SAT MATH PRACTICE TEST 17

Module 1
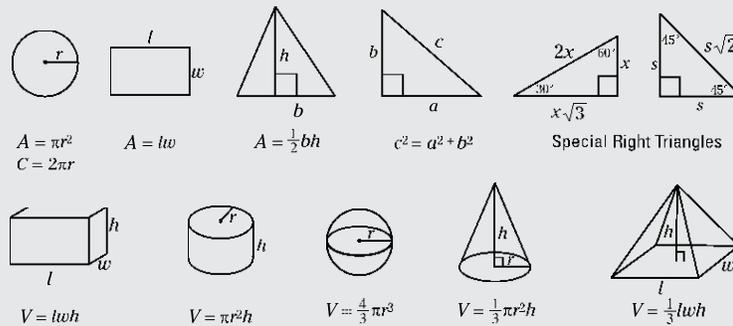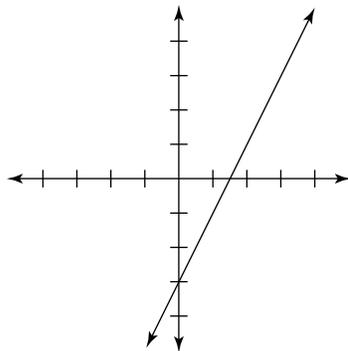
1. Which of the following is the correct equation for this graph?

(A) $y = 2x + 3$

(B) $y = 2x - 3$

(C) $y = 3x + 2$

(D) $y = 3x - 2$

2. If $2x + 5 = 7x - 30$, what is the value of $8 - 3x$?

3. Anna paid \$8,000 for an investment and later sold it for \$11,000. By what percentage did Anna's investment increase in value?

(A) $33\frac{1}{3}\%$

(B) 35%

(C) $37\frac{1}{2}\%$

(D) 40%

$$u = \frac{2v - 3w}{6}$$

4. If this equation is true, what is v in terms of u and w?
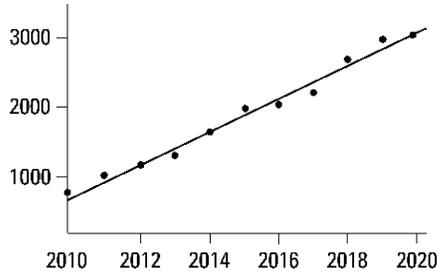
(A) $\dfrac{2u + 3w}{6}$

(B) $\dfrac{2u - 3w}{6}$

(C) $\dfrac{6u + 3w}{2}$

(D) $\dfrac{6u - 3w}{2}$

5. Together, Megan and Andrew sold a total of 63 tickets to their school play. Megan sold 5 fewer than 3 times the number of tickets that Andrew sold. How many tickets did Megan sell?

6. This graph provides data on the number of employees at a company from 2010 to 2020, along with the line of best fit for the data shown. Which of the following is the best approximation for the equation of the line of best fit?

(A) $y = 250x + 400$

(B) $y = 250x + 600$

(C) $y = 600x + 250$

(D) $y = 600x + 400$

7. If data set A includes 25 values and has a median of 50, what is the maximum number of values in that set that could be greater than 80?

(A) 0

(B) 12

(C) 13

(D) 24
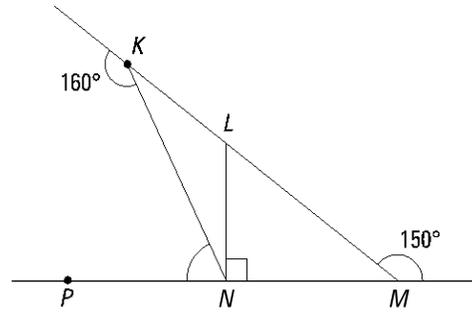
8. In this figure, what is the measure of angle KNP?

(A) $40°$

(B) $50°$

(C) $60°$

(D) $70°$
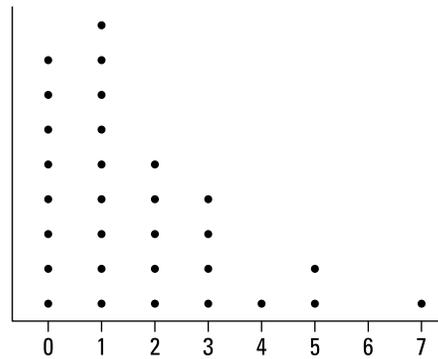
9. Mr. Baldwin asked his 30 students to record the number of siblings they have. This dot plot shows the results. What is the median number of siblings for the class?

(A) 1

(B) 2

(C) 3

(D) 3.5

$$F + V - E = 2$$

10. This formula works for all solids that have F faces, V vertexes, and E edges. If a solid has k faces, $k - 8$ vertices, and $k + 10$ edges, then what does k equal?

11. If $f(x) = \dfrac{x-4}{(x+2)^3}$, what value of x is not in the domain of this function?

(A) -4

(B) -2

(C) 2

(D) 4

12. Dinah sold hats and scarves to earn money for a class ski trip. She made a profit of \$2.75 on each hat and \$3.25 on each scarf. She set herself a quota of selling at least 100 items and a goal of earning a dollar value of at least \$300. Although the number of items that Dinah sold fell short of her quota, her dollar earnings exceeded her goal. If h and s respectively represent the number of hats and scarves that Dinah sold, which system of linear inequalities best represents the results of her effort?

(A) $\begin{array}{l} h+s < 100 \\ 2.75h + 3.25s > 300 \end{array}$

(B) $\begin{array}{l} h+s > 100 \\ 2.75h + 3.25s > 300 \end{array}$

(C) $\begin{array}{l} h+s < 300 \\ 2.75h + 3.25s > 100 \end{array}$

(D) $\begin{array}{l} h+s > 300 \\ 2.75h + 3.25s < 100 \end{array}$

$$-2y \geq -2x + 6$$
$$x + 1 \leq 5$$

13. In the system of linear inequalities shown here, which of the following is true for all values in the solution set?

(A) $y \leq 1$

(B) $y \geq 1$

(C) $y \leq -1$

(D) $y \geq -1$

14. A team of 3 servers can set 10 tables in 8 minutes. Assuming that all of the servers work at the same rate, how long will it take 2 servers to set 20 tables?

(A) 24 minutes

(B) 25 minutes

(C) 48 minutes

(D) 50 minutes

15. If a triangle includes an angle θ such that $\cos\theta = \dfrac{\sqrt{446}}{5\ 446}$, what is the value of $\tan\theta$?

x	$y = f(x)$
$2n$	6
$4n$	12
$6n$	18
$8n$	24

16. This table shows four input and output values for the linear function $f(x)$. What is the value of $f(3)$?

(A) $3n$

(B) $9n$

(C) $\dfrac{3}{n}$

(D) $\dfrac{9}{n}$

$$(x-2)^2 + (y-3)^2 = 9$$

17. If this equation defines the graph of a circle on the xy-plane that intersects the x-axis at the point $(p, 0)$, what is the value of p?
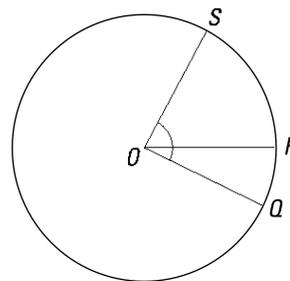
18. This circle has a radius of 3 units. If the arc length of QR is $\dfrac{5\pi}{12}$ and the measure of angle ROS is $\dfrac{5\pi}{12}$ radians, then what is the measure of angle QOS in degrees? Omit the degree symbol (°) when recording your answer.

19. $m^2 m^{-\frac{1}{2}} = n$

What is the value of m in terms of n in this equation?

(A) $\sqrt{n^3}$

(B) $\sqrt[3]{n^2}$

(C) $\dfrac{1}{\sqrt{n^3}}$

(D) $\dfrac{1}{\sqrt[3]{n^2}}$

$$\frac{2x^2 - 8y^2}{x^2 - 7xy - 18y^2}$$

20. Which of the following is equivalent to this expression?

(A) $\dfrac{2(x+2y)}{x+9y}$

(B) $\dfrac{2(x-2y)}{x+9y}$

(C) $\dfrac{2(x+2y)}{x-9y}$

(D) $\dfrac{2(x-2y)}{x-9y}$

Questions 21 and 22 refer to the following information about $f(x)$ and $g(x)$.

x	$f(x)$
0	1
1	2
2	4
3	0
4	3

$$g(x) = x - x^{-1}$$

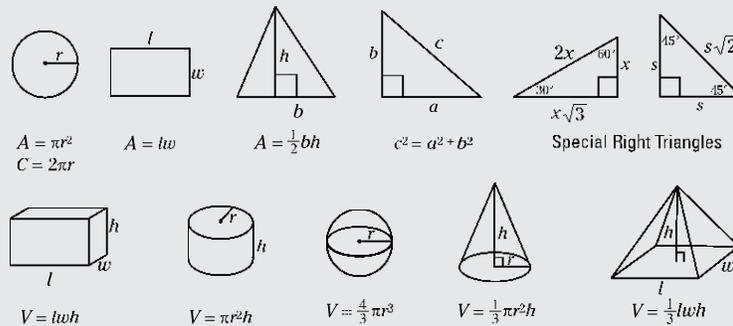**21.** What is the value of $g(f^{-1}(4))$, given that $f^{-1}(x)$ is the inverse of $f(x)$?

22. If the equation $f(3) = g(m)$ is true for some value of $m > 0$, what is the value of m?

Module 2

1. Jessica is a server in a large restaurant who can set a table with 4 place settings in 2 minutes. At this rate, how long would it take Jessica to set up 5 tables that each have 6 place settings?

(A) 7 minutes and 30 seconds

(B) 10 minutes

(C) 12 minutes

(D) 15 minutes

2. Aaron wants to bake cupcakes using a recipe that calls for $2\frac{1}{2}$ cups of flour to bake 12 cupcakes. If he uses $12\frac{1}{2}$ cups of flour, how many cupcakes can he make?

(A) 30

(B) 36

(C) 48

(D) 60
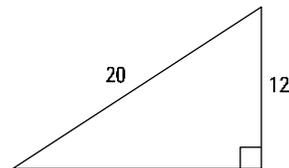
3. The right triangle shown here has one leg of length 12 units and a hypotenuse of length 20 units. What is the area of this triangle in square units?

(A) 96

(B) 120

(C) 192

(D) 240

4. Alistair regularly exercises by walking up the stairs to his apartment rather than taking the elevator. Typically, he walks up 193 steps, starting in the parking garage, which is below ground level, and ending on the floor where his apartment is located. There are 31 steps from the parking garage to the first floor, and after that, Alistair walks up x flights of stairs, each of which has k steps. Which of the following equations best models the number of steps that Alistair walks?

(A) $k + x + 31 = 193$

(B) $kx + 31 = 193$

(C) $31k + x = 193$

(D) $31x + k = 193$

5. If $n = 5$, what is the sum of $n^2 - 10$ and $2n - 3$?

$$x^3 + 32 = -32$$

6. Which of the following is the complete solution set for the equation shown here?

(A) $\{4\}$

(B) $\{-4\}$

(C) $\{-4, 4\}$

(D) The equation has no solutions.

x	f(x)
2	12
3	30
4	84
5	246

7. This table shows four values for the exponential function $f(x) = 3^x + j$. What is the value of j?

(A) 3

(B) 4

(C) 5

(D) 6

8. If $x \geq 0$, for what value of x is $|-7x + 3| + 4$ equal to 15?

9. Raymond owns shares in a stock that are currently worth $10,800. If this amount includes a 35% profit over what he paid for the shares last year, what was the purchase price of the shares?

(A) $7,020

(B) $7,450

(C) $7,680

(D) $8,000

$$f(x) = 3x^2 - 18x + 1$$

10. If this function has a vertex at (h, k), then $k =$

(A) -28

(B) -26

(C) 26

(D) 28

11. If $n^2 - p^2 = 40$ and $n + p = 5$, then $n - p =$

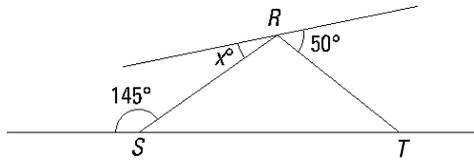(A) 8

(B) 35

(C) 45

(D) 200

12. If $\sqrt{x + 5} + 1 = x$, then the complete solution set for x is

(A) $\{-1\}$

(B) $\{4\}$

(C) $\{-1, 4\}$

(D) The equation has no solutions.

$$\frac{3x + 3}{x^2 + 3x + 2}$$

13. Which of the following is equivalent to the expression shown here?

(A) $\dfrac{3}{x + 1}$

(B) $\dfrac{3}{x + 2}$

(C) $\dfrac{3}{x^2 + 1}$

(D) $\dfrac{3}{x^2 + 2}$

14. In this figure, the length of RS is equivalent to the length of RT. What is the value of x?

(A) 15

(B) 20

(C) 25

(D) 30

$$3x + 4y = 17.3$$
$$-x + 5y = 6.9$$

15. What is the value of x in this system of linear equations?

(A) 2.9

(B) 3.1

(C) 3.4

(D) 3.8

$$\frac{2a}{5b} = \frac{1}{4}$$

16. Given this equation, what does $10a - 5b$ equal?

(A) a

(B) $2a$

(C) $3a$

(D) $4a$

d	$P(d)$
1	36
2	43
3	52
4	62

17. Evan currently does 30 pushups every day. He set a goal of increasing the number of pushups by 20% every day for the next 15 days, using the equation $P(d) = 30(k)^d$ to calculate his goal for any day d, rounding to the nearest whole pushup for each day. This chart shows Evan's goal for the first four days of his challenge. Assuming he is successful, how many pushups will he do on the 15th day?
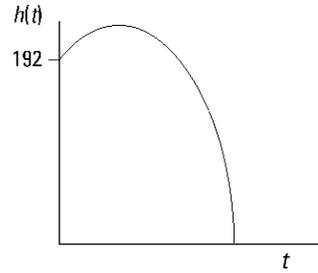
18. This graph shows the height of a rubber ball t seconds after release after having been thrown upward from a 192-foot-high platform at a velocity of 64 feet per second. The equation for this function is $h(t) = -16t^2 + 64t + 192$. How many seconds after release did the ball hit the ground?

(A) 2 seconds

(B) 6 seconds

(C) 8 seconds

(D)   12 seconds

19. The value of a stock is projected to increase in the next 6 months according to the function $f(x) = 448(1.015)^x$, where $x \leq 6$ is the number of months from now. If this model is correct, approximately how much will the value of the stock increase from month 3 to month 6?

(A) \$19

(B) \$21

(C) \$23

(D) \$25

$$(2x - 5)(x + n) = 2x^2 - kx + 30$$

20. If this equation is true for all values of x, then $k + n =$

21. If $g(x)$ is a transformation of $f(x) = 2x^3$ that moves the inflection point of $f(x)$ from (0, 0) to (−1, 3), then $g(x) =$

(A) $2x^3 + 6x^2 + 6x - 1$

(B) $2x^3 + 6x^2 + 6x + 1$

(C) $2x^3 - 6x^2 - 6x - 5$

(D) $2x^3 + 6x^2 + 6x - 5$
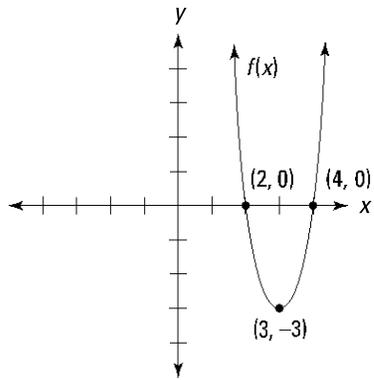
22. In this figure, the function $f(x) = u(x-u)^2 - u$ has roots at $x = 2$ and $x = 4$. If $v = u + 1$ and $g(x) = v(x-v)^2 - v$, then the roots of $g(x)$ are at

(A) $x = 1$ and $x = 3$

(B) $x = 3$ and $x = 5$

(C) $x = 1$ and $x = 5$

(D) $x = 2$ and $x = 6$

Answers and Explanations for Practice SAT Math Test 17

Module 1

1. **B.** $y = 2x - 3$. The graph is a linear function, so its equation is $y = mx + b$. It has a slope of $m = 2$ and a y-intercept of $b = -3$, so Answer B is correct.

2. **−13.** Begin by solving the equation for x:

$$2x + 5 = 7x - 30$$
$$5 = 5x - 30$$
$$35 = 5x$$
$$7 = x$$

   Now, substitute 7 for x into the expression $8 - 3x$:

$$8 - 3(7) = 8 - 21 = -13$$

3. **C. $37\frac{1}{2}$%.** Anna's investment increased by $\$11,000 - \$8,000 = \$3,000$. To find the percent increase, begin by changing the fraction $\frac{3,000}{8,000}$ to a decimal by dividing:

$$3,000 \div 8,000 = 0.375$$

Now, change this decimal to a percent by moving the decimal point two places to the right and attaching a percent sign:

$$0.375 = 37.5\% = 37\frac{1}{2}\%$$

Therefore, Answer C is correct.

4. C. $\dfrac{6u + 3w}{2}$. To isolate the variable v, begin by multiplying both sides of the equation by 6:

$$u = \frac{2v - 3w}{6}$$
$$6u = 2v - 3w$$

Next, add $3w$ to both sides:

$$6u + 3w = 2v$$

Complete the problem by dividing both sides by 2:

$$\frac{6u + 3w}{2} = v$$

Therefore, Answer C is correct.

5. 46. To begin, let a equal the number of tickets that Andrew sold. Megan sold 5 fewer than 3 times the number of tickets that Andrew sold, so the number of tickets Megan sold is $3a - 5$. Together, Megan and Andrew sold 63 tickets, so you can make the following equation:

$$a + 3a - 5 = 63$$

Simplify and solve for a:

$$4a - 5 = 63$$
$$4a = 68$$
$$a = 17$$

Thus, Andrew sold 17 tickets, so Megan sold $63 - 17 = 46$ tickets, and so the answer is 46.

6. B. $y = 250x + 600$. The line of best fit crosses the graph at approximately 600, so this is the y-intercept b for the function. It also rises by about 250 every year, so this is the slope m. Thus, the function that approximates the line of best fit is:

$$y = mx + b = 250x + 600$$

Therefore, Answer B is correct.

7. B. 12. To find the median of a data set with 25 values, arrange these values left to right from least to greatest:

X X X X X X X X X X X X 50 X X X X X X X X X X X X

If the median of this data set is 50, then the middle value equals 50, and all 12 values to the left of this are less than or equal to 50. Thus, no more than 12 values in this data set could be greater than 80, so Answer B is correct.

8. B. 50°. Angle LMN forms a linear pair with the $150°$ angle, so $LMN = 30°$. Angle MNL is a right angle, so it's $90°$. The sum of the three angles of triangle MNL is $180°$. Thus, $NLM = 180° - 30° - 90° = 60°$. Angle NLM forms a linear pair with angle KLN, so $KLN = 120°$. Angle NKL forms a linear pair with the $160°$ angle, so $KLN = 20°$. The sum of the three angles of triangle KLN is $180°$. Thus, $LNK = 180° - 120° - 20° = 40°$. Therefore, $KNP = 50°$, so Answer B is correct.

9. A. 1. According to the dot plot, here are the number of siblings that each of the 30 students reported, in order from least to greatest:

0 0 0 0 0 0 0 0 1 1 1 1 1 1 **1 1** 1 2 2 2 2 2 3 3 3 3 4 5 5 7

The two middle numbers, 1 and 1, are bolded. The average of these two values is also 1, so the median number of siblings among classmates is 1. Thus, Answer A is correct.

10. 20. Plug in k for F, $k-8$ for V, and $k+10$ for E into the formula $F+V-E=2$:

$$F+V-E=2$$
$$k+(k-8)-(k+10)=2$$
$$k+k-8-k-10=2$$
$$k-18=2$$
$$k=20$$

Therefore, the correct answer is 20.

11. B. −2. When x equals a value such that the denominator of the rational expression $\dfrac{x-4}{(x+2)^3}$ equals 0, this x value is left out of the denominator. To find such values, solve the following equation:

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

Thus, the value -2 is not in the domain, so Answer B is correct.

12. A. $\begin{array}{l} h+s<100 \\ 2.75h+3.25s>300 \end{array}$. The expression $h+s$ represents the number of hats and scarves that Dinah sold. This number was fewer than 100, so $h+s<100$. The expression $2.75h+3.25s$ represents the dollar value that Dinah earned on hat and scarf scales. This value was greater than 300, so $2.75h+3.25s>300$. Therefore, Answer A is correct.

13. A. $y \le 1$. To isolate y in the first inequality, divide both sides by -1, flipping the inequality sign from $\ge$ to $\le$, and then simplify:

$$\frac{-2y}{-2} \le \frac{-2x+6}{-2}$$
$$y \le x-3$$

Next, to make the left side of the second inequality equal to $x-3$, subtract 4 from both sides of the second inequality:

$$x+1 \le 5$$
$$x-3 \le 1$$

Now, the two inequalities both have $\le$, so you can arrange them as follows:

$$y \le x-3 \le 1$$

This inequality implies $y \le 1$, so Answer A is correct.

14. A. 24 minutes. A team of 3 servers can set 10 tables in 8 minutes, so the same team can set 20 tables in $8 \times 2 = 16$ minutes. Thus, only 1 server would take $16 \times 3 = 48$ minutes to set 20 tables. Thus, 2 servers would take $48 \div 2 = 24$ minutes to set 20 tables, so Answer A is correct.

15. $\dfrac{11}{5}$ **or 5.5.** The value $\dfrac{5\sqrt{146}}{146}$ is the rationalized form of $\dfrac{5}{\sqrt{146}}$ because:

$$\frac{5}{\sqrt{146}} = \frac{5}{\sqrt{146}} \cdot \frac{\sqrt{146}}{\sqrt{146}} = \frac{5\sqrt{146}}{146}$$

Thus, $\cos\theta = \dfrac{5}{\sqrt{146}}$, so the adjacent side and hypotenuse of this triangle are in a ratio of $5:\sqrt{146}$. Thus, you can use the Pythagorean Theorem to calculate the relative length of the opposite side of the triangle as follows:

$$a^2 + b^2 = c^2$$
$$5^2 + b^2 = \sqrt{146}^2$$
$$25 + b^2 = 146$$
$$b^2 = 121$$
$$b = 11$$

Thus, the opposite and adjacent sides of the triangle are in a ratio of $11:5$, so

$$\tan\theta = \frac{11}{5} = 5.5$$

Therefore, the correct answer is $\dfrac{11}{5}$ or 5.5.

16. D. $\dfrac{9}{n}$**.** The function $f(x)$ is linear, so use $f(x) = y = mx + b$. To find m, use the slope formula $m = \dfrac{y_2 - y_1}{x_2 - x_1}$ with any two x and y values from the table:

$$m = \frac{12 - 6}{4n - 2n} = \frac{6}{2n} = \frac{3}{n}$$

Thus, $y = \dfrac{3}{n}x + b$. Now, plug in $2n$ for x and 6 for y, and solve for b:

$$6 = \frac{3}{n}(2n) + b$$
$$6 = 6 + b$$
$$0 = b$$

Thus, $f(x) = \dfrac{3}{n}x$, so:

$$f(3) = \frac{3}{n}(3) = \frac{9}{n}$$

Therefore, Answer D is correct.

17. 2. The equation $(x - h)^2 + (y - k)^2 = r^2$ defines a circle whose center is at (h, k) with a radius of r. Thus, the equation $(x - 2)^2 + (y - 3)^2 = 9$ defines a circle whose center is at $(2, 3)$ with a radius of 3. This circle intersects the x-axis at $(2, 0)$, so $p = 2$. Therefore, the correct answer is 2.

18. 100. The measure of angle ROS is $\dfrac{5\pi}{12}$ radians. Convert this value into degrees as follows:

$$\frac{5\pi}{12} \times \frac{180°}{\pi} = 75°$$

The arc length of QR is $\dfrac{5\pi}{12}$ and the circle has a radius of 3 units. Substitute this information into the formula for arc length and substitute θ for the measure of angle QR in radians, then solve for θ:

$$\text{Arc length} = \text{Radius} \times \text{Radians}$$

$$\frac{5\pi}{12} = 3 \times \theta$$

$$\frac{5\pi}{36} = \theta$$

Convert $\dfrac{5\pi}{36}$ to degrees:

$$\frac{5\pi}{36} \times \frac{180°}{\pi} = 25°$$

Thus, $QOS = 25° + 75° = 100°$, so the correct answer is 100.

19. B. $m = \sqrt[3]{n^2}$. To solve the equation $m^2 m^{-\frac{1}{2}} = n$ for m in terms of n, begin by combining the two exponents of m by adding them:

$$m^{\frac{3}{2}} = n$$

Next, remove this exponent of m using the reciprocal exponent:

$$\left(m^{\frac{3}{2}}\right)^{\frac{2}{3}} = n^{\frac{2}{3}}$$

Simplifying the left side of the equation cancels out the exponents, because $\dfrac{3}{2} \times \dfrac{2}{3} = 1$:

$$m = n^{\frac{2}{3}}$$

To complete the problem, rewrite the right side using radical notation:

$$m = \sqrt[3]{n^2}$$

Therefore, Answer B is correct.

20. D. $\dfrac{2(x - 2y)}{x - 9y}$. First, factor the polynomial in the numerator of $\dfrac{2x^2 - 8y^2}{x^2 - 7xy - 18y^2}$, using GCF and then difference-of-squares factoring:

$$\frac{2x^2 - 8y^2}{x^2 - 7xy - 18y^2} = \frac{2(x^2 - 4y^2)}{x^2 - 7xy - 18y^2} = \frac{2(x + 2y)(x - 2y)}{x^2 - 7xy - 18y^2}$$

Next, factor the quadratic polynomial in the denominator:

$$= \frac{2(x + 2y)(x - 2y)}{(x + 2y)(x - 9y)}$$

Now, cancel a factor of $x + 2y$ in both the numerator and denominator:

$$= \frac{2(x - 2y)}{x - 9y}$$

Therefore, Answer D is correct.

21. $\dfrac{3}{2}$ **or 1.5.** The function $f^{-1}(x)$ is the inverse of $f(x)$, so it accepts an input $f(x)$ and outputs x. Thus, $f^{-1}(4) = 2$. Next, substitute 2 for $f^{-1}(4)$ into the expression $g(f^{-1}(4))$:

$$g(f^{-1}(4)) = g(2)$$

Now, use $g(x) = x - x^{-1}$ to find $g(2)$:

$$g(2) = 2 - 2^{-1} = 2 - \frac{1}{2} = \frac{3}{2}$$

Therefore, the correct answer is $\dfrac{3}{2}$ or 1.5.

22. **1.** To begin, use the table to evaluate $f(3)$:

$$f(3) = 0$$

Thus, you're looking for a positive value of m such that

$$g(m) = 0$$

Now, use $g(x) = x - x^{-1}$ to evaluate $g(m)$:

$$g(m) = m - m^{-1}$$

Set this expression equal to 0 and solve for m:

$$m - m^{-1} = 0$$
$$m - \frac{1}{m} = 0$$
$$m = \frac{1}{m}$$
$$m^2 = 1$$
$$m = \pm\sqrt{1}$$
$$m = \pm 1$$

Therefore, the correct answer is 1.

Module 2

1. **D. 15 minutes.** Jessica can set 4 place settings in 2 minutes, so she can set 2 place settings per minute. In order to set 5 tables that each have 6 place settings, she needs to set $5 \times 6 = 30$ place settings. Thus, she can complete this task in $30 \div 2 = 15$ minutes, so Answer D is correct.

2. **D. 60.** Make a proportional equation using the information in the problem. For convenience, use the decimal values of the fractions given:

$$\frac{2.5}{12} = \frac{12.5}{x}$$

Solve for x by cross-multiplying and then dividing both sides by 2.5:

$$2.5x = 150$$
$$\frac{2.5x}{2.5} = \frac{150}{2.5}$$
$$x = 60$$

Therefore, Answer D is correct.

3. A. 96. The right triangle has a short leg of 12 and a hypotenuse of 20, so it's a 3-4-5 right triangle multiplied by a factor of 4. Thus, its long leg is 16. You can verify this using the Pythagorean Theorem:

$$12^2 + 16^2 = 20^2$$
$$144 + 256 = 400$$

Thus, the base and height of this triangle are 16 and 12, respectively. Plug these values into the formula for the area of a triangle:

$$A = \frac{1}{2}bh = \frac{1}{2}(16)(12) = 96$$

Therefore, Answer A is correct.

4. B. $kx + 31 = 193$. To find the number of steps, begin by multiplying the number of flights of stairs (x) by the number of steps in each flight (k), and then add the number of steps from the parking garage to the first floor (31). Therefore, Answer B is correct.

5. 22. Make a single expression that is the sum of $n^2 - 10$ and $2n - 3$:

$$n^2 - 10 + 2n - 3$$

Substitute 5 for n into this expression and evaluate:

$$= 5^2 - 10 + 2(5) - 3 = 25 - 10 + 10 - 3 = 22$$

Therefore, the correct answer is 22.

6. B. {−4}. Solve the equation by subtracting 32 from both sides, and then taking the cube root of the result:

$$x^3 + 32 = -32$$
$$x^3 = -64$$
$$\sqrt[3]{x^3} = \sqrt[3]{-64}$$
$$x = -4$$

This is the only solution to the equation, so Answer B is correct.

7. A. 3. To find the value of j, plug in any coordinate pair in the table into the function. For example, here's the result when you plug in the coordinate pair (2, 12):

$$f(x) = 3^x + j$$
$$12 = 3^2 + j$$
$$12 = 9 + j$$
$$3 = j$$

Therefore, Answer A is correct.

8. 2. To begin, set up the following equation:

$$|-7x + 3| + 4 = 15$$

Next, subtract 4 from both sides:

$$|-7x + 3| = 11$$

Now, break the equation into two equations and solve separately:

$$-7x + 3 = 11 \qquad\qquad -7x + 3 = -11$$
$$-7x = 8 \qquad\qquad\qquad -7x = -14$$
$$x = -\frac{8}{7} \qquad\qquad\qquad x = 2$$

Because $x \geq 0$, the correct answer is 2.

9. **D. \$8,000.** Let x be the purchase price of the shares in dollars. Then 135% of x equals 10,800, so:

$$1.35x = 10,800$$

Solve by dividing each side by 1.35:

$$\frac{1.35x}{1.35} = \frac{10,800}{1.35}$$
$$x = 8,000$$

Thus, Raymond paid \$8,000, so Answer D is correct.

10. **B. –26.** To find the axis of symmetry, use $x = -\frac{b}{2a}$, substituting 3 for a and -18 for b:

$$x = -\frac{-18}{2(3)} = 3$$

Thus, 3 is also the x-value of the vertex, so $h = 3$. To find k, substitute 3 for x into the function $f(x) = 3x^2 - 18x + 1$ and solve for $f(x)$:

$$f(x) = 3(3)^2 - 18(3) + 1 = 27 - 54 + 1 = -26$$

Therefore, Answer B is correct.

11. **A. 8.** You can factor $n^2 - p^2$ as follows:

$$n^2 - p^2 = (n + p)(n - p)$$

Now, plug in 40 for $n^2 - p^2$ and 5 for $n + p$:

$$40 = 5(n - p)$$

Next, divide both sides by 8:

$$8 = n - p$$

Therefore, Answer A is correct.

12. **B. {4}.** The four answers offer two possible solutions, so begin by plugging -1 into the equation $\sqrt{x + 5} + 1 = x$ and solving:

$$\sqrt{-1 + 5} + 1 = -1$$
$$\sqrt{4} + 1 = -1$$
$$2 + 1 = -1$$
$$3 = -1 \qquad \text{WRONG!}$$

This equation is incorrect, so −1 isn't part of the solution set, which rules out Answers A and C. Next, try plugging in 4 for x:

$$\sqrt{4+5}+1=4$$
$$\sqrt{9}+1=4$$
$$3+1=4$$
$$4=4$$

This equation is correct, so 4 is in the solution set. Thus, Answer B is correct.

13. **B.** $\dfrac{3}{x+2}$. To begin, factor out a GCF of 3 in the numerator, and factor the quadratic in the denominator into two binomials:

$$\frac{3x+3}{x^2+3x+2}=\frac{3(x+1)}{(x+1)(x+2)}$$

Now, cancel a factor of $x+1$ in the numerator and denominator:

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

Therefore, Answer B is correct.

14. **B. 20.** The $145°$ angle and angle RST are a linear pair, so the measure of angle RST is $35°$. The length of RS equals that of RT, so triangle RST is isosceles. Thus, the two lower angles of the triangle are equal, so angle STR also measures $35°$. The sum of three angles in a triangle is $180°$, so angle TRS measures $180-35-35=110$. So, you can solve the following equation to find x:

$$x+110+50=180$$
$$x+160=180$$
$$x=20$$

Therefore, Answer B is correct.

15. **B. 3.1.** To begin, multiply the second equation by 3:

$$3x+4y=17.3$$
$$-3x+15y=20.7$$

Next, add the two equations together and solve for y:

$$19y=38$$
$$y=2$$

Plug in 2 for y into the second equation and solve for x:

$$-x+5(2)=6.9$$
$$-x+10=6.9$$
$$-x=-3.1$$
$$x=3.1$$

Therefore, Answer B is correct.

16. B. $2a$. Cross-multiply the equation to get rid of the fractions:

$$\frac{2a}{5b} = \frac{1}{4}$$
$$8a = 5b$$

Next, subtract $5b$ over to the left side of the equation:

$$8a - 5b = 0$$

To change the left side of the equation to $10a - 5b$, add $2a$ to both sides of the equation:

$$10a - 5b = 2a$$

Therefore, Answer B is correct.

17. 462. An increase of 20% implies a factor of $120\% = 1.2$, so $k = 1.2$ in the function $P(d) = 30(k)^d$. So, use the following function:

$$P(d) = 30(1.2)^d$$

Now, calculate $P(15)$:

$$P(15) = 30(1.2)^{15} \approx 462$$

Therefore, the correct answer is 462.

18. B. 6 seconds. When the ball hits the ground, t is a positive number corresponding to one of the roots of the function. To find this value, set $h(t) = -16t^2 + 64t + 192$ equal to 0:

$$0 = -16t^2 + 64t + 192$$

Divide the equation by -16:

$$0 = t^2 - 4t - 12$$

Factor the right side of the equation:

$$0 = (t + 2)(t - 6)$$

Split this equation into two separate equations and solve for t:

$$0 = t + 2 \qquad\qquad 0 = t - 6$$
$$-2 = t \qquad\qquad 6 = t$$

The positive root 6 corresponds to the time when the ball hits the ground, so Answer B is correct.

19. B. $21. Find the values of the function at both 3 and 6:

$$f(3) = 448(1.015)^3 \approx 468.46 \qquad\qquad f(6) = 448(1.015)^6 \approx 489.86$$

Now subtract the lesser value from the greater one:

$$489.86 - 468.46 = 21.40$$

Therefore, Answer B is correct.

20. 11. Begin by simplifying the left side of the equation:

$$(2x - 5)(x + n) = 2x^2 - kx + 30$$
$$(2x - 5)(x + n) = 2x^2 - kx + 30$$
$$2x^2 + 2nx - 5x - 5n = 2x^2 - kx + 30$$

This equation is true for all values of x, so the constant terms $-5n$ and 30 are equivalent. Thus:

$$-5n = 30$$
$$n = -6$$

Plug this value back into the equation and simplify:

$$2x^2 + 2(-6)x - 5x - 5(-6) = 2x^2 - kx + 30$$
$$2x^2 - 12x - 5x + 30 = 2x^2 - kx + 30$$
$$2x^2 - 17\mathbf{x} + 30 = 2x^2 - kx + 30$$
$$-17x = -kx$$
$$17 = k$$

Therefore, $k + n = 17 + (-6) = 11$, so the correct answer is 11.

21. C. $2x^3 + 6x^2 + 6x + 5$. The graph of $g(x)$ transforms $f(x) = 2x^3$ by moving it left 1 unit and up 3 units. Thus:

$$g(x) = f(x + 1) + 3 = 2(x + 1)^3 + 3$$

To complete the problem, simplify the resulting function:

$$= 2(x + 1)(x + 1)(x + 1)^3 + 3$$
$$= 2(x^2 + 2x + 1)(x + 1) + 3$$
$$= 2(x^3 + 3x^2 + 3x + 1) + 3$$
$$= 2x^3 + 6x^2 + 6x + 2 + 3$$
$$= 2x^3 + 6x^2 + 6x + 5$$

Therefore, Answer C is correct.

22. B. $x = 3$ and $x = 5$. The function $f(x) = U(x - U)^2 - U$ is in vertex form, which is $f(x) = a(x - h)^2 + k$. Its vertex is at $(h, k) = (3, -3)$, with a stretch factor of $a = 3$, so $U = 3$. Thus, $V = U + 1 = 4$, so $g(x) = 4(x - 4)^2 - 4$. The vertex of this function is $(h, k) = (4, -4)$, and its vertical stretch factor a is also 4, so if you graph this function, you can find the roots at $x = 3$ and $x = 5$, as shown in this figure:
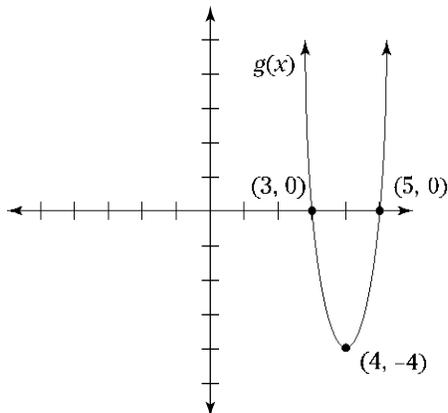
Another way to solve this problem is to change $g(x) = 4(x-4)^2 - 4$ to standard form as follows:

$$g(x) = 4(x^2 - 8x + 16) - 4$$
$$= 4x^2 - 32x + 64 - 4$$
$$= 4x^2 - 32x + 60$$

Next, set this equation to 0 and factor to solve for x:

$$4x^2 - 32x + 60 = 0$$
$$x^2 - 8x + 15 = 0$$
$$(x-3)(x-5) = 0$$

So the roots of this equation are at $x = 3$ and $x = 3$. Therefore, Answer B is correct.