 3$ or $x = 1$

(C) $x = 4$ or $x = 2$

(D) $x = 5$ or $x = 2$

Question 17: (Multiple Choice) Factor the quadratic expression:

$$6x^2 + 11x - 10.$$

(A) $(2x - 1)(3x + 10)$

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

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

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

Question 18: (Free Response) Solve for x:

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

Provide your answer in simplest form.

Question 19: (Free Response) Write the quadratic equation whose solutions are 2 and -3.

Question 20: (Multiple Choice) Solve for x:

$$2(x - 3) = 4x + 2.$$

(A) $x = -2$

(B) $x = -3$

(C) $x = -4$

(D) $x = -5$

Question 21: (Multiple Choice) Solve for x:

$$|3x + 1| = 7.$$

(A) $x = 2$ or $x = -\frac{8}{3}$

(B) $x = -2$ or $x = \frac{8}{3}$

(C) $x = 2$ or $x = \frac{8}{3}$

(D) $x = -2$ or $x = -\frac{8}{3}$

Question 22: (Multiple Choice) Factor completely:

$$6x^2 + 11x - 35.$$

(A) $(2x + 7)(3x - 5)$

(B) $(2x - 7)(3x + 5)$

(C) $(3x + 7)(2x - 5)$

(D) $(3x - 7)(2x + 5)$

Question 23: (Multiple Choice) Solve for x:

$$\frac{2x}{x-3} = 4.$$

(A) $x = 4$

(B) $x = 5$

(C) $x = 6$

(D) $x = 7$

Question 24: (Multiple Choice) Solve the system of equations:

$$\begin{cases} x + 2y = 7, \\ 2x - y = 1. \end{cases}$$

(A) $\left(\frac{9}{5}, \frac{13}{5}\right)$

(B) $\left(\frac{13}{5}, \frac{9}{5}\right)$

(C) $(3, 2)$

(D) $(2, 3)$

Question 25: (Multiple Choice) Expand the expression:

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

(A) $2x^2 + 2x - 12$

(B) $2x^2 - 2x - 12$

(C) $2x^2 + 12x - 12$

(D) $2x^2 - 12x - 12$

Question 26: (Multiple Choice) Solve the quadratic equation:

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

(A) $x = -2$ or $x = -3$

(B) $x = 2$ or $x = 3$

(C) $x = 2$ or $x = -3$

(D) $x = -2$ only

Question 27: (Multiple Choice) Simplify the expression:

$$\frac{3x}{4} - \frac{2x}{3}.$$

(A) $\frac{x}{12}$

(B) $\frac{5x}{12}$

(C) $\frac{x}{6}$

(D) $\frac{5x}{6}$

Question 28: (Free Response) Solve for x:

$$\frac{1}{x} + \frac{1}{x+2} = \frac{3}{4}.$$

Provide your answer in simplest form.

Question 29: (Free Response) Factor completely:

$$x^3 - 27.$$

2 Geometry and Trigonometry

Question 1: (Multiple Choice) Find the area of a rectangle with length 3 and width 4.

(A) 7

(B) 12

(C) 14

(D) 16

Question 2: (Multiple Choice) In a 30°-60°-90° right triangle, if the side opposite the 30° angle is 5, what is the hypotenuse?

(A) 5

(B) 10

(C) $5\sqrt{3}$

(D) $10\sqrt{3}$

Question 3: (Multiple Choice) A circle has a circumference of 10π. What is its area?

(A) 25π

(B) 16π

(C) 50π

(D) 100π

Question 4: (Free Response) Find the slope of the tangent line to the circle

$$x^2 + y^2 = 25$$

at the point $(3, 4)$.

Question 5: (Free Response) In triangle ABC, if $\angle A = 45°$ and $\angle B = 60°$, determine the measure of $\angle C$.

Question 6: (Multiple Choice) The area of a circle is 49π. What is the radius of the circle?

(A) 6

(B) 7

(C) 14

(D) 49

Question 7: (Multiple Choice) In a right triangle, if one angle is 30° and the hypotenuse is 10, what is the length of the side opposite the 30° angle?

(A) 5

(B) $5\sqrt{3}$

(C) 10

(D) $10\sqrt{3}$

Question 8: (Multiple Choice) The vertices of a rectangle are $(1, 2)$, $(1, 5)$, $(4, 2)$, and $(4, 5)$. What is the perimeter of the rectangle?

(A) 9

(B) 12

(C) 14

(D) 18

Question 9: (Multiple Choice) A triangle has angles in the ratio $3 : 4 : 5$. What is the measure of the largest angle?

(A) 60°

(B) 75°

(C) 90°

(D) 105°

Question 10: (Multiple Choice) If $\sin\theta = \frac{1}{2}$ and θ is in the first quadrant, what is θ?

(A) 30°

(B) 45°

(C) 60°

(D) 90°

Question 11: (Multiple Choice) What is the equation of a circle with center $(2, -3)$ and radius 4?

(A) $(x-2)^2 + (y+3)^2 = 16$

(B) $(x+2)^2 + (y-3)^2 = 16$

(C) $(x-2)^2 + (y+3)^2 = 8$

(D) $(x-2)^2 + (y+3)^2 = 8$

Question 12: (Multiple Choice) The length of an arc of a circle with radius r subtended by a central angle θ (in radians) is given by $L = r\theta$. If $L = 5$ and $r = 2$, find θ.

(A) 2.5

(B) 5

(C) 2

(D) 7.5

Question 13: (Multiple Choice) Find the area of a triangle with base 8 and height 5.

(A) 20

(B) 40

(C) 10

(D) 30

Question 14: (Free Response) Find the coordinates of the midpoint of the segment connecting $(3, -2)$ and $(-1, 6)$.

Question 15: (Free Response) Solve for x in the trigonometric equation:

$$\cos x = \frac{\sqrt{2}}{2} \quad \text{for } 0^\circ \leq x < 360^\circ.$$

Provide all solutions.

item (Multiple Choice) The circumference of a circle is 18π. What is its radius?

(A) 9

(B) 6

(C) 3

(D) 18

Question 16: (Multiple Choice) What is the length of the hypotenuse in a right triangle with legs of lengths 3 and 4?

(A) 5

(B) 6

(C) 7

(D) 4

Question 17: (Multiple Choice) Using Heron's formula, approximate the area of a triangle with sides 7, 8, and 9. (Round to the nearest integer.)

(A) 24

(B) 27

(C) 30

(D) 33

Question 18: (Free Response) Determine the equation of the line that passes through the points $(2, 3)$ and $(4, 7)$.

Question 19: (Free Response) Solve the trigonometric equation:

$$\tan x = 1, \quad 0^\circ \leq x < 360^\circ.$$

Provide all solutions.

Question 20: (Multiple Choice) Find the area of a rectangle with length 3 and width 4.

(A) 7

(B) 12

(C) 14

(D) 16

Question 21: (Multiple Choice) In a 30°-60°-90° right triangle, if the side opposite the 30° angle is 5, what is the hypotenuse?

(A) 5

(B) 10

(C) $5\sqrt{3}$

(D) $10\sqrt{3}$

Question 22: (Multiple Choice) A circle has a circumference of 10π. What is its area?

(A) 25π

(B) 16π

(C) 50π

(D) 100π

Question 23: (Free Response) Find the slope of the tangent line to the circle

$$x^2 + y^2 = 25$$

at the point $(3, 4)$.

Question 24: (Free Response) In triangle ABC, if $\angle A = 45°$ and $\angle B = 60°$, determine the measure of $\angle C$.

Question 25: (Multiple Choice) Find the area of a circle with radius 7.

(A) 49π

(B) 14π

(C) 21π

(D) 28π

Question 26: (Multiple Choice) What is the circumference of a circle with diameter 10?

(A) 10π

(B) 5π

(C) 20π

(D) 25π

Question 27: (Multiple Choice) In a 30°-60°-90° triangle, if the side opposite the 30° angle is 6, what is the length of the hypotenuse?

(A) 6

(B) $6\sqrt{3}$

(C) 12

(D) $3\sqrt{3}$

Question 28: (Multiple Choice) An inscribed angle in a circle intercepts an arc of 80°. What is the measure of the inscribed angle?

(A) 40°

(B) 80°

(C) 160°

(D) 20°

Question 29: (Multiple Choice) What is the sine of 45°?

(A) $\frac{\sqrt{2}}{2}$

(B) $\frac{1}{\sqrt{2}}$

(C) $\frac{1}{2}$

(D) $\sqrt{2}$

Question 30: (Multiple Choice) What is the cosine of 60°?

(A) $\frac{1}{2}$

(B) $\frac{\sqrt{3}}{2}$

(C) 1

(D) 0

Question 31: (Multiple Choice) In a right triangle, if one angle is 90° and the legs measure 3 and 4, what is the length of the hypotenuse?

(A) 5

(B) 6

(C) 7

(D) 8

Question 32: (Multiple Choice) A regular hexagon is inscribed in a circle of radius 10. What is the length of one side of the hexagon?

(A) 5

(B) 10

(C) $10\sqrt{2}$

(D) 20

Question 33: (Free Response) In a circle, if a central angle measures $120°$, what is the measure of an inscribed angle intercepting the same arc?

Question 34: (Free Response) In a right triangle, one acute angle measures $37°$ and the side adjacent to this angle is 8. Find the length of the hypotenuse (round your answer to the nearest tenth).

3 Problem Solving and Data Analysis

Question 1: (Multiple Choice) A store sold 120 pencils in one day. If 30% of the pencils were red, how many red pencils were sold?

(A) 36

(B) 30

(C) 24

(D) 40

Question 2: (Multiple Choice) If the mean of 5 numbers is 12, what is the sum of the numbers?

(A) 60

(B) 12

(C) 72

(D) 48

Question 3: (Multiple Choice) A survey found that 40% of students prefer math over science. If 200 students were surveyed, how many prefer math?

(A) 80

(B) 70

(C) 90

(D) 100

Question 4: (Multiple Choice) In a class, the ratio of boys to girls is 3 : 2. If there are 15 boys, how many girls are there?

(A) 5

(B) 8

(C) 10

(D) 12

Question 5: (Multiple Choice) A car travels 150 miles in 3 hours. What is its average speed?

(A) 50 mph

(B) 55 mph

(C) 60 mph

(D) 45 mph

Question 6: (Multiple Choice) The probability of an event is $\frac{3}{8}$. What is the probability that the event does not occur?

(A) $\frac{5}{8}$

(B) $\frac{3}{8}$

(C) $\frac{1}{2}$

(D) $\frac{2}{3}$

Question 7: (Multiple Choice) If a stock's price increases by 20% and then decreases by 20%, what is the overall percent change?

(A) 0%

(B) 4% decrease

(C) 4% increase

(D) 20% increase

Question 8: (Multiple Choice) A rectangle's length is twice its width, and its perimeter is 36. What is the area of the rectangle?

(A) 36

(B) 60

(C) 72

(D) 96

Question 9: (Free Response) A bag contains 5 red, 7 blue, and 8 green marbles. If one marble is selected at random, what is the probability that it is blue? Provide your answer as a simplified fraction.

Question 10: (Free Response) A table shows the number of books read by students: $1, 2, 3, 4, 5$. The frequencies are $2, 5, 7, 3, 1$ respectively. What is the median number of books read?

Question 11: (Multiple Choice) The median of the set $\{3, 7, 8, 12, 15\}$ is:

(A) 7

(B) 8

(C) 10

(D) 12

Question 12: (Multiple Choice) A box contains 3 red, 5 blue, and 2 yellow marbles. What is the probability of drawing a blue marble?

(A) $\frac{1}{2}$

(B) $\frac{5}{10}$

(C) $\frac{5}{3}$

(D) $\frac{5}{2}$

Question 13: (Multiple Choice) A line of best fit for a dataset is given by $y = 2x + 1$. What is the predicted value of y when $x = 4$?

(A) 7

(B) 8

(C) 9

(D) 10

Question 14: (Free Response) A dataset consists of the values $5, 7, 7, 8, 10$. Calculate the mean and standard deviation of the dataset.

Question 15: (Free Response) In a class of 40 students, 18 play soccer, 15 play basketball, and 5 play both sports. How many students play neither sport?

Question 16: (Multiple Choice) A test consists of 50 questions. If a student answers 70% of the questions correctly, how many correct answers do they have?

(A) 30

(B) 35

(C) 40

(D) 45

Question 17: (Multiple Choice) The mode of the dataset $\{2, 3, 3, 4, 5\}$ is:

(A) 2

(B) 3

(C) 4

(D) 5

Question 18: (Multiple Choice) In a bag with 10 marbles numbered 1 through 10, what is the probability of drawing an even number?

(A) $\frac{1}{2}$

(B) $\frac{2}{5}$

(C) $\frac{3}{5}$

(D) $\frac{2}{3}$

Question 19: (Free Response) A dataset consists of the values: $3, 5, 7, 8, 10$. Calculate the range and the interquartile range (IQR) of the dataset.

Question 20: (Free Response) A class of 30 students took a test. The test scores (in percentages) along with their frequencies are given by:

$$70\ (2), \quad 75\ (5), \quad 80\ (10), \quad 85\ (8), \quad 90\ (5).$$

Find the weighted average score.

(Multiple Choice) A store sells notebooks in packs of 5 for \$8. What is the cost of 12 notebooks?

(A) \$19.20

(B) \$19.60

(C) \$19.00

(D) \$20.00

(Multiple Choice) A recipe calls for 3 cups of flour for every 2 cups of sugar. If a baker uses 9 cups of flour, how many cups of sugar are needed?

(A) 4 cups

(B) 5 cups

(C) 6 cups

(D) 7 cups

(Multiple Choice) The probability of drawing a red card from a standard deck is $\frac{1}{2}$. If 8 cards are drawn with replacement, what is the probability of drawing exactly 4 red cards?

(A) $\binom{8}{4}\left(\frac{1}{2}\right)^8$

(B) $\binom{8}{4}\left(\frac{1}{2}\right)^4$

(C) $\binom{8}{4}\left(\frac{1}{2}\right)^5$

(D) $\binom{8}{4}\left(\frac{1}{2}\right)^2$

(Multiple Choice) If a car travels at 60 mph for 2 hours and 30 minutes, how far does it travel?

(A) 120 miles

(B) 135 miles

(C) 150 miles

(D) 180 miles

(Multiple Choice) A store discounts an item by 25% during a sale. If the sale price is \$45, what was the original price?

(A) \$50

(B) \$55

(C) \$60

(D) \$65

(Multiple Choice) In a survey, 60% of respondents said they liked a new product. If 300 people were surveyed, how many did not like the product?

(A) 60

(B) 90

(C) 120

(D) 150

(Multiple Choice) The mean of five numbers is 18. If four of the numbers are 16, 20, 15, and 22, what is the fifth number?

(A) 17

(B) 18

(C) 19

(D) 20

(Multiple Choice) A rectangular garden has a length that is twice its width. If the perimeter is 36 meters, what is the area of the garden?

(A) 36 m^2

(B) 54 m^2

(C) 72 m^2

(D) 81 m^2

(Free Response) A data set contains the following values: $4, 8, 6, 5, 3, 7, 9$. Calculate the median of the data set.

(Free Response) A store's sales over five days were: \$150, \$200, \$175, \$225, and \$250. Find the range and the mean of the sales.

4 Advanced Math

Question 1: (Multiple Choice) Solve for x in the equation:

$$x^2 - 2x - 8 = 0.$$

(A) $x = 2 \pm \sqrt{10}$

(B) $x = 4$ or -2

(C) $x = 3$ or -3

(D) $x = 4$ or -4

Question 2: (Multiple Choice) If $f(x) = 2x^2 - 3x + 1$, what is $f(2)$?

(A) 3

(B) 4

(C) 5

(D) 6

Question 3: (Multiple Choice) Solve for x in the equation:

$$\sqrt{2x + 5} = 3.$$

(A) 1

(B) 2

(C) 3

(D) 4

Question 4: (Multiple Choice) Express $16^{\frac{3}{4}}$ in simplest form.

(A) 4

(B) 6

(C) 8

(D) 16

Question 5: (Multiple Choice) Simplify the expression:

$$\frac{3x^2 - 12}{3}.$$

(A) $x^2 - 4$

(B) $(x - 2)(x + 2)$

(C) $x^2 - 12$

(D) Both (A) and (B)

Question 6: (Multiple Choice) Solve the inequality:

$$2x - 5 < 3.$$

(A) $x < 3$

(B) $x < 4$

(C) $x \leq 4$

(D) $x > 4$

Question 7: (Multiple Choice) The function $g(x) = \frac{1}{x-2}$ has a vertical asymptote at $x = 2$. What is its horizontal asymptote?

(A) $y = 1$

(B) $y = 0$

(C) $y = 2$

(D) $y = -2$

Question 8: (Multiple Choice) Evaluate $\log_2(32)$.

(A) 4

(B) 5

(C) 6

(D) 8

Question 9: (Free Response) Find the inverse of the function:

$$f(x) = \frac{3x - 1}{2}.$$

Express your answer in simplest form.

Question 10: (Free Response) Simplify the expression:

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

Express your answer as a single rational expression.

Question 11: (Multiple Choice) Solve for x:

$$x^2 + 6x + 9 = 0.$$

(A) $x = -3$ (double root)

(B) $x = 3$

(C) $x = 0$

(D) $x = -6$

Question 12: (Multiple Choice) Simplify the expression:

$$(2x^3)^2.$$

(A) $4x^5$
(B) $4x^6$
(C) $2x^5$
(D) $2x^6$

Question 13: (Multiple Choice) If $f(x) = x^2 - 4x + 4$, what is the vertex of the parabola?

(A) $(2, 0)$
(B) $(2, -4)$
(C) $(4, 0)$
(D) $(0, 4)$

Question 14: (Free Response) Determine the derivative of

$$f(x) = 3x^2 - 2x + 1.$$

Question 15: (Free Response) Solve for x in the equation:

$$e^x = 5.$$

Express your answer in terms of natural logarithms.

Question 16: (Multiple Choice) Solve the equation:

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

(A) $x = 3$ (double root)
(B) $x = -3$
(C) $x = 6$
(D) $x = 0$

Question 17: (Multiple Choice) Simplify the expression:

$$(3x^2)^2.$$

(A) $9x^4$
(B) $6x^4$
(C) $9x^2$
(D) $6x^2$

Question 18: (Multiple Choice) For the quadratic function $f(x) = x^2 - 4x + 4$, what is the vertex?

(A) $(2, 0)$

(B) $(2, -4)$

(C) $(4, 0)$

(D) $(0, 4)$

Question 19: (Free Response) Determine the derivative of

$$f(x) = 4x^3 - 2x^2 + x - 5.$$

Question 20: (Free Response) Solve for x in the exponential equation:

$$2^x = 7.$$

Express your answer in terms of logarithms.

Question 21: (Multiple Choice) Solve for x in the equation:

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

(A) $x = 3$ or $x = -\frac{1}{2}$

(B) $x = -3$ or $x = \frac{1}{2}$

(C) $x = \frac{5 \pm \sqrt{41}}{4}$

(D) $x = \frac{5 \pm \sqrt{49}}{4}$

Question 22: (Multiple Choice) Evaluate the logarithm:

$$\log_3(81).$$

(A) 3

(B) 4

(C) 5

(D) 6

Question 23: (Multiple Choice) Which of the following is equivalent to:

$$16^{\frac{3}{4}}?$$

(A) 8

(B) 4

(C) 2

(D) 16

Question 24: (Multiple Choice) Simplify the expression:

$$\frac{2}{3x^{-2}}.$$

(A) $\frac{2x^2}{3}$

(B) $\frac{2}{3x^2}$

(C) $\frac{3x^2}{2}$

(D) $\frac{3}{2x^2}$

Question 25: (Multiple Choice) Find the inverse of the function:

$$f(x) = \frac{2x+3}{5}.$$

(A) $f^{-1}(x) = \frac{5x-3}{2}$

(B) $f^{-1}(x) = \frac{5x+3}{2}$

(C) $f^{-1}(x) = \frac{2x-3}{5}$

(D) $f^{-1}(x) = \frac{2x+3}{5}$

Question 26: (Multiple Choice) Differentiate $f(x) = 3x^3 - 4x + 7$ with respect to x.

(A) $9x^2 - 4$

(B) $9x^2 + 4$

(C) $3x^2 - 4$

(D) $3x^2 + 4$

Question 27: (Multiple Choice) Solve for x in the equation:

$$e^x = 20.$$

(A) $x = \ln 20$

(B) $x = 20$

(C) $x = \ln 2 + \ln 10$

(D) Both (A) and (C)

Question 28: (Multiple Choice) Simplify the expression:

$$\frac{1}{\sqrt{50}}.$$

(A) $\frac{\sqrt{2}}{10}$

(B) $\frac{\sqrt{2}}{5}$

(C) $\frac{5\sqrt{2}}{10}$

(D) $\frac{5\sqrt{2}}{2}$

Question 29: (Free Response) Solve for x in the equation:

$$\log_2(x-1) + \log_2(x+3) = 3.$$

Express your answer in simplest form.

Question 30: (Free Response) Find the second derivative of the function:

$$f(x) = x^4 - 2x^3 + x - 5.$$