

Foudations 20 Final Review (ch. 5 to 8)

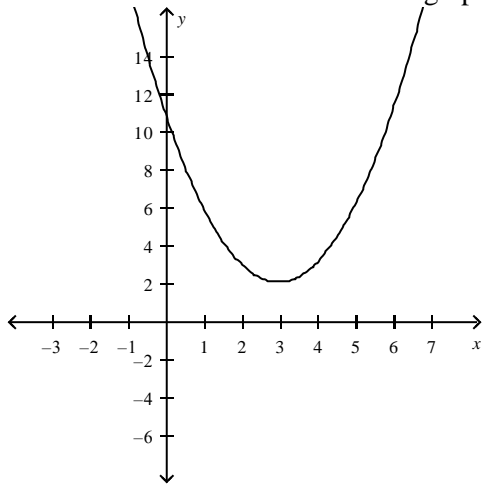
Multiple Choice

Identify the choice that best completes the statement or answers the question.

- ___ 1. What z-score corresponds to having 67.35% of the data to the right?
- $z = 0.45$
 - $z = 0.445$
 - $z = -0.45$
 - $z = -0.44$
- ___ 2. Environment Canada compiled data on the number of lightning strikes per square kilometre in Alberta and British Columbia towns from 1999 to 2008.
- | | | | | | |
|------|------|------|------|------|------|
| 0.42 | 0.04 | 0.81 | 0.40 | 0.03 | 0.74 |
| 0.28 | 0.03 | 0.70 | 0.23 | 0.03 | 0.66 |
| 0.13 | 0.02 | 0.61 | 0.12 | 0.01 | 0.58 |
| 0.10 | 0.00 | 0.49 | 0.07 | 1.08 | 0.43 |
| 0.05 | 0.91 | 0.42 | 0.04 | 0.88 | |

Determine the mean, to two decimal places.

- 0.12
 - 0.00
 - 0.36
 - 0.60
- ___ 3. For which inequality is $(-5, 1)$ a possible solution?
- $y > 9$
 - $y - 2x \geq 10$
 - $y \leq -9 + 2x$
 - $y < x - 2$
- ___ 4. Which set of data is correct for this graph?



	Axis of Symmetry	Vertex	Domain	Range
A.	$x = 3$	$(3, 2)$	$x \in \mathbf{R}$	$2 \leq y$
B.	$x = 3$	$(2, 3)$	$x \in \mathbf{R}$	$y \in \mathbf{R}$
C.	$x = 2$	$(2, 3)$	$-1 \leq x \leq 7$	$2 \leq y$
D.	$x = 3$	$(3, 2)$	$-2 \leq x \leq 8$	$0 \leq y$

- Set A.
 - Set C.
 - Set D.
 - Set B.
- ___ 5. Which quadratic function has a minimum?
- $y = (x - 2)^2 + 11$
 - $y = -(x + 1)^2 - 50$
 - $y = -2(x - 3)^2 + 1$
 - $y = -(x - 2)^2 - 4$

___ 6. Solve $m^2 - 10m + 16 = 0$ by factoring.

- a. $m = 4, m = 4$
- b. $m = -8, m = -2$
- c. $m = -4, m = -4$
- d. $m = 8, m = 2$

___ 7. Which set of data is correct for the quadratic relation $f(x) = (x + 45)^2 + 60$?

	Direction parabola opens	Vertex	Axis of Symmetry
A.	upward	$(-60, -45)$	$x = -60$
B.	downward	$(60, 45)$	$x = 60$
C.	upward	$(-45, 60)$	$x = -45$
D.	downward	$(45, 60)$	$x = 45$

- a. Set A.
- b. Set D.
- c. Set B.
- d. Set C.

___ 8. Lucas drove 116 km in 1 h 45 min and used 14 L of fuel. Which equation determines his average fuel consumption, C , in litres per 100 km?

- a. $C = \left(\frac{116 \text{ km}}{1.75 \text{ h}} \right) (14 \text{ L})$
- b. $C = \frac{116 \text{ km} \cdot 14 \text{ L}}{100 \text{ km}}$
- c. $C = (1.75 \text{ h}) \left(\frac{14 \text{ L}}{116 \text{ km}} \right)$
- d. $C = \left(\frac{14 \text{ L}}{116 \text{ km}} \right) (100)$

___ 9. A picture is 46 cm by 32 cm. A scale diagram of the picture must fit in a space that is 3 m by 2 m. Which scale would be the most reasonable one to use for the scale diagram?

- a. 60%
- b. 1 cm:60 cm
- c. 6 cm:1 m
- d. 1 cm:6 cm

Short Answer

10. Determine the z -score for the given values.
 $\mu = 360, \sigma = 20, x = 315$

11. Calculate the raw score for the given values.
 $\mu = 86, \sigma = 13.5, z = -0.27$

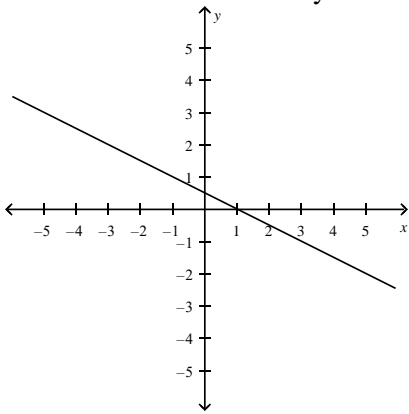
12. Determine the percent of data:

- a) to the right of the z -score: $z = -0.19$.
- b) to the left of the z -score: $z = 1.13$
- c) between the z -scores of $z = -0.34$ and $z = 0.81$

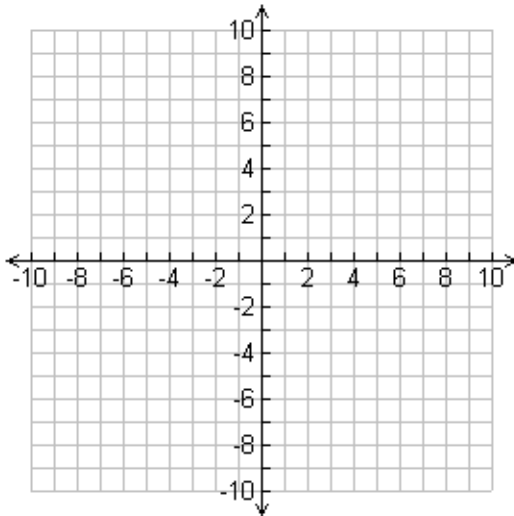
13. The results of a survey have a confidence interval of 29% to 37%, 9 times out of 10. Determine the margin of error.

14. A survey regarding people's perceptions of car manufacturers' reliability found that 66% plus or minus 5% of respondents believe that Japanese cars are the most reliable, 95 times out of 100. In a population of 250,000, how many people would say they believe Japanese cars are the most reliable?

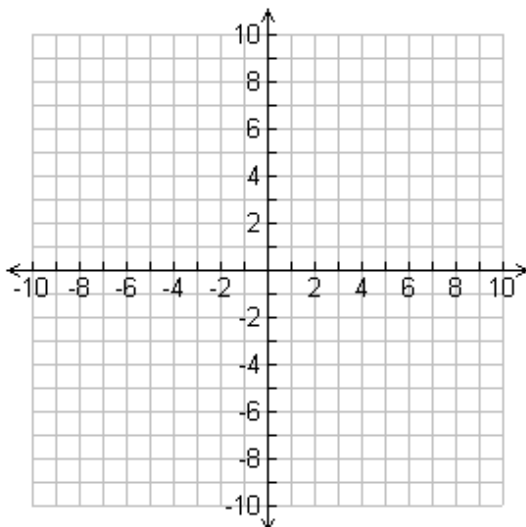
15. Which side of the boundary line is the solution set for the linear inequality $x + 2y - 1 > 0$?



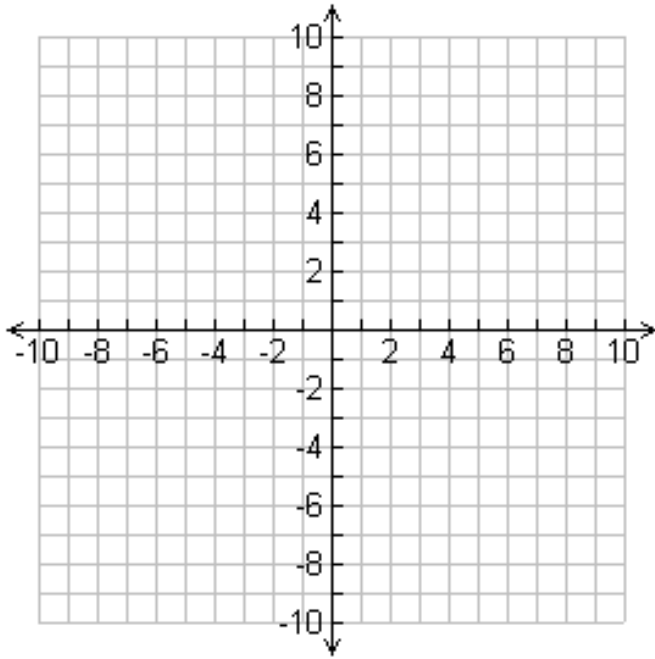
16. Graph the solution set for the following system of inequalities.
 $\{(x, y) \mid x + 2y \leq 2, y + 2 > x, x \in \mathbb{R}, y \in \mathbb{R}\}$



17. Determine the system of linear inequalities represented here:



18. Sketch the graph of $f(x) = -(x - 4)^2 + 2$ using a minimum of 5 points. Label the vertex with its coordinates. Draw and label the axis of symmetry with its equation. Then state the domain and range of the function.



19. Solve the following quadratic equations using the quadratic formula. State the solution as exact values.

a) $x^2 - 2x - 1 = 0$

b) $3x^2 - 8x + 2 = 0$

20. Solve the following quadratic equations by factoring. State the solution as integers or fractions in lowest terms.

a) $x^2 - 2x + 1 = 0$

b) $x^2 + 2x - 15 = 0$

c) $4x^2 - 25 = 0$

d) $2x^2 + 9x - 5 = 0$

21. Jean wants to defrost a frozen turkey that weighs 9 kg by putting it in cold water. His cookbook says to allow 1.5 h of thawing time for every 3 lb of turkey. How many hours will it take to thaw the turkey?
22. The actual width of a garage door is 3 m. In a scale diagram, the width of the garage door is 20 cm. What scale factor was used? Give your answer as a percent to one decimal place.
23. The radius of a circle with an area of 8 cm^2 will be enlarged by a scale factor of 4. Determine the area of the enlarged circle.
24. A 1:165 scale model of a Ferris wheel is 38.4 cm tall and has a diameter of 36.1 cm. Determine the actual dimensions of the Ferris wheel.
25. An orange has a diameter of 8 cm. A honeydew melon has a diameter of 18 cm. Estimate how many times greater the volume of a melon is, compared with the volume of an orange.

Problem

26. A hardware manufacturer produces bolts that has an average length of 1.22 in., with a standard deviation of 0.02 in. To be sold, all bolts must have a length between 1.20 in. and 1.25 in. What percent, to the nearest whole number, of the total production can be sold?

27. Monroe and Connie drove from Winnipeg to Lethbridge for a music festival. They took turns driving, so they only needed to stop for gas or food. They drove the 1202 km distance in 15 h 34 min. They used 127.8 L of fuel, which cost \$142.54.

a) Determine their average speed to the nearest tenth of a kilometre per hour.

b) Determine their average fuel consumption per 100 km.

c) What was the average cost of a litre of gas?

28. Jasmine throws a softball to Lauren. The height of the ball, $h(t)$, in metres t seconds after Jasmine's throw can be modelled as $h(t) = -4.9(t - 0.8)^2 + 4.5$.

a) What is the height of the ball 0.25 seconds after Jasmine throws it?

b) What is the initial height of the ball?

c) How long does it take the ball to reach its maximum height?

d) What is the maximum height of the ball?

e) What is the axis of symmetry for the function?

f) What are the domain and range of the function?

29. Michaela collects stamps and coins.

- She has at most 100 stamps and at most 70 coins, but at least ten of each.
- There were no more than 150 items in total.
- Each stamp cost her 10¢ and each coin cost her 50¢

a) Create an algebraic model to represent the situation.

b) Create an objective function to determine the maximum and minimum amount of money that Michaela spent on her collection.

c) Graph the system of inequalities and determine the feasible region.



d) Determine the optimal solutions.

Foundations 20 Final Review (ch. 5 to 8) Answer Key

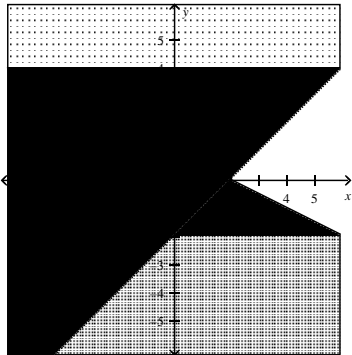
MULTIPLE CHOICE

- | | | |
|------|------|------|
| 1. C | 2. C | 3. B |
| 4. A | 5. A | 6. D |
| 7. D | 8. D | 9. D |

SHORT ANSWER

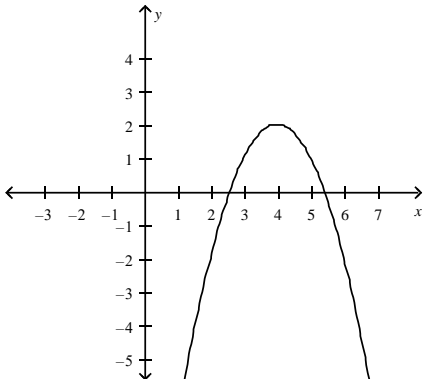
10. -2.25 11. 82.355
12. a) 57.53% b) 87.08% c) 42.41%
13. $\pm 4\%$ 14. Between 152,500 and 177,500
15. above the line

16.



17. $y < 6, \quad y \geq 3x + 6$

18.



domain : $\{x/x \in \mathbb{R}\}$ Range : $\{y|y \leq 2, y \in \mathbb{R}\}$

19. a) $x = 1 + \sqrt{2}, x = 1 - \sqrt{2}$

b) $x = \frac{4 \pm \sqrt{10}}{3}$

20. a) $x = 1$

b) $x = -5, x = 3$

c) $x = 5/2, x = -5/2$

d) $x = 1/2, x = -5$

21. 10 h

22. 6.7%

23. 128 cm²

24. 63.4 m tall

59.6 m in diameter

25. about 11 times greater

PROBLEM

26. Determine the two z-scores:

$$z_1 = \frac{1.20 - 1.22}{0.02}$$

$$z_2 = \frac{1.25 - 1.22}{0.02}$$

$$z_1 = -1$$

$$z_2 = 1.5$$

The z-scores are -1 and 1.5.

Using the z-score table, $93.32\% - 15.87\% = 77.45\%$ of the data is between these two z-scores. About 77% of the total production can be sold.

27. a) $15 \text{ h } 34 \text{ min} = 15 \text{ h} + (34 \text{ min})\left(\frac{1 \text{ h}}{60 \text{ min}}\right)$

$15 \text{ h } 34 \text{ min} = 15 \text{ h} + 0.566\dots \text{ h}$

$15 \text{ h } 34 \text{ min} = 15.566\dots \text{ h}$

Rate = $\frac{\text{distance}}{\text{time}}$

Rate = $\frac{1202 \text{ km}}{15.566\dots \text{ h}}$

Rate = $77.216\dots \text{ km/h}$

Their average speed was 77.2 km/h.

b) Rate of fuel use = $\frac{\text{volume of gas}}{\text{distance}}$

Rate of fuel use = $\frac{127.8 \text{ L}}{1202 \text{ km}}$

Rate of fuel use = $0.106\dots \text{ L/km}$

Rate of fuel use = $0.106\dots \text{ L/km} \left(\frac{100}{100}\right)$

Rate of fuel use = $10.632\dots \text{ L}/100 \text{ km}$

Their average fuel consumption was 10.6 L/100 km.

c) Unit cost = $\frac{\text{total cost}}{\text{volume of gas}}$

Unit cost = $\frac{\$142.54}{127.8 \text{ L}}$

Unit cost = $\$1.12 / \text{L}$

The average fuel cost was \$1.12/L.

28. a) $h = 3.01775 \text{ m}$ b) $h = 1.364 \text{ m}$ c) 0.8 s d) 4.5 m
 e) $t = 0.8$ f) Domain: time ≥ 0 seconds, Range : height between 0 m and 4.5 m

29. a) $c \geq 10, s \geq 10, c \leq 70, s \leq 100, c + s \leq 150$
 b) Cost = $50c + 10s$
 c)



- d) 80 stamps and 70 coins for maximum cost of \$43.00
 10 stamps and 10 coins for minimum cost of \$6.00