

MCR3U: Exam Review W24 - Multiple Choice

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

_____ 1. Which relation is a function?

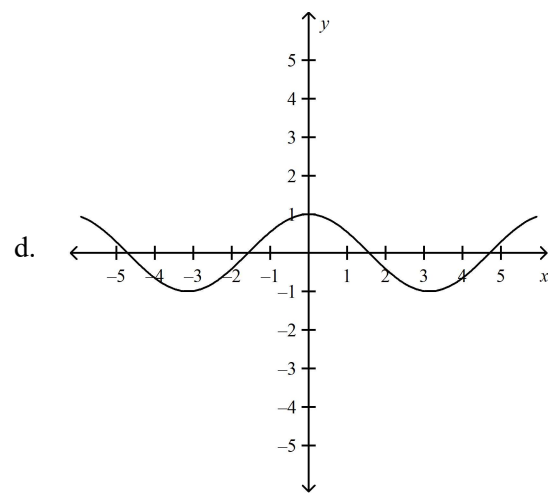
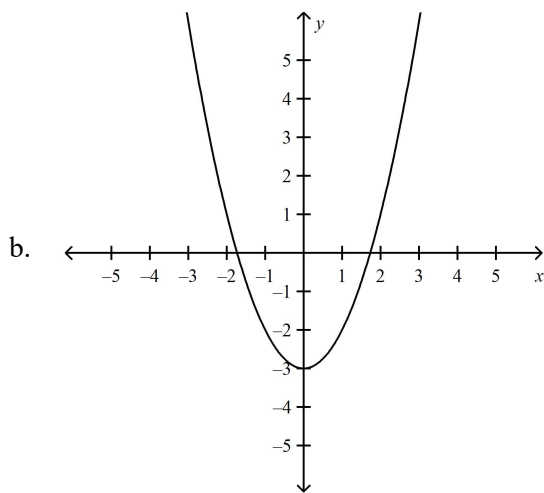
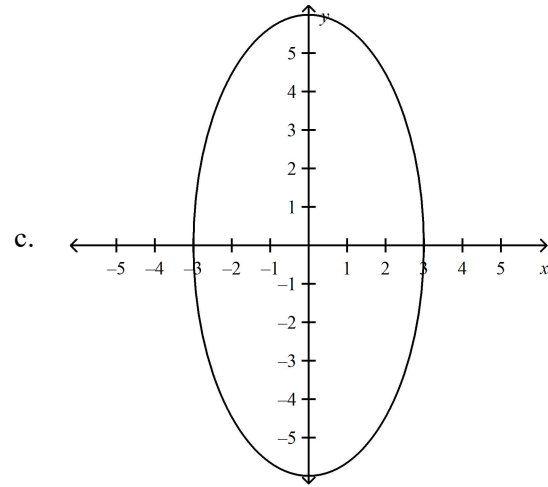
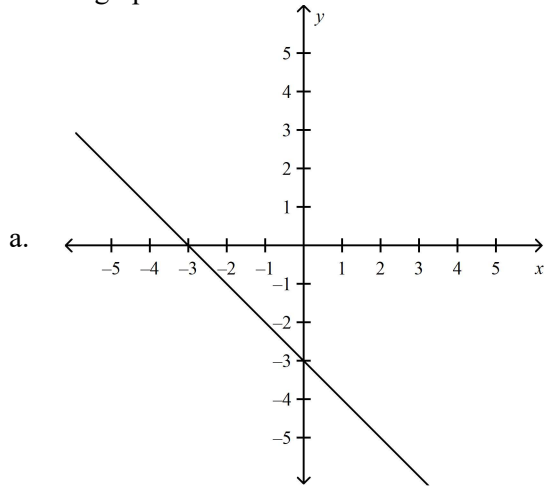
a. $\{(-3, -2), (-1, 3), (0, -2), (3, 4)\}$

c. $\{(-7, -7), (-2, 5), (-1, 6), (-2, -5)\}$

b. $\{(0, 1), (3, 2), (5, -3), (0, 2)\}$

d. $\{(-4, -7), (-9, 5), (4, -2), (-9, 0)\}$

_____ 2. Which graph is not a function?



_____ 3. Evaluate $f(x) = -4x^2 + 7$ for $f(1) + f(-2)$.

a. -6

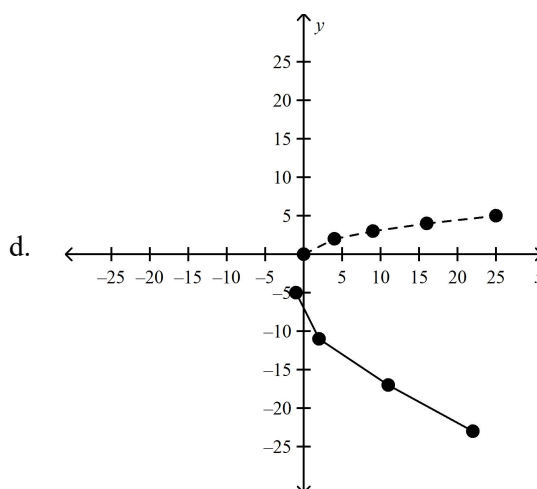
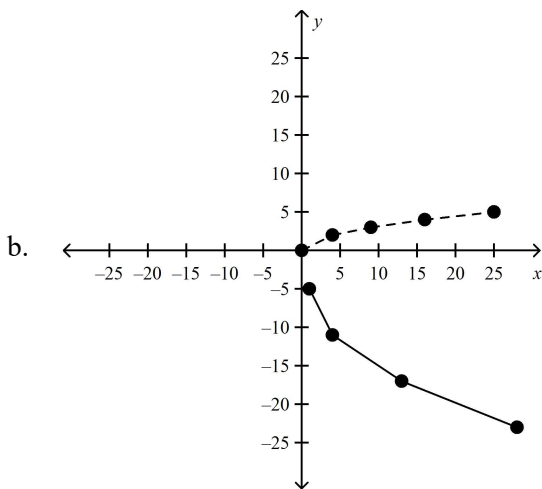
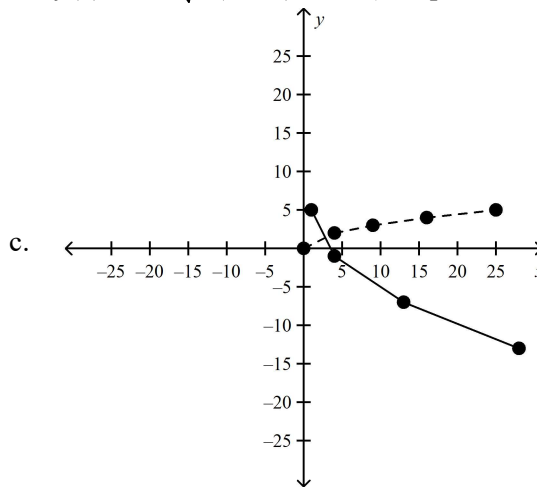
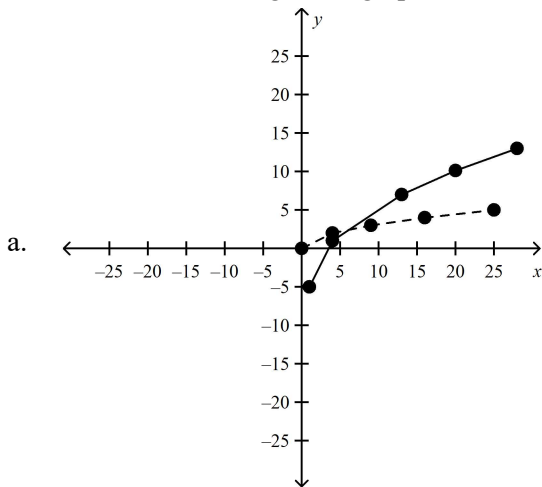
c. 26

b. 3

d. 94

- _____ 4. What are the domain and range of the function $f(x) = \sqrt{x - 5}$?
- | | |
|--|---|
| a. Domain = $\{x \in \mathbf{R}\}$
Range = $\{y \in \mathbf{R}\}$ | c. Domain = $\{x \in \mathbf{R} \mid x \geq 25\}$
Range = $\{y \in \mathbf{R} \mid y \geq 1\}$ |
| b. Domain = $\{x \in \mathbf{R} \mid x \geq 0\}$
Range = $\{y \in \mathbf{R} \mid y \geq 0\}$ | d. Domain = $\{x \in \mathbf{R} \mid x \geq 5\}$
Range = $\{y \in \mathbf{R} \mid y \geq 0\}$ |
- _____ 5. What are the domain and range of the relation that contains the points $\{(-16, -10), (-14, -8), (-11, -3), (-7, 4), (-1, -8)\}$?
- | |
|--|
| a. Domain = $\{-16, -14, -11, -10, -8, -7, -3, -1, 4\}$
Range = $\{-16, -14, -11, -10, -8, -7, -3, -1, 4\}$ |
| b. Domain = $\{-10, -8, -3, 4\}$
Range = $\{-16, -14, -11, -7, -1\}$ |
| c. Domain = $\{-16, -14, -11, -7, -1\}$
Range = $\{-10, -8, -3, 4\}$ |
| d. Domain = $\{-16 \leq x \leq -1\}$
Range = $\{-10 \leq y \leq 4\}$ |
- _____ 6. What are the domain and range of the function $d(x) = 5(x - 9)^2 - 32$?
- | | |
|--|---|
| a. Domain = $\{x \in \mathbf{R}\}$
Range = $\{y \in \mathbf{R} \mid y \geq 0\}$ | c. Domain = $\{x \in \mathbf{R}\}$
Range = $\{y \in \mathbf{R} \mid y \geq -842\}$ |
| b. Domain = $\{x \in \mathbf{R}\}$
Range = $\{y \in \mathbf{R} \mid y \geq -32\}$ | d. Domain = $\{x \in \mathbf{R}\}$
Range = $\{y \in \mathbf{R}\}$ |
- _____ 7. What are the domain and range of the function $f(x) = \sqrt{3 - x}$?
- | | |
|--|---|
| a. Domain = $\{x \in \mathbf{R}\}$
Range = $\{y \in \mathbf{R}\}$ | c. Domain = $\{x \in \mathbf{R} \mid x \geq 0\}$
Range = $\{y \in \mathbf{R} \mid y \geq 1\}$ |
| b. Domain = $\{x \in \mathbf{R} \mid x \leq 3\}$
Range = $\{y \in \mathbf{R} \mid y \geq 0\}$ | d. Domain = $\{x \in \mathbf{R} \mid 0 \leq x \leq 3\}$
Range = $\{y \in \mathbf{R} \mid y \geq 0\}$ |
- _____ 8. Which of the following is NOT a transformation that can be used to graph the function $f(x) = -6(x - 4)^2 + 2$ from the parent function?
- Vertical translation 2 units up
 - Horizontal compression by a factor of $\frac{1}{6}$
 - Reflection in the x -axis
 - Horizontal translation 4 units to the right

9. Which of the following is the graph of the function $f(x) = -2\sqrt{3(x-1)} + 5$? (The parent function is dotted.)



10. Simplify.

$$(6n^2 - 3n + 9) - (n^2 + 3n - 5)$$

a. $5n^2 + 4$

c. $7n^2 + 14$

b. $5n^2 - 6n + 14$

d. $7n^2 + 6n + 4$

11. A rectangle has length $(3x + 5)$ cm and width $(2x - 1)$ cm. What is the area of the rectangle?

a. $5x + 4 \text{ cm}^2$

c. $6x^2 + 7x - 5 \text{ cm}^2$

b. $6x^2 - 5 \text{ cm}^2$

d. $6x^2 + 13x - 5 \text{ cm}^2$

12. Expand and simplify.

$$(2x - 7)(-4x + 5)$$

a. $-8x^2 + 38x - 35$

c. $-8x^2 + 35$

b. $8x^2 - 38x - 35$

d. $-8x^2 + 18x + 35$

_____ 20. Simplify.

$$\frac{6r^3 - 6r^2}{r^4 + 5r^3} \div \frac{3r^2 - 15r + 12}{2r^2 + 2r - 40}$$

a. $\frac{9(r-1)(r-1)}{r(r+5)(r+5)}$

b. $\frac{-14}{r - 13r^2}$

c. $\frac{r}{9}$

d. $\frac{4}{r}$

_____ 21. Simplify.

$$\frac{7}{3g} + \frac{2}{5g^4}$$

a. $\frac{35g^3 + 6}{30g^4}$

b. $\frac{9}{8g^5}$

c. $\frac{41}{15g}$

d. $\frac{35g^3 + 6}{15g^4}$

_____ 22. Simplify.

$$\frac{4}{x+2} - \frac{3}{x-1}$$

a. $\frac{x-10}{(x+2)(x-1)}$

b. $\frac{1}{(x+2)(x-1)}$

c. 1

d. $\frac{1}{(x-1)}$

_____ 23. Simplify.

$$\frac{1}{t^2 + 5t + 4} + \frac{5t}{3t + 3}$$

a. $\frac{5t + 1}{(t+1)(t+7)}$

b. $\frac{5t^2 + 20t + 1}{3(t+4)(t+1)}$

c. $\frac{5t^2 + 20t + 3}{3(t+4)(t+1)}$

d. $\frac{5t}{3(t+4)(t+1)^2}$

_____ 24. Which of the following is true about the parabola for the function $f(x) = 3(x - 4)^2 + 5$?

a. The y-intercept is 0.

b. The vertex is (4, 5).

c. The axis of symmetry is $x = -4$.

d. The parabola opens down.

_____ 25. The points (-3, 5) and (7, 5) are the same distance from the vertex of their parabola. What is the equation for the axis of symmetry of the parabola?

a. $x = 5$

b. $x = 0$

c. $x = -3$

d. $x = 2$

___ 44. Which of the following is equivalent to the expression $\left(\frac{(3j^{-3}k^6)^4}{j^{-2}k^{-8}} \right)^{\frac{1}{2}}$?

a. $\frac{j^{20}}{162k^{64}}$

c. $\frac{9k^8}{j^5}$

b. $\frac{9k^{16}}{j^5}$

d. $\frac{40.5k^{16}}{j^5}$

___ 45. Which function describes exponential decay?

a. $f(x) = 6(1.01)^x$

c. $f(x) = 25(0.8)^x$

b. $f(x) = 3.4(40)^{2x}$

d. $f(x) = 8(17)^{\frac{x}{4}}$

___ 46. The growth in population of a town since 2000 is given, in thousands, by the function $P(n) = 36.5(1.06)^n$. In which year will the population expect to reach 70 000?

a. 2008

c. 2011

b. 2010

d. 2013

___ 47. A 300 g sample of thorium-234 has a half-life of 24 days. The mass of thorium, in grams, that remains after t

days can be modelled by $M(t) = 300\left(\frac{1}{2}\right)^{\frac{t}{24}}$. What mass will remain after 31 days?

a. 122.5 g

c. 177.5 g

b. 150 g

d. 193.75 g

___ 48. The population of a small village has grown at an annual rate of approximately 5.5%. How long will it take for its population of 3200 people to double at this growth rate?

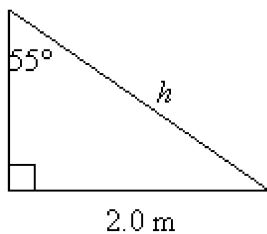
a. about 1.5 years

c. about 13 years

b. about 11 years

d. about 16 years

___ 49. Determine the length of the hypotenuse of the triangle to the nearest tenth of a metre.



a. 3.1 m

c. 2.1 m

b. 2.4 m

d. 2.9 m

58. Which of the following completes the missing step to the following proof.

$$\frac{\cos^2 \theta}{1 - \sin \theta} = 1 + \sin \theta$$

L.S.:

$$\frac{\cos^2 \theta}{1 - \sin \theta}$$

= ???

$$= \frac{(1 - \sin \theta)(1 + \sin \theta)}{1 - \sin \theta}$$

$$= 1 + \sin \theta$$

= R.S.

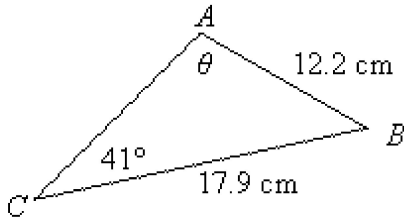
a. $\frac{1 - \sin^2 \theta}{1 - \sin \theta}$

b. $\frac{\cos^2 \theta + \sin^2 \theta}{1 - \sin \theta}$

c. $\frac{\cos^2 \theta}{1 - \sin \theta} \cdot \frac{1 + \sin \theta}{1 + \sin \theta}$

d. $\frac{\cos^2 \theta}{1 - \sin \theta} \cdot \frac{\sin^2 \theta}{\sin^2 \theta}$

59. Determine the measure of the angle θ to the nearest degree.



a. $\theta = 78^\circ$

b. $\theta = 72^\circ$

c. $\theta = 74^\circ$

d. $\theta = 69^\circ$

60. Determine $\angle B$ to the nearest degree for the triangle with the given information.

$a = 3.7 \text{ m}$, $b = 4.9 \text{ m}$, $\angle A = 46^\circ$

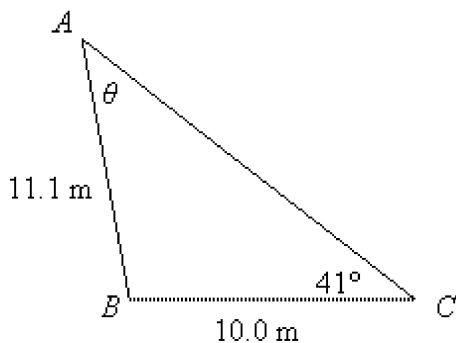
a. $\angle B = 59^\circ$

b. $\angle B = 53^\circ$

c. $\angle B = 72^\circ$

d. $\angle B = 61^\circ$

61. Determine the measure of the angle θ to the nearest degree.



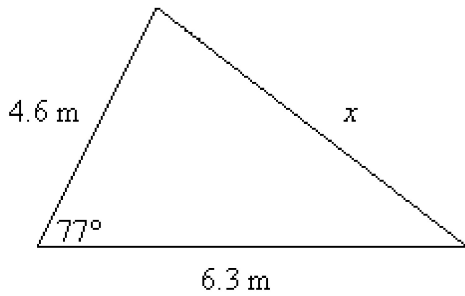
a. $\theta = 47^\circ$

b. $\theta = 39^\circ$

c. $\theta = 36^\circ$

d. $\theta = 41^\circ$

___ 62. Determine x to the nearest tenth of a metre.



- a. 7.5 m
- b. 7.9 m
- c. 6.2 m
- d. 6.9 m

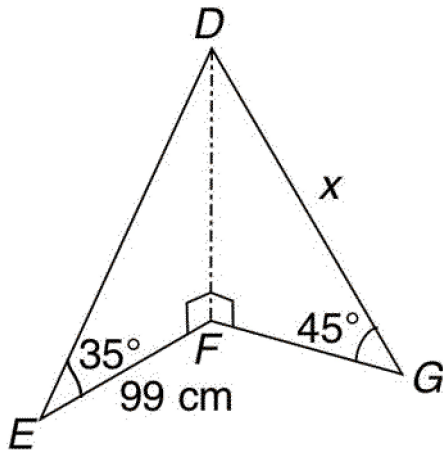
___ 63. In $\triangle ABC$, $a = 5.4$ m, $b = 7.2$ m, and $c = 10.0$ m. Determine $\angle C$ to the nearest degree.

- a. 92°
- b. 97°
- c. 104°
- d. 108°

___ 64. In $\triangle ABC$, $a = 9.4$ m, $b = 16.1$ m, and $\angle C = 68^\circ$. Determine $\angle B$ to the nearest degree.

- a. $\angle B = 77^\circ$
- b. $\angle B = 85^\circ$
- c. $\angle B = 67^\circ$
- d. $\angle B = 82^\circ$

___ 65. Determine the value of x to the nearest cm.



- a. 47 cm
- b. 68 cm
- c. 74 cm
- d. 98 cm

___ 66. Frank is riding a Ferris wheel, where t is time in seconds. Suppose the Ferris wheel is 20 m tall. Let $h(t) = 10\cos(12t)$ represent the height of Frank in m above or below the centre of the Ferris wheel. How long does it take to make two complete cycles on the Ferris wheel? Assume there are no stops.

- a. 60 s
- b. 30 s
- c. 45 s
- d. 120 s

___ 67. A spring bounces up and down according to the model $d(t) = 6\cos(60t) - 2$, where $d(t)$ is the displacement in cm from the rest position and t is time in seconds. What is the range?

- a. $\{y \in \mathbf{R} \mid -6 \leq y \leq 6\}$
- b. $\{y \in \mathbf{R} \mid -2 \leq y \leq 6\}$
- c. $\{y \in \mathbf{R} \mid -6 \leq y \leq 8\}$
- d. $\{y \in \mathbf{R} \mid -8 \leq y \leq 4\}$

