

**Sample Questions – Mathematics**

- 1 A bag contains seven yellow balls and three white balls. Trish selects three balls at random from the bag.

What is the probability that all three balls are yellow?

- (A)  $\frac{1}{180}$
- (B)  $\frac{7}{24}$
- (C)  $\frac{343}{1000}$
- (D)  $\frac{7}{10}$

- 2 If  $f''(x) > 0$  and  $f'(x) < 0$  for all  $x$  over a given domain, which of the following describes the graph of  $y = f(x)$ ?

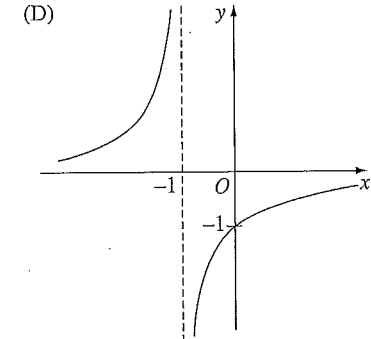
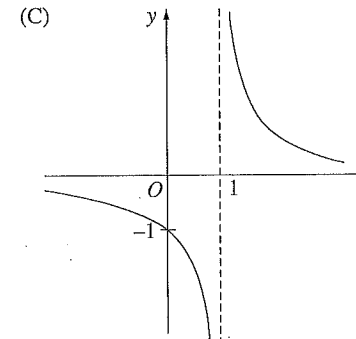
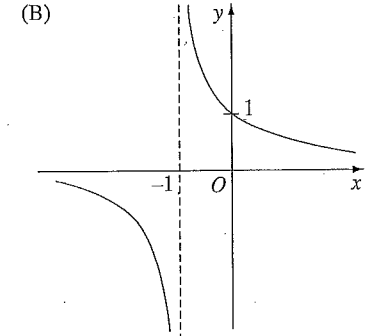
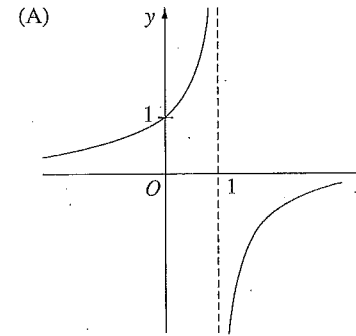
- (A) Increasing and concave up
- (B) Increasing and concave down
- (C) Decreasing and concave up
- (D) Decreasing and concave down

- 3 A parabola has its focus at  $(0, 4)$ . The equation of its directrix is  $x = -4$ .

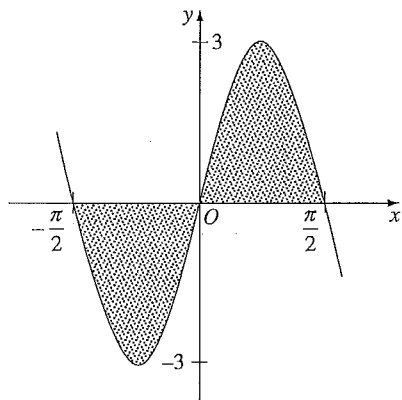
Which of the following is the equation of the parabola?

- (A)  $x^2 = 16y$
- (B)  $(x + 2)^2 = 8(y - 4)$
- (C)  $(y + 2)^2 = 8(x - 4)$
- (D)  $(y - 4)^2 = 8(x + 2)$

- 4 Which of the following graphs represents  $y = \frac{1}{1-x}$ ?



5 The diagram below shows the graph of the function  $f(x) = 3 \sin 2x$ .



Which expression gives the total shaded area?

(A)  $3 \int_{-3}^3 \sin 2x \, dx$

(B)  $6 \int_0^3 \sin 2x \, dx$

(C)  $3 \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin 2x \, dx$

(D)  $6 \int_0^{\frac{\pi}{2}} \sin 2x \, dx$