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Mathematics

HiSET® Exam Free Practice Test FPT – 7

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Formula Sheet

Perimeter / Circumference

Rectangle

$Perimeter = 2(length) + 2(width)$

Circle

$Circumference = 2\pi(radius)$

Area

Circle

$Area = \pi(radius)^2$

Triangle

$Area = \frac{1}{2}(base)(height)$

Parallelogram

$Area = (base)(height)$

Trapezoid

$Area = \frac{1}{2}(base_1 + base_2)(height)$

Volume

Prism/Cylinder

$Volume = (area\ of\ the\ base)(height)$

Pyramid/Cone

$Volume = \frac{1}{3}(area\ of\ the\ base)(height)$

Sphere

$Volume = \frac{4}{3}\pi(radius)^3$

Length

1 foot = 12 inches

1 yard = 3 feet

1 mile = 5,280 feet

1 meter = 1,000 millimeters

1 meter = 100 centimeters

1 kilometer = 1,000 meters

1 mile ≈ 1.6 kilometers

1 inch = 2.54 centimeters

1 foot ≈ 0.3 meter

Capacity / Volume

1 cup = 8 fluid ounces

1 pint = 2 cups

1 quart = 2 pints

1 gallon = 4 quarts

1 gallon = 231 cubic inches

1 liter = 1,000 milliliters

1 liter ≈ 0.264 gallon

Weight

1 pound = 16 ounces

1 ton = 2,000 pounds

1 gram = 1,000 milligrams

1 kilogram = 1,000 grams

1 kilogram ≈ 2.2 pounds

1 ounce ≈ 28.3 grams

Mathematics

Directions

Time – 45 minutes

25 Questions

This is a test of your skills in applying mathematical concepts and solving mathematical problems. Read each question carefully and decide which of the five alternatives best answers the question. Then mark your choice on your answer sheet.

There are relatively easy problems scattered throughout the test. Thus, do not waste time on problems that are too difficult; go on, and return to them if you have time.

Work as quickly as you can without becoming careless. Try to answer every question even if you have to guess.

Mark all your answers on the answer sheet. Give only one answer to each question.

If you decide to change one of your answers, be sure to erase the first mark completely.

Be sure that the number of the question you are answering matches the number of the row of answer choices you are marking on your answer sheet. The answer sheet may contain more rows than you need.

1

What are the zeros of the function $f(x) = x^2 + 2x - 24$?

A. -8 and 3

B. -6 and 4

C. -4 and 6

D. -3 and 8

E. -2 and 24

2

What is the sum of $5x^2 + 3x - 7$ and $12x + 12$?

A. $5x^2 + 15x + 5$

B. $5x^2 + 15x + 19$

C. $17x^2 + 3x + 5$

D. $17x^2 + 15x + 12$

E. $20x^4 + 5$

3

Aisha has \$100 saved from her job. She wants to buy as many charms for her bracelet, at \$4 each and earrings at \$5 per set, as she can without spending all of her money. The inequality represents her spending, where x is the number of charms and y is the number of sets of earrings.

$$4x + 5y < 100$$

Which ordered pair (x, y) represents a combination of charms and earrings Aisha can buy?

A. $(16, 8)$

B. $(15, 8)$

C. $(9, 13)$

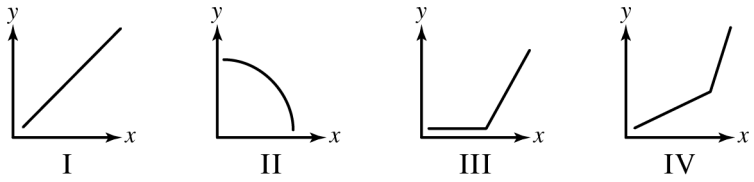
D. $(6, 15)$

E. $(5, 16)$

GO ON

4

Which of the following graphs represents the relationship between x and y if y always increases as x increases?



A. I and IV only

B. I and III only

C. III and IV only

D. I, III, and IV only

E. I, II, III, and IV

5

A restaurant is at 75 percent capacity with 120 patrons. How many people are in the restaurant when it is at 100 percent capacity?

A. 90

B. 120

C. 160

D. 200

E. 280

6

Several students are going to ride their bikes from the city park to Lake Kegonsa, a distance of 25 miles. They will ride at an average rate of 10 miles per hour. What is the latest time they can leave the park in order to arrive at the lake by 11 A.M.?

A. 7:30 A.M.

B. 8:00 A.M.

C. 8:30 A.M.

D. 9:00 A.M.

E. 9:30 A.M.

7

Ms. Lund placed a 7-foot ladder against a wall with the base of the ladder 4 feet (ft.) away from the wall. She decided that a different, 10-foot ladder needed to be used. If Ms. Lund wants the longer ladder to rest against the wall at the same angle as the shorter ladder, about how far away from the wall should she place its base?

A. 5.7 ft.

B. 6.0 ft.

C. 7.0 ft.

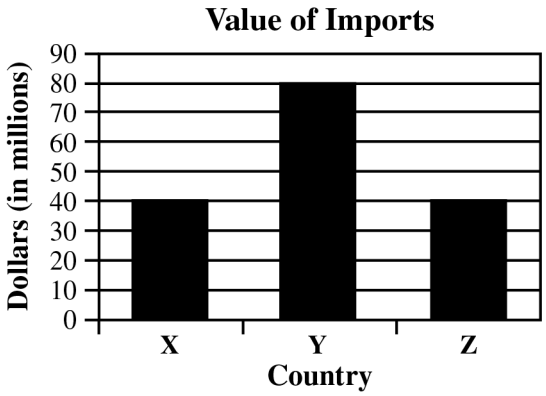
D. 8.1 ft.

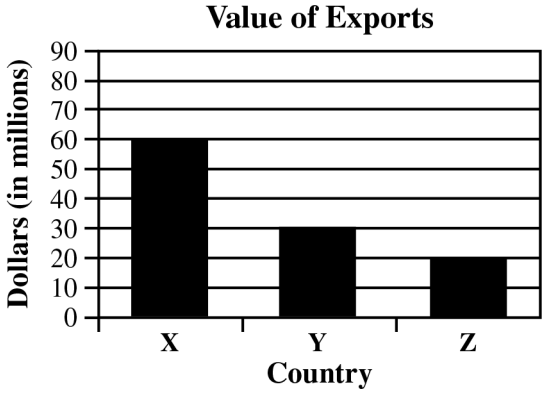
E. 17.5 ft.

GO ON

Question 8 refers to the following information.

The graphs below show the total value (in U.S. dollars) of the imports and exports of Country W with its only three trade partners, Countries X, Y, and Z, in a recent year.





8

What percent of Country W's total imports was from Country X?

A. 20

B. 25

C. 33

D. 40

E. 50

9

What is the solution to $3x^2 - 2x + 4 = 0$?

A. $x = \dfrac{-1 \pm i\sqrt{11}}{3}$

B. $x = \dfrac{1 \pm i\sqrt{11}}{3}$

C. $x = \dfrac{1 \pm 2i\sqrt{11}}{3}$

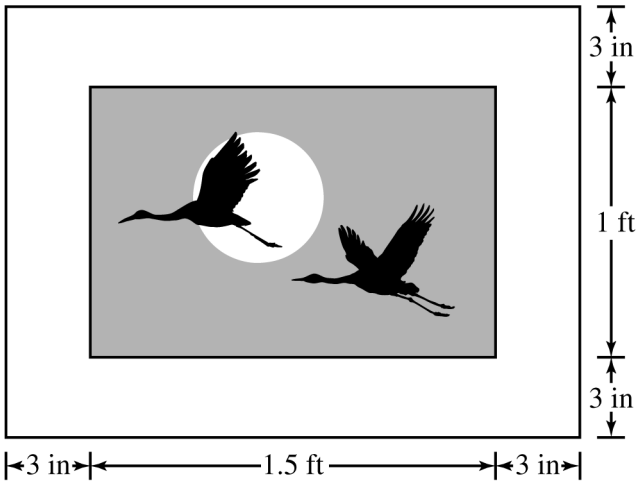
D. $x = \dfrac{1 \pm \sqrt{13}}{3}$

E. $x = \dfrac{1 \pm i\sqrt{13}}{3}$

GO ON

10

An artist has all her paintings framed with a 3-inch-wide border. She has a painting to be framed that is 1 foot by 1.5 feet.



Which of the following measurements represents the perimeter of the painting with the border?

A. 2.5 feet

B. 3 feet

C. 5 feet

D. 6 feet

E. 7 feet

11

It takes 1 bag of chocolate chips to make 72 cookies. How many bags does it take to make 18 dozen cookies?

A. 2

B. 3

C. 4

D. 6

E. 36

12

Each time a coin is flipped, it has a 50% chance of landing on heads and a 50% chance of landing on tails. The coin will be flipped 3 times. What is the probability it will land on tails all 3 times?

A. $\frac{1}{8}$

B. $\frac{1}{6}$

C. $\frac{1}{4}$

D. $\frac{1}{3}$

E. $\frac{1}{2}$

13

An electronics store offers to finance the purchase of any single item with zero interest for one year, with a down payment of \$60. The rest of the purchase price will be split evenly into four quarterly payments. Which of the following equations represents the relationship between the amount, a dollars, of each quarterly payment and the purchase price, s dollars, of an item under this offer?

A. $a = \frac{s - 60}{4}$

B. $a = \frac{s + 60}{4}$

C. $a = \frac{s}{4} - 60$

D. $a = 4s - 60$

E. $a = 4s + 60$

GO ON

14

Let $g(x) = x^2 - 1$. What is the average rate of change of the function from $x = 3$ to $x = 6$?

A. $\frac{1}{9}$

B. 2

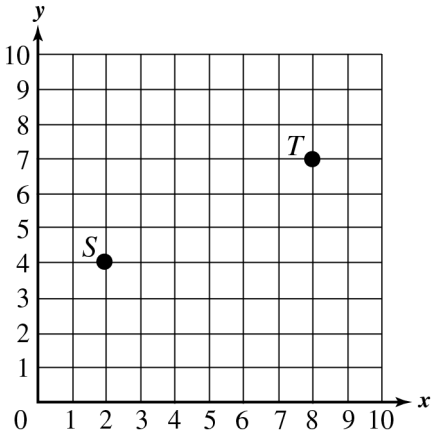
C. $\frac{8}{3}$

D. $\frac{35}{8}$

E. 9

15

Which expression gives the distance between point S and point T?



A. $\sqrt{10^2 + 11^2}$

B. $\sqrt{6^2 + 3^2}$

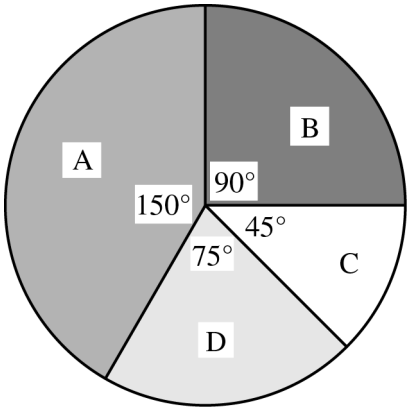
C. $\sqrt{4^2 + 7^2}$

D. $\sqrt{2^2 + 8^2}$

E. $\sqrt{2^2 + 1^2}$

16

Melody is making a spinner with a 12-inch diameter for a game. She will divide the following spinner into sections.



What is the area, in square inches, of section C?

A. 144π

B. 36π

C. 4.5π

D. 3.2π

E. 0.8π

GO ON

17

A lighting designer created a program for the opening of a stage show. When the show starts, 10 lights are on. Every 30 seconds, 1 more light comes on. If t is time in minutes and L is the number of lights that are on, which function best models the number of lights that are on after t minutes of the stage show?

A. $L = \frac{1}{2}t + 10$

B. $L = 2t + 10$

C. $L = 30t + 10$

D. $L = 10t + \frac{1}{2}$

E. $L = 10t + 30$

18

A radio station ordered hats and coffee mugs to give away as prizes. A total of 1,000 of these items were ordered, and 3 times as many coffee mugs were ordered as hats. In which equation does h represent the number of hats ordered?

A. $h = 1{,}000(3)$

B. $h = 1{,}000(4)$

C. $h = \frac{1{,}000}{2}$

D. $h = \frac{1{,}000}{3}$

E. $h = \frac{1{,}000}{4}$

19

Volunteers are needed to do a total of 60 hours of work at a concert. The shortest volunteer shift is 2 hours, and the longest is 3 hours. Which inequality shows v, the number of volunteers needed?

A. $20 < v > 30$

B. $20 < v < 30$

C. $20 \leq v \geq 30$

D. $20 \geq v \geq 30$

E. $20 \leq v \leq 30$

20

Jenna bought some apples for $1.25 per pound and some avocados for $4 per pound. Altogether, she spent $14.25 for 7 pounds of apples and avocados. What is the total number of pounds of avocados Jenna bought?

A. 1

B. 2

C. 3

D. 4

E. 5

GO ON

21

Khalid is 56 years old. Cathleen is 6 years older than Brody. The sum of Cathleen's and Brody's ages is half Khalid's age. How old is Cathleen?

A. 62

B. 34

C. 22

D. 17

E. 11

22

A backpack is on sale for 25% off. After the discount is taken, a 7% sales tax is applied. If the original price of the backpack is p, which equation represents the final cost, c, in dollars, of the backpack?

A. $c = p(0.25)$

B. $c = p(1.07)$

C. $c = p(0.25)(0.07)$

D. $c = p(0.75)(0.07)$

E. $c = p(0.75)(1.07)$

GO ON

Questions 23 and 24 refer to the following information.

A newspaper published the table below. It shows a sample of the daily wages paid by 5 local factories. Each factory reported the wages of 5 workers.

Factory A	Factory B	Factory C	Factory D	Factory E
$140	$130	$100	$200	$160
$160	$220	$300	$210	$200
$200	$120	$250	$205	$150
$190	$150	$180	$220	$170
$180	$140	$190	$220	$190

23

What is the median daily wage reported by Factory D?

A. $200

B. $210

C. $205

D. $220

E. $211

24

The worker at Factory A who made $180 per day received a raise and now makes $195 per day. If this value were changed in the table, how much would the average wage increase for Factory A as a result of this raise?

A. $ 3.00

B. $ 3.50

C. $15.00

D. $26.50

E. $39.00

25

Lydia and Claudia have the same number of charms in their collections. Lydia started with 6 charms and bought 3 more packs. Claudia started with 9 charms and bought 2 more packs. If each pack had x charms, which equation can be used to find x?

A. $x = (2 + 3) - (6 + 9)$

B. $x = 6 + 3 + 9 + 2$

C. $6x + 3 = 9x + 2$

D. $3x - 2x = 6 + 9$

E. $3x + 6 = 2x + 9$

STOP

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Sequence Number	Correct Response	Content Category	Question Difficulty
1	B	IV. Algebraic Concepts	Medium
Rationale			
Option B is correct because $f(x) = x^2 + 2x - 24$ $f(x) = (x + 6)(x - 4)$ $x + 6 = 0$ or $x - 4 = 0$ $x = -6$ or $x = 4$			

Sequence Number	Correct Response	Content Category	Question Difficulty
2	A	IV. Algebraic Concepts	Easy
Rationale			
Option A is correct because $5x^2 + 3x - 7 + 12x + 12 = (5)x^2 + (3 + 12)x + (-7 + 12) = 5x^2 + 15x + 5$.			

Sequence Number	Correct Response	Content Category	Question Difficulty
3	D	I. Numbers and Operations on Numbers	Medium
Rationale			
Option D is correct because $4(6) + 5(15) < 100$ $24 + 75 < 100$ $99 < 100$			

Sequence Number	Correct Response	Content Category	Question Difficulty
4	A	IV. Algebraic Concepts	Medium
Rationale			
Option A is correct because graph I keeps rising from left to right and so does graph IV.			

Sequence Number	Correct Response	Content Category	Question Difficulty
5	C	I. Numbers and Operations on Numbers	Medium
Rationale			
Option C is correct because $\frac{75}{120} = \frac{100}{x}$ $75x = 12{,}000$ $x = 160$			

Sequence Number	Correct Response	Content Category	Question Difficulty
6	C	I. Numbers and Operations on Numbers	Medium
Rationale			
Option C is correct because $25 \text{ miles} \times \frac{1 \text{ hour}}{10 \text{ miles}} = 2.5 \text{ hours}$; $11{:}00 - 2{:}30 = 8{:}30$. So the time they would need to leave would be 8:30 A.M.			

Sequence Number	Correct Response	Content Category	Question Difficulty
7	A	II. Measurement/Geometry	Hard
Rationale			
Option A is correct because $\frac{7}{4} = \frac{10}{x}$ $7x = 40$ $x \approx 5.7$			

Sequence Number	Correct Response	Content Category	Question Difficulty
8	B	I. Numbers and Operations on Numbers	Medium
Rationale			
Option B is correct because $40 + 80 + 40 = 160$ $\frac{40}{160} = \frac{1}{4} = 0.25 = 25\%$			

Sequence Number	Correct Response	Content Category	Question Difficulty
9	B	IV. Algebraic Concepts	Hard

Rationale

Option B is correct because

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(3)(4)}}{2(3)}$$

$$x = \frac{2 \pm \sqrt{4 - 48}}{6}$$

$$x = \frac{2 \pm \sqrt{-44}}{6}$$

$$x = \frac{2 \pm 2i\sqrt{11}}{6}$$

$$x = \frac{1 \pm i\sqrt{11}}{3}$$

Sequence Number	Correct Response	Content Category	Question Difficulty
10	E	I. Numbers and Operations on Numbers	Medium

Rationale

Option E is correct because

$$\text{length} = 1.5 \text{ feet} + 3 \text{ inches} + 3 \text{ inches} = 1.5 \text{ feet} + 6 \text{ inches}$$

$$6 \text{ inches} \times \frac{1 \text{ foot}}{12 \text{ inches}} = 0.5 \text{ foot}$$

$$\text{length} = 1.5 \text{ feet} + 0.5 \text{ foot}$$

$$\text{length} = 2.0 \text{ feet}$$

$$\text{width} = 1 \text{ foot} + 6 \text{ inches}$$

$$\text{width} = 1.5 \text{ feet}$$

$$p = 2l + 2w$$

$$p = 2(2 \text{ feet}) + 2(1.5 \text{ feet})$$

$$p = 4 \text{ feet} + 3 \text{ feet}$$

$$p = 7 \text{ feet}$$

Sequence Number	Correct Response	Content Category	Question Difficulty
11	B	I. Numbers and Operations on Numbers	Medium
Rationale			
Option B is correct because $18 \text{ dozen} \times \frac{12}{1 \text{ dozen}} = 216$ $\frac{72}{1} = \frac{216}{x}$ $72x = 216$ $x = 3$			

Sequence Number	Correct Response	Content Category	Question Difficulty
12	A	III. Data Analysis/Probability/Statistics	Easy
Rationale			
Option A is correct because $50\% = \frac{1}{2}$ and $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$.			

Sequence Number	Correct Response	Content Category	Question Difficulty
13	A	IV. Algebraic Concepts	Medium
Rationale			
Option A is correct because the amount paid, a, each quarter is equal to the purchase price, s, less 60 dollars divided by four equal payments, or $a = \frac{s - 60}{4}$.			

Sequence Number	Correct Response	Content Category	Question Difficulty
14	E	IV. Algebraic Concepts	Medium
Rationale			
Option E is correct because using $g(x) = x^2 - 1$ from $x = 3$ to $x = 6$, then $g(3) = 3^2 - 1 = 8$ and $g(6) = 6^2 - 1 = 35$. $\frac{35 - 8}{6 - 3} = \frac{27}{3} = 9$.			

Sequence Number	Correct Response	Content Category	Question Difficulty
15	B	II. Measurement/Geometry	Medium
Rationale			
Option B is correct because there are 6 horizontal units between S and T. There are 3 vertical units between S and T. Therefore, the distance between S and T is calculated using the Pythagorean Theorem, $ST^2 = 6^2 + 3^2$. Solving for ST, $ST = \sqrt{6^2 + 3^2}$ units.			

Sequence Number	Correct Response	Content Category	Question Difficulty
16	C	II. Measurement/Geometry	Medium
Rationale			
Option C is correct because 45° is $\frac{1}{8}$ of a circle $\left[\frac{45}{360} = \frac{1}{8}\right]$. So $\frac{45}{360}\pi(6)^2 = \frac{1}{8}\pi(36) = 4.5\pi$			

Sequence Number	Correct Response	Content Category	Question Difficulty
17	B	IV. Algebraic Concepts	Hard
Rationale			
Option B is correct because the show started with 10 lights. That would be the y-intercept of the equation. The rate is 1 light per 30 seconds, which is equivalent to 2 lights per minute. Knowing the rate and the y-intercept, the equation of the line can be written as $y = mx + b$, or $L = 2t + 10$.			

Sequence Number	Correct Response	Content Category	Question Difficulty
18	E	IV. Algebraic Concepts	Hard
Rationale			
Option E is correct because the total number of prizes was 1,000, so $h + c = 1{,}000$. Since there are 3 times as many coffee mugs as hats, $c = 3h$. Substituting into the first equation, the equation becomes $h + 3h = 1{,}000$. This results in $4h = 1{,}000$ or $h = \frac{1{,}000}{4}$.			

Sequence Number	Correct Response	Content Category	Question Difficulty
19	E	IV. Algebraic Concepts	Hard

Rationale

Option E is correct because if everyone worked 2 hours, then $vT \leq 60$, or $v(2) \leq 60$, or $v \leq 30$. If everyone worked 3 hours, then $vT \geq 60$, or $v(3) \geq 60$, or $v \geq 20$. So the inequality representing the number of volunteers would be $20 \leq v \leq 30$.

Sequence Number	Correct Response	Content Category	Question Difficulty
20	B	IV. Algebraic Concepts	Medium

Rationale

Option B is correct because if P represents the number of apples and V represents the number of avocados, then

$$1.25P + 4.00V = 14.25$$
$$125P + 400V = 1{,}425$$
$$P + V = 7$$
$$P = 7 - V$$
$$125(7 - V) + 400V = 1{,}425$$
$$875 - 125V + 400V = 1{,}425$$
$$275V = 550$$
$$V = 2$$

Sequence Number	Correct Response	Content Category	Question Difficulty
21	D	IV. Algebraic Concepts	Medium

Rationale

Option D is correct because if Cathleen's age is C, Brody's age is B, and Khalid's age is 56, then $C = B + 6$, and $C + B = \frac{1}{2}(56)$ so substituting in for C,

$$2B + 6 = 28$$
$$2B = 22$$
$$B = 11$$
$$C = B + 6$$
$$C = 11 + 6$$
$$C = 17$$

Sequence Number	Correct Response	Content Category	Question Difficulty
22	E	IV. Algebraic Concepts	Hard
Rationale			
Option E is correct because 25% off the original price, p, is equivalent to $75\% \times p$, or $0.75p$. The tax on the backpack is 7% of the new price or $0.07(0.75p)$. Therefore, the cost of the backpack, including the discount and tax, should be $c = 0.75p + 0.07(0.75p)$, or $c = 1.07(0.75p)$, or $c = p(0.75)(1.07)$.			

Sequence Number	Correct Response	Content Category	Question Difficulty
23	B	III. Data Analysis/Probability/Statistics	Medium
Rationale			
Option B is correct because if the values are written in order, the result is 200, 205, 210, 220, 220. Then the middle number is chosen for the median, which is \$210.			

Sequence Number	Correct Response	Content Category	Question Difficulty
24	A	III. Data Analysis/Probability/Statistics	Medium
Rationale			
Option A is correct because an increase of \$15 in the total daily wages of the workers divided equally by the 5 workers results in the average increasing by \$3.			

Sequence Number	Correct Response	Content Category	Question Difficulty
25	E	IV. Algebraic Concepts	Medium
Rationale			
Option E is correct because if Lydia started with 6 charms and increased the number of charms by x charms per package times 3 packages, Lydia now has $3x + 6$ charms. For the same reason, Claudia now has $2x + 9$ charms. Since the two people have the same number of charms, $3x + 6 = 2x + 9$.			

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